



Cattle Creek Wind Farm

MSES Impact Assessment Report

PREPARED FOR
RWE Cattle Creek Onshore Wind
Pty Ltd

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MSES Impact Assessment Report

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
ALA	Atlas of Living Australia
AO	Acceptable Outcome
AusWind	Australian Wind Energy Association
BACI	Before-After-Control-Impact
BBMP	Bird and Bat Management Plan
BHT	Broad Habitat Type
BESS	Battery Energy Storage System
BMP	Bushfire Management Plan
BUS	Bird Utilisation Survey
CEMP	Construction Environmental Management Plan
CRM	Collision Risk Model
CVMP	Cleared Vegetation Management Plan
DAMS	Development Assessment Mapping System
Dbh	Diameter at breast height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment, Water, Heritage and the Arts
DESI	Department of Environment, Science and Innovation
DETSI	Department of Environment, Tourism, Science and Innovation
DNRMMRRD	Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development
DRDMW	Department of Regional Development, Manufacturing and Water
DoR	Department of Resources
DPI	Department of Primary Industries
DSDIP	Department of State Development, Infrastructure and Planning
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning
EMP	Environmental Management Plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth Government)
ERM	Environmental Resources Management Australia Pty Ltd
ESCPC	Erosion and Sediment Control Plan - Construction
Fisheries Act	<i>Fisheries Act 1994</i>
HES	High Ecological Significance
HEV	High Ecological Value
IBRA	Interim Biogeographic Regionalisation for Australia

Acronym	Description
LGA	Local Government Area
LFC tool	Landscape Fragmentation and Connectivity tool
LIKT	Locally important koala trees
LoO	Likelihood of Occurrence
MCU	Material Change of Use
MHQA	Modified Habitat Quality Assessment
MSES	Matters of State Environmental Significance
NC Act	<i>Nature Conservation Act 1999</i> (Queensland Government)
PMST	Protected Matters Search Tool
PO	Performance Outcome
RE	Regional Ecosystem
RMP	Rehabilitation Management Plan
SDAP	State Development Assessment Provisions
SRI	Significant Residual Impact
SRIA	Significant Residual Impact Assessment
SRIG	Significant Residual Impact Guidelines
State Code 16	State Code 16: Native vegetation clearing
State Code 23	State Code 23: Windfarm development
State Code 27	State Code 27: Battery storage facility development
SWMP	Stormwater Management Plan
TEC	Threatened Ecological Community
VM Act	<i>Vegetation Management Act 1999</i> (Queensland Government)
VFMP	Vegetation and Fauna Management Plan
Water Act	<i>Water Act 2000</i> (Queensland Government)
WTG	Wind Turbine Generator

KEY DEFINITIONS

Key Term	Definition
The Proponent	RWE Cattle Creek Onshore Wind Pty Ltd
Proposed Development	Cattle Creek Wind Farm
Project Area	The wind farm and BESS project area comprising twelve separate lots, and adjacent road reserves with a total area of approximately 20,404.5 ha.
Disturbance Footprint	The area of maximum direct disturbance associated with the construction, operation and decommissioning of the Proposed Development in the Project Area, which is approximately 2,221.2 ha.
Locality	Refers to the Project Area and a 10 km buffer.

EXECUTIVE SUMMARY

Overview

RWE Cattle Creek Onshore Wind Pty Ltd (the Proponent) is developing the Cattle Creek Wind Farm (the Proposed Development) approximately 60km south-west of Dalby and 110 km west of Toowoomba, in the Toowoomba Regional Council and Western Downs Regional Council Local Government Areas (LGAs) of Queensland. The Proposed Development consists of the construction, operation, maintenance, and decommissioning of up to 135 Wind Turbine Generators (WTG), Battery Energy Storage System (BESS) of up to 450 MW and ancillary infrastructure.

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the Proponent to develop a Matters of State Environmental Significance (MSES) Impact Assessment Report (herein referred to as 'MSES IAR') for the Proposed Development. The MSES IAR will support a Development Application (DA) for a Material Change of Use (Wind Farm, Battery Storage Facility and ancillary infrastructure), and Operational Works (Clearing Native Vegetation). This Report includes responses to State Code 16: Native vegetation clearing (State Code 16), State Code 23: Wind farm development (State Code 23) and State Code 27: Battery storage facility development (State Code 27) as outlined within the State Development Assessment Provisions.

Overview of the Project Area

The Proposed Development will be located on freehold grazing land, over twelve separate lots and associated road reserves herein referred to as the 'Project Area'. The total area encompassing the Project Area is approximately 20,404.5 ha.

The Project Area is the land/properties containing the wind farm and BESS and is located within the Rural Zone of the Toowoomba Regional Council and Western Downs Regional Council, with the predominant land use being cattle grazing, animal husbandry and related rural activities. The Project Area has been influenced by historical agricultural activities, with large expanses of cleared grazing and cropping land and patches of remnant vegetation existing in a predominantly fragmented condition. The surrounding landscape within the locality (10 km buffer) has also been influenced by historical land clearing and cattle grazing, except for the surrounding State Forests, namely Kumbarilla State Forest, Western Creek State Forest and Dunmore State Forest.

Throughout the life of the Proposed Development, host properties will continue to use land for agricultural activities and it is anticipated that tracks established during construction of the Proposed Development will aid continued agricultural activities.

Overview of Disturbance Footprint

The layout of the Proposed Development has been, and will continue to be, refined through an iterative process, and informed by careful consideration of the ecological values, infrastructure constructability requirements, landowner considerations and viable wind resource. The Disturbance Footprint assessed in this MSES IAR incorporates the current best estimate of the area in which direct impact may occur during the construction, operation, and decommissioning of the Proposed Development, which has incorporated preliminary

engineering designs. The land where the Proposed Development infrastructure will be located (the Disturbance Footprint) occupies 2,221.2 ha, which equates to 10.9% of the Project Area.

Importantly, a commitment to pre-clearance surveys, prior to construction of the Proposed Development, will support micro-siting and adjustments of infrastructure within the Disturbance Footprint to further avoid MSES. This will result in the actual area of direct impact associated with the Proposed Development being less than the 2,221.2 ha Disturbance Footprint.

MSES and Significant Residual Impact Assessment

An assessment of potential direct and indirect impacts of the Proposed Development to MSES within the Project Area has been undertaken against the *Queensland Environmental Offsets Policy–Significant Residual Impact Guideline (SRIG)* (Department of Environment and Heritage Protection, 2014) for MSES and prescribed activities assessable under the *Sustainable Planning Act 2009* (Department of State Development, Infrastructure and Planning (DSDIP, 2014)). The guideline is to assist in deciding whether or not a prescribed activity will, or is likely to have significant residual impact on a MSES.

The MSES Significant Residual Impact Assessment (SRIA) has been undertaken for the MSES that are relevant to the Proposed Development, including regulated vegetation, connectivity areas and protected wildlife habitat for protected species that are known, likely or have the potential to occur within the Project Area. The MSES SRIA identified that the Proposed Development is likely to, or has the potential to result in a SRIA to the following:

- Regulated Vegetation that is a prescribed Regional Ecosystem (RE) (Category B – remnant) located within a defined distance of a relevant watercourse or relevant drainage feature; and
- Protected wildlife habitat, including potential habitat for diamond firetail (*Stagonopleura guttata*), glossy black-cockatoo (*Calyptrorhynchus lathami lathami*) and koala (*Phascolarctos cinereus*).

Offsets

Where significant residual impacts to MSES cannot be avoided, the Proponent is committed to offsetting the residual impacts to the relevant MSES. Offsets for the diamond firetail, glossy black-cockatoo and koala will be delivered by a land based offset as required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as these matters are also Matters of National Environmental Significance (MNES). Of note, greater glider habitat will also be utilised for Offsets under the EPBC Act for MNES.

The offsets required for Category B REs impacted within a defined distance of a *Vegetation Management Act 1999* (VM Act) watercourse or drainage feature will be secured according to the *Financial Settlement Offset Calculation Methodology in the QEOP 2014*. The Proponent will also offset the 'actual' area of habitat impacted (rather than the area of habitat overlapping with the Disturbance Footprint presented in this MSES IAR). The 'actual' area of impact will be further defined at the detailed design phase. This incentivises ongoing minimisation of impacts to MSES habitats to reduce the offset requirement and reduce the overall impact to MSES.

1. INTRODUCTION AND BACKGROUND

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the Proponent to prepare this Matters of State Environmental Significance (MSES) Impact Assessment Report (MSES IAR) for the Proposed Development to support a combined Development Application (DA) for Material Change of Use (Wind Farm, Battery Storage Facility and ancillary infrastructure) and Operational Works (Clearing Native Vegetation) under the Planning Act 2016 (Qld) (Planning Act).

The Proposed Development will be located on freehold grazing land, over twelve separate lots and associated road reserves ('Project Area'). The total area encompassing the Project Area is approximately 20,404.5 ha. The Project Area and regional context is shown on Figure 1-1.

For the purpose of this MSES IAR, the following definitions apply:

- **Project Area** - The host properties on which the Proposed Development will be undertaken, covering a total area of 20,404.5 ha; and
- **Disturbance Footprint** - The area where direct disturbance associated with construction, operation and decommissioning of the Proposed Development, within the Project Area, encompassing approximately 2,221.2 ha.

This MSES IAR documents:

- Relevant ecological values within the Project Area;
- Potential impacts of the Proposed Development on ecological values in the Project Area;
- Avoidance and minimisation measures for layout design; and
- Measures to mitigate impacts during construction and operation phases of the Proposed Development.

This MSES IAR outlines the results of the desktop assessment and findings from nine seasonal ecology surveys, undertaken in December 2023, February, May, July/August and December 2024, February, May, July and October 2025. The aim of this report is to describe the existing vegetation communities and habitats for protected species that occur or have the potential to occur within the Project Area, including an assessment of bird utilisation and collision risk. The focus of this assessment are those MSES that include vegetation communities, flora and fauna listed under the *Queensland Vegetation Management Act 1999* (VM Act) and/or the *Nature Conservation Act 1999* (NC Act).

Assessment of impacts to relevant MSES has been undertaken in Section 10, in accordance with the *Queensland Environmental Offsets Policy-Significant Residual Impact Guideline* (SRIG)(Department of Environment and Heritage Protection, 2014) for MSES and prescribed activities assessable under the *Sustainable Planning Act 2009* (Department of State Development, Infrastructure and Planning (DSDIP, 2014)).

1.1 SCOPE AND OBJECTIVES

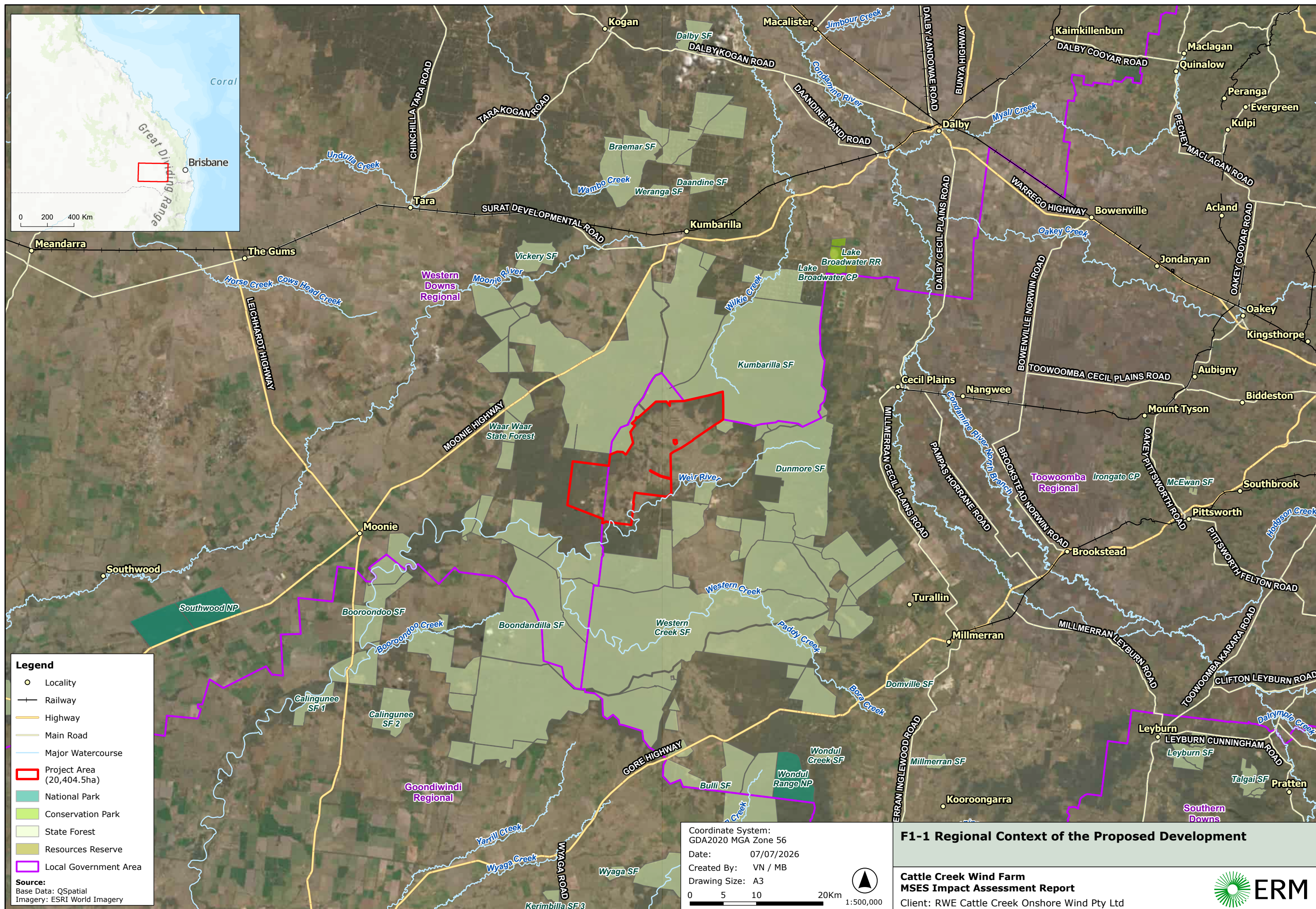
The purpose of this MSES IAR is to document existing ecological values relevant to MSES within the Project Area. The specific objectives are to:

- Identify and map MSES, as defined in Schedule 2 of the *Environmental Offsets Regulation 2014*;

- Present the results of WildNet and other relevant desktop sources to identify MSES known, likely, or potentially occurring within the Project Area;
- Identify the likelihood of occurrence (LoO) of listed threatened species and their associated habitat in the Project Area, based on desktop and field collected information;
- Describe and map habitats of MSES, based on desktop and field collected information;
- Assess the quality and importance of known or potential habitat for MSES within the Project Area; and
- Complete an SRIA in accordance with the SRIG (DSDIP, 2014) for all known, likely and potentially occurring MSES.

The information collected, and assessment undertaken as part of this MSES IAR will be used to inform the Proposed Development's avoidance and mitigation measures, quantify impacts to MSES and define the requirements for offset associated with an SRI to MSES.

The layout and Disturbance Footprint used to undertake the SRIA in this MSES IAR has undergone several iterations informed by the baseline ecological assessment prepared by ERM, with the explicit intent of minimising impacts on ecological values within the Project Area. It should be noted, however, that any MSES offset requirements will be based on the actual area of impact to each relevant MSES, rather than the broader area of overlap with the Disturbance Footprint shown in this IAR. The actual impact area will be further refined during detailed design. This approach provides a clear incentive for continued avoidance and minimisation of impacts to MSES habitat, thereby reducing the eventual offset obligation and the overall extent of impact.



2. PROPOSED DEVELOPMENT DESCRIPTION

2.1 LOCATION

The Project Area is located in both the Toowoomba Regional Council and Western Downs Regional Council Local Government Area (LGA). The closest major town is Dalby approximately 60 km north-east of the Project Area, with Queensland's capital, Brisbane, located 220 km east of the Project Area.

The Project Area consists of land/properties containing the Proposed Development and has been zoned as rural. The predominant land use being cattle grazing, animal husbandry and related rural activities. The landscape has been majorly influenced by historical grazing, with large patches of cleared land featuring no remnant vegetation. The surrounding landscape within the locality (10 km) has also been influenced by historical land clearing and cattle grazing, with the exception of the surrounding State Forests.

The Project Area lies adjacent to and within the locality (10 km) of five State Forests:

- The Kumbarilla State Forest is located on the northern boundary of the Project Area and has an area of approximately 86,000 ha;
- The Western Creek State Forest is located approximately 5 km south-east and has an area of approximately 100,000 ha;
- Dunmore State Forest is located approximately 10 km south-east and has an area of approximately 20,000 ha;
- Waar Waar State Forest is located approximately 9 km west, and covers an area of approximately 4,000 ha; and
- Boondandilla State Forest is located approximately 5 km south-west, and covers an area of approximately 57,300 ha.

The Project Area is approximately 20,404.5 ha in size and consists of 12 individual land parcels (lots) spanning five properties plus adjacent road reserves. The property lots and their respective sizes are outlined in Table 2-1.

TABLE 2-1 PROJECT AREA PROPERTY LIST

Property	Lot on Plan	Tenure	Size (ha)
Landowner 1	2DY452	Freehold	4,698.8
Landowner 2	27CP882781	Freehold	2,406.6
	2DY831	Freehold	3,013.8
Landowner 3	1RP174414	Freehold	2,049.6
	16SP201705	Freehold	1,019.9
	15SP201705	Freehold	1,032.3
	3RP174414	Freehold	823.6
Landowner 4	2RP174414	Freehold	1,176.7
Landowner 5	8DY247	Freehold	964.9
	9DY247	Freehold	965.5

Property	Lot on Plan	Tenure	Size (ha)
	22DY800	Freehold	1,028.3
	21DY218	Freehold	1,041.1
Road Reserves			183.4
TOTAL			20,404.5

2.2 PROPOSED DEVELOPMENT SPECIFICATIONS

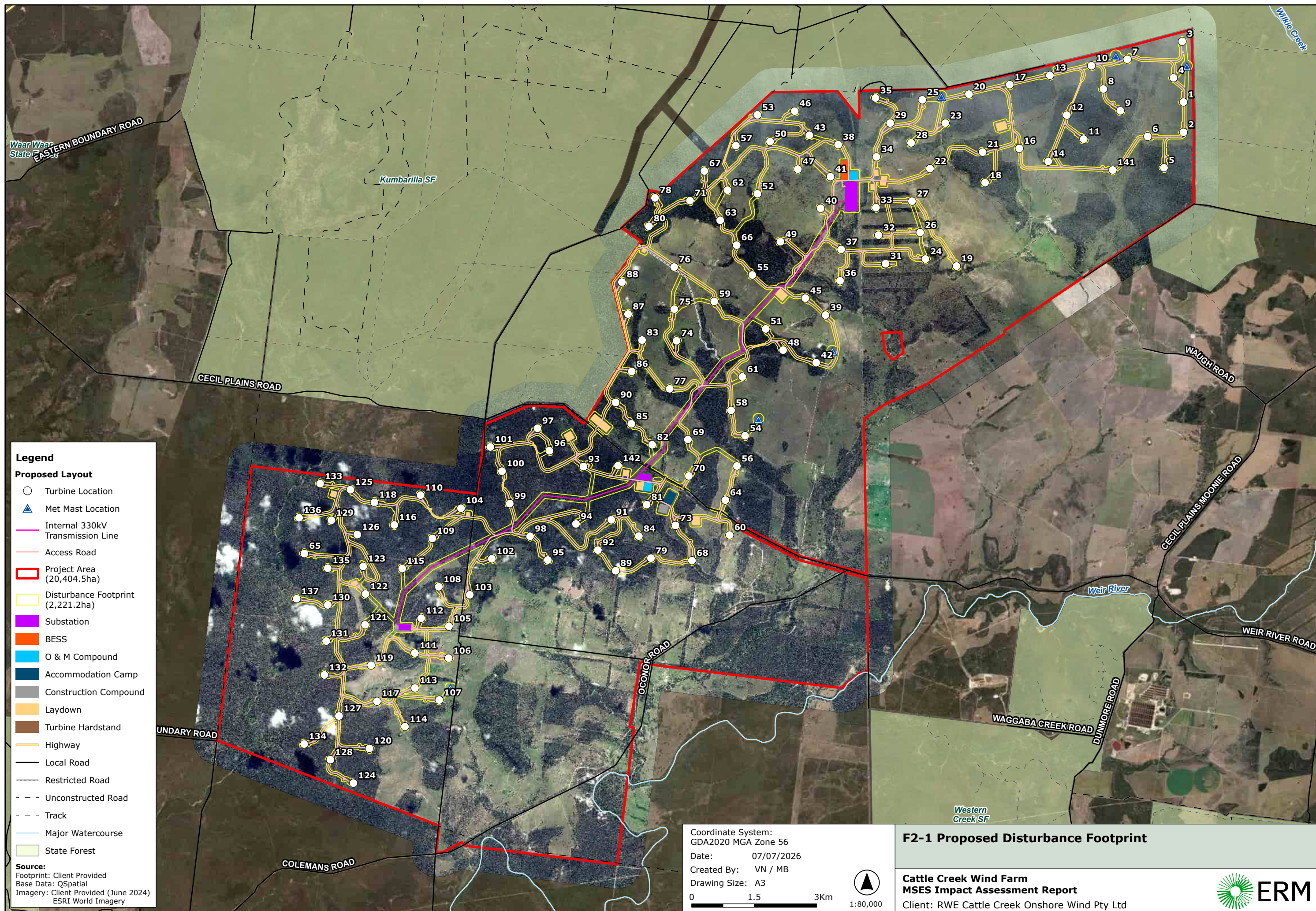
The Proposed Development consists of the construction, operation, maintenance and decommissioning of up to 135 WTGs, BESS of up to 450 MW and ancillary infrastructure (supporting infrastructure) consisting of:

- WTG foundations, crane hardstands, crane boom laydown, blade laydown and rotor assembly area;
- Access tracks, including:
 - New and upgraded tracks within the Project Area, generally comprising of a nominal range of 5.5 m – 10 m wide permanent access track, and a maximum 50 - 95 m wide cleared corridor for Oversize Overmass (OSOM) vehicles;
- Low voltage (LV) and medium voltage (MV) underground cabling, as well as MV and high voltage (HV) overhead transmission lines;
- Internal collector substations;
- A switching station adjacent to the existing 330 kV Powerlink transmission line. This has been accounted for within the Disturbance Footprint, thereby allowing the clearing of the site to be assessed as part of the impacts associated with the Proposed Development (noting, however, that the switching station infrastructure will be constructed, owned and operated by Powerlink);
- Permanent meteorological masts;
- Construction compounds and laydown areas;
- Washdown areas;
- Operational and maintenance facilities; and
- A construction workers accommodation facility.

Further, there is the potential for the inclusion of the below infrastructure:

- Concrete batching plants;
- Borrow pits; and
- Communications tower.

The proposed Disturbance Footprint occupies an area of 2,221.2 ha or 10.9% of the Project Area. The Disturbance Footprint is shown on Figure 2-1.



3. LEGISLATIVE AND POLICY CONTEXT

This MSES IAR has been undertaken with consideration for State and Local regulatory frameworks and associated legislation. Table 3-1 summarises the relevant legislation and policies.

TABLE 3-1 KEY LEGISLATION AND POLICIES

Act/Policy	Administering Authority	Purpose
State Legislation		
<i>Planning Act 2016</i> (Planning Act) Planning Regulation 2017 (Planning Regulation)	Department of State Development, Infrastructure, Local Government and Planning (DSDILGP)	The Planning Act guides Development within Queensland, while the Planning Regulation provides the operational requirements for the Planning Act. Under the Planning Regulation the Proposed Development will trigger a Material Change of Use (MCU) application and will be assessed by the State Assessment and Referral Agency (SARA) as an Assessment Manager, rather than a local planning scheme. Additionally, a trigger for vegetation clearing will require a referral to SARA separately, where an MCU is proposed on a lot that is 5 ha or larger per Schedule 10, Part 3, Section 5, Division 4, Table 1 – Assessable Development under Section 5.
State Development Assessment Provisions (SDAP), State Code 16: Native Vegetation Clearing (State Code 16)	State Assessment and Referral Agency (SARA)	State Code 16 provides the assessment criteria for assessable development that is the clearing of native vegetation under the Planning Act. It aids in the application in preparing development applications for native vegetation clearing and is consistent with the VM Act. State Code 16, and the relevant provisions will be applied when assessing clearing of remnant vegetation, connectivity, and clearing of remnant vegetation intersecting a watercourse.
SDAP, State Code 23: Wind Farm Development (State Code 23)	SARA	State Code 23 specifically relates to wind farm development and provides guidance regarding ecological assessment requirements. This MSES IAR is required to identify and assess the risk to flora, fauna and associated ecological systems and processes. It is then required to determine how this risk may be mitigated or managed, through siting and design of the Proposed Development. Under State Code 23, the assessment must contain the following: • Desktop review of available information to identify birds and bat species that may be impacted by the Proposed Development, including obstruction of and proximity to flight paths (addressed in Section 4.3 of this MSES IAR); • Field surveys to map the vegetation and identify flora and fauna species including corridors (addressed in Section 4.5 and 5 of this MSES IAR); • Review of vegetation and corridors including worst-case scenario impacts to regulated vegetation and locally significant vegetation (addressed in Section 5 and 10 of this MSES IAR);

Act/Policy	Administering Authority	Purpose
		- Species-specific studies to obtain more information about flora and fauna (particularly birds and bats) that may be at risk from the Proposed Development (addressed in Section 5.4, 5.5, 5.8.3 of this MSES IAR and the Preliminary Bird and Bat Management Plan (BBMP); - Avoidance, mitigation and offset strategies to minimise and mitigate impacts on species (addressed in Section 7 and Section 11); - Implementation processes for monitoring programs associated with construction and operational phases (addressed in Section 7 and 8 of this MSES IAR and the Preliminary BBMP; and, - Preliminary vegetation, flora and fauna, and bird and bat management plans. A Preliminary BBMP and Preliminary Vegetation and Fauna Management Plan (VFMP) have been drafted and can be found in Appendix E and Appendix F respectively.
SDAP, State Code 27: Battery Storage Facility Development (State Code 27)	SARA	State Code 27 specifically relates to battery storage facility development and aids in preparing development applications for battery storage facilities. Under State Code 27, an ecological assessment report is required for development applications for battery storage facilities. This MSES IAR is an ecological assessment report. State Code 27 also states that the following environmentally-relevant management plans will likely be conditioned: - VFMP; - Cleared Vegetation Management Plan (CVMP); - Bushfire Management Plan (BMP); - Stormwater Management Plan (SWMP); - Rehabilitation Management Plan (RMP); and - Construction Environmental Management Plan (CEMP).
<i>Nature Conservation Act 1992 (NC Act)</i>	Department of Environment, Tourism, Science and Innovation (DETSI)	The NC Act and associated regulations provide a framework for the creation and management of protected areas and protection of native species. It includes designation of threatened species status and provides for protected plant trigger areas.
<i>Vegetation Management Act 1999 (VM Act)</i>	Department of Resources (DoR)	The VM Act is the regulatory framework for the management of vegetation using the RE classification system and classification of regulated vegetation. It regulates the broad-scale clearing of vegetation, with the intent of conserving remnant vegetation, preventing the loss of biodiversity, maintaining ecological processes and allowing for sustainable use. There are clearing exemptions for some work activities.
<i>Biosecurity Act 2014, Biosecurity Regulation 2016</i>	Department of Primary Industries (DPI)	This <i>Biosecurity Act 2014</i> provides for the management of biosecurity risks in Queensland. The Act provides measures to safeguard Queensland economy, environment, agricultural and tourism industries and way of life from pests, diseases and contaminants.

Act/Policy	Administering Authority	Purpose
		Restricted matters are assigned a category (or categories) from 1 to 7, with each category placing restrictions on the dealings with the matter.
Environmental Offsets Framework (<i>Environmental Offsets Act 2014</i> , Environmental Offsets Regulation 2014, Environmental Offsets Policy Version 1.7)	DETSI	An environmental offset condition may be imposed under various State assessment frameworks for an activity that will or is likely to have a Significant Residual Impact (SRI) on a prescribed environmental matter that is a MSES. There is a guideline to assist in determining whether or not a significant residual impact is likely.
<i>Fisheries Act 1994</i> (Fisheries Act)	DPI	The Fisheries Act provides the principal legislative framework for the regulation of fishing activities and areas that are fish habitat within a given area. This outlines how activities are to be conducted given the importance of the habitat for fish. All waters are protected against degradation by direct or indirect impacts associated with development activities. Measures designed to protect fisheries resources include the declaration of fish habitat areas, protection of marine plants and designation of waterways for fish passage.
<i>Water Act 2000</i> (Water Act)	Department of Regional Development, Manufacturing and Water (DRDMW)	The Water Act provides the framework for the planning and sustainable use and management of groundwater and surface water in Queensland. It also sets up conditions and controls the activities that may impact upon water resources and quality. The DNR Watercourse Identification Map identifies watercourses and drainage features mapped under the Water Act.
Local Legislation		
Toowoomba Region Planning Scheme 2022 Version 28 (TRPS)	Toowoomba Regional Council	Secondary development approvals for the Proposed Development (for example, operational works or building works) within the Toowoomba Region local government area may be regulated by this Planning Scheme. The Planning Scheme overlays relevant to the Project Area are: • Environmental Significance Overlay – Area of Ecological Significance, Waterways and Wetlands, Biodiversity Corridors; • Bushfire Hazard Overlay – Medium Bushfire Risk; • Agricultural Land Overlay – Agricultural Land; • Balance Mixed Overlay – Flood Hazard; and • Landslide Hazard Overlay – High Landslide Hazard.

Act/Policy	Administering Authority	Purpose
Western Downs Regional Planning Scheme 2017 (WDRPS)	Western Downs Regional Council	Secondary development for the Proposed Development (for example, operational works or building works) within the Western Downs Region local government area may be regulated by this Planning Scheme. The Planning Scheme overlays relevant to the Project Area are: • Biodiversity Areas Overlay – MSES Regulated Vegetation; • Bushfire Overlay – Medium Bushfire Hazard, High Bushfire Hazard; • Flood Hazard Overlay – Potential Flood Hazard Areas; • Extractive Industry Overlay – Authority to Prospect; • Agricultural Land Classification Overlay – Agricultural Land Classification – Class A; • Stock Routes Overlay – Stock Route 50 m buffer; • Scenic Amenity Overlay – High Landscape Value Area; • Waterway Corridors Overlay – Waterway Corridor; and • Wetlands Overlay – Wetlands – Wetlands Trigger Area.

4. ASSESSMENT METHODOLOGY

4.1 OVERVIEW

This section outlines the methods implemented to identify ecological values and MSES in the Project Area. The methods include a desktop review to identify values that may be present, which informed the design of a field survey program to collect field data. This data was used to describe on-ground conditions and to assess the known, likely, and potential occurrence of MSES within the Project Area.

4.2 EXPERT CONSULTATION

Supervision, guidance, and technical reviews have been undertaken by Dr David Dique, a lead Partner at ERM with 30 years of experience in research, government and ecological consulting. David has led the design of all field surveys. Over the last 20 years, David has become recognised as a specialist in koala ecology research, conservation, and mapping planning. David completed his PhD on koalas in South-east Queensland in 2004 and has since played key roles on expert panels for State and Commonwealth Governments in koala management policy development. This includes developing the Queensland koala habitat mapping, participating as an invited expert on a panel for the review of the status of the koala in Australia and contributing as an invited expert for the development of the EPBC Act koala referral guidelines.

Oversight, guidance, and technical review has been undertaken by ERM Technical Director, Matt Davis, a 19-year experienced ecologist with expertise in both flora and fauna surveys and the development of ecological survey programs and assessment methods. Matt Davis played a key role in developing and carrying out the field survey program by leading elements of both the flora and fauna survey efforts.

Principal Ecologist Adam Pavitt and Senior Ecologist Timothy Callaghan, each with 10 years' experience, also played advisory roles in the development of the field survey program and attended several of the surveys. Adam Pavitt led threatened fauna surveys while Timothy Callaghan led vegetation assessments, including RE and Threatened Ecological Community (TEC) ground-truthing, alongside Matt Davis. The extended field team supporting these senior ecologists included a range of suitably qualified ecologists and botanists who were able to gather and analyse the results of the field surveys.

Additional targeted surveys for mollusc species were undertaken by specialist, Craig Eddie. Craig is the Director and Principal Ecologist at Boobook Ecological Consulting and has over 30 years of experience in fauna, flora, vegetation and landscape management. His extensive expertise and knowledge of ecological systems has made him a respected specialist among the scientific and local communities.

Passive bat surveys were undertaken with the use of ultrasonic detectors (i.e. Anabats) and as such, an expert with the ability to interpret the frequency of bat calls was consulted to analyse these results. This was done by expert Kelly Mathews, who is the Director at Green Tape Solutions and is a Certified Environmental Practitioner. Kelly has over 16 years' experience in ecology including the reporting and interpretation of bat calls from ultrasonic detectors.

4.3 DESKTOP REVIEW

The databases and other desktop sources reviewed included State and other publicly available information sources (Table 4-1). A search encompassing the Project Area and a 10 km buffer (the Locality) was utilised for database searches.

WildNet searches were produced using a central point with a buffer to ensure searches captured WildNet database records within 10km of the Project Area at a minimum. As a result, some records captured in the search may be further than 10 km from the Project Area boundary, in particular to the east and west.

WildNet search results are cross-referenced with Atlas of Living Australia (ALA) to further interrogate records of MSES for recency and distribution within the Locality. WildNet search results are presented in Appendix A.

The desktop methods described above are in accordance with the requirements for State Code 23 and 27 for a desktop review to interrogate available information to identify species sensitive to the Proposed Development, particularly impacts to birds and bats.

Results of the desktop review were used to produce a preliminary LoO analysis for significant species, as detailed in Section 4.4 of this Report. This informed the methods and survey locations for targeted listed threatened species surveys. This preliminary LoO was then refined to produce a final LoO (Appendix B) informed by field survey data, based on ground-truthed habitat characteristics in the Project Area.

TABLE 4-1 DATABASES REVIEWED FOR DESKTOP ANALYSIS

Information Source	Name	Data Description
Department of the Environment, Tourism, Science and Innovation (DETSI)	Regional Ecosystem (RE) Version 13.1 mapping	This product maps remnant and regrowth vegetation communities across Queensland and identifies communities listed as Endangered, Of Concern or Least Concern status as defined by the <i>Vegetation Management Act 1999</i> (VM Act).
Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (DNRMMRRD)	Property Maps of Assessable Vegetation mapping (published 13 December 2024)	This product provides certified property scale maps showing 'Category X' areas in which the clearing of native vegetation is generally exempt clearing work that does not require a development approval under the Planning Act.
Queensland Government	MSES version 4.1 mapping	This product maps areas of MSES as defined under the Qld State Planning Policy.
DNRMMRRD	Queensland Globe	This is a Google Earth based product that allows viewing of spatial data and imagery covering Queensland.
DETSI	WildNet records – through the Environmental Reports	A database that contains records of wildlife sightings including threatened flora and fauna species (protected under the NC Act that have been provided to the agency by Government departments and external organisations. Search area: Three separate polygons encompassing the Project Area with a 10 km buffer area.

Information Source	Name	Data Description
		Search date: 19 March 2024, 30 October 2024, 31 July 2025 and 5 December 2025.
Ala.org.au	ALA	Australia national biodiversity database (supported by the National Collaborative Research Infrastructure Strategy, CSIRO). Database contains records accessed through an interactive spatial portal. Threatened species are searched to identify known records in proximity to the Project Area. Search area: Project Area boundary shp. with a 10 km buffer area Search date: 19 March 2024, 30 October 2024, 31 July 2025 and 5 December 2025.

4.4 LIKELIHOOD OF OCCURRENCE

As part of the initial desktop assessments, a preliminary LoO assessment was undertaken using desktop sources and database searches to identify potential MSES that may occur within the Project Area. This assessment was then refined using site-specific and species-specific habitat information gathered through field surveys to produce a final LoO assessment (Appendix B).

The assessment ranks the likelihood of the species occurring within the Project Area through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field survey. The criteria are outlined in Table 4-2.

The Queensland Method for Mapping Matters of State Environmental Significance (DESI, 2024) defines habitat for threatened species as preferred and general habitat. This approach has been adopted for the LoO.

Preferred habitat is defined as areas or locations which have the potential to provide necessary resources needed for the maintenance of a population. This includes the presence of desired habitat features for a species whereby activities such as breeding, nesting, and foraging contributes to the maintenance of the population.

General habitat is defined as areas or locations which have the potential to host a species for a limited amount of time or to support an ecological function (such as dispersal) that is not restricted to that area. General habitat may be considered suitable for a species, but not preferred, where there are some desired features present but not all, and so a population may not be maintained, may have poor connectivity to known preferred habitat, or may be known to be disturbed.

Where species presence cannot be discounted, they are conservatively categorised as potentially occurring. Recent records of threatened species within the Locality are defined by and restricted to only those that have been recorded in databases searches within the last 20 years.

Under State Code 23 and State Code 27, ecological assessments are required to include species-specific methods to understand more information on protected flora and fauna that are at risk from the Proposed Development. The first stage of this assessment involved analysing each MSES generated from desktop sources to inform the preliminary LoO. Following this, MSES specific surveys were carried out to inform the final LoO. The final results are provided in Appendix B.

Final likelihood classification also considered input from subject matter experts and lead field ecologists with experience in the region of species distribution and presence. For example, some potentially occurring species may have received a final classification as unlikely to occur based on the disturbed extent and lack of connectivity to potential habitat beyond the Project Area.

TABLE 4-2 LIKELIHOOD OF OCCURRENCE CRITERIA

	Preferred habitat exists	General habitat exists¹	Habitat does not exist²
Records within Project Area (based on site surveys and recent (last 20 years) records)	Known	Known	Known
Records within the Locality ³	Likely	Potential	Unlikely
No records within the Locality, but Project Area is within known distribution	Potential	Potential	Unlikely
No records within the Locality, and Project Area is outside of known distribution	Unlikely	Unlikely	Unlikely

¹Habitat may be considered general but not preferred because: some preferred habitat features may be present but not all; habitat may have poor connectivity; or habitat may be known to be disturbed; or preferred habitat requires confirmation.

²Based on sources reviewed and/or field survey results.

³'Locality' refers to the Project Area and a 10 km buffer.

4.5 FIELD SURVEYS

This section details the targeted survey techniques and effort completed across the Project Area and aligned with state survey guidelines, as further described in this section.

4.5.1 SURVEY GUIDELINES

Table 4-3 provides an overview of the State and Commonwealth survey guidelines which were used to inform the methods applied for the field surveys.

TABLE 4-3 SURVEY GUIDELINES RELEVANT TO THE INVESTIGATION

Source	Survey Guidelines
Department of the Environment, Water, Heritage and the Art (DEWHA, 2017)	<u>Survey Guidelines for Australia's Threatened Birds</u> The 'Survey Guidelines for Australia's Threatened Birds' assist in determining the likelihood of a bird species presence or absence within a survey area, using species-specific survey methods. These guidelines are not mandatory; however, they have been prepared by expert sources and are helpful in determining the presence or absence of a species.

Source	Survey Guidelines
(DEWHA, 2010)	<u>Survey guidelines for Australia's Threatened Bats</u> The 'Survey Guidelines for Australia's Threatened Bats' assist in determining the likelihood of a bat species presence or absence within a survey area, using species-specific survey methods. These guidelines are not mandatory; however, they have been prepared by expert sources and are helpful in determining the presence or absence of a species.
Department of Sustainability, Environment, Water, Populations and Communities (DSEWPC, 2011)	<u>Survey Guidelines for Australia's Threatened Mammals</u> The 'Survey Guidelines for Australia's Threatened Mammals' assist in determining the likelihood of a mammalian species presence or absence within a survey area, using species-specific survey methods. These guidelines are not mandatory; however, they have been prepared by expert sources and are helpful in determining the presence or absence of a species.
(DSEWPC, 2011)	<u>Survey Guidelines for Australia's Threatened Reptiles</u> The 'Survey Guidelines for Australia's Threatened Reptiles' assist in determining the likelihood of a reptilian species presence or absence within a survey area, using species-specific survey methods. These guidelines are not mandatory; however, they have been prepared by expert sources and are helpful in determining the presence or absence of a species.
Department of the Environment (DoE, 2015)	<u>Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act</u> This draft guideline is intended to provide guidance to proponents on the need to refer an action to which the EPBC Act applies.
(DoEE, 2017)	<u>Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species</u> The 'Industry guidelines for avoiding, assessing, and mitigating impacts on EPBC Act listed migratory shorebird species' applies to 37 migratory shorebirds that regularly visit Australia yearly and are listed as Migratory under the EPBC Act. The purpose of this policy statement is to assist proponents in avoiding, assessing, and mitigating significant impacts on migratory shorebirds listed under the EPBC Act. These guidelines detail survey timing, effort, coverage and minimum requirements.
(Youngentob, Marsh, & Skewes, 2021)	<u>A review of koala habitat assessment criteria and methods</u> This document collates information on koala (<i>Phascolarctos cinereus</i>) and their habitat that is relevant for determining whether an area is likely to be koala habitat, reviews the benefits and limitations of current methods for assessing koala presence and abundance, and critically assesses the extent that commonly used criteria for evaluating koala habitat are backed by peer-reviewed research.
(DCCEEW, 2024)	<u>Draft referral guidelines for nationally listed Brigalow Belt reptiles</u> The 'Draft referral guidelines for nationally listed Brigalow Belt reptiles' applies to nine nationally listed reptiles of the Brigalow Belt, anywhere they may occur in Australia. These guidelines detail survey effort, technique, and considerations.
(DCCEEW, 2024)	<u>Onshore Wind Farm Guidance</u> The purpose of this document is to describe best practice approaches to assist the Australian onshore wind farm industry when bringing projects forward for approval under Australia's national environmental law, the EPBC Act.

Source	Survey Guidelines
(DES, 2022)	<u>Guide to greater glider habitat in Queensland</u> This document collates information on greater glider (<i>Petauroides</i> spp.) and their habitat preferences determining whether a specific area is suitable habitat for greater gliders in Queensland. It compiles relevant information about the species and its habitat requirements, including the importance of large, hollow-bearing trees. The document also provides a review of methods for surveying these trees to help identify and protect critical habitats for this endangered species.
(DES, 2020)	<u>Flora Survey Guidelines – Protected Plants</u> These guidelines detail the minimum requirements and approved methods for conducting flora surveys in Queensland. The purpose of these guidelines is to ensure that a proper survey is undertaken to identify any protected plants that may be present in an area where clearing is proposed. It specifies who is qualified to undertake a survey, the extent of the area that must be surveyed, the specific methods to be used, and the information that must be included.
(DES, 2022)	<u>Terrestrial Vertebrate Fauna Survey Guidelines for Queensland</u> The 'Terrestrial Vertebrate Fauna Survey Guidelines for Queensland' assist in determining the likelihood of a terrestrial vertebrate species presence or absence within a survey area, using species-specific survey methods. These guidelines are not mandatory; however, they have been prepared by expert sources and are helpful in determining the presence or absence of a species.
(Ferguson & Mathieson, 2014)	<u>Targeted species survey guidelines - Yakka skink (<i>Egernia rugosa</i>)</u> These guidelines outline the appropriate survey methods and minimum effort required to detect the presence or likely absence of the yakka skink (<i>Egernia rugosa</i>). The guidelines detail the best times of year for surveys, the signs to look for, and the specific habitats to investigate to ensure a comprehensive and effective survey is conducted.
(Hourigan, 2012)	<u>Targeted species survey guidelines – Glossy black cockatoo (<i>Calyptrorhynchus lathami</i>)</u> This document provides guidance on the survey methods required to detect the glossy black-cockatoo (<i>Calyptrorhynchus lathami</i>) and identify its habitat. It outlines key habitat features relevant to the species, reviews effective techniques for recording presence and habitat use, and discusses the strengths and limitations of survey approaches in ensuring accurate assessments for conservation and management purposes.
(DSDILGP, 2023)	<u>Planning guidance, State code 23: Wind farm development</u> The purpose of this code is to provide assessment benchmarks and planning requirements for wind farm developments in Queensland. It sets out the criteria against which proposed projects are assessed under the State Development Assessment Provisions, ensuring wind farms are appropriately located, designed, constructed and operated to minimise environmental and community impacts.
(DSDILGP, 2025)	<u>Planning guidance, State Code 27: Battery storage facility development</u> The purpose of this code is to provide planning requirements for battery storage facility developments in Queensland. It sets out the criteria against which proposed projects are assessed under the State Development Assessment Provisions, ensuring battery storage facility are appropriately located, designed, constructed and operated to minimise environmental and community impacts.

4.5.2 SURVEY SUMMARY AND EFFORT

Nine field surveys have been undertaken across the Project Area between December 2023 and October 2025. A summary of field survey timing, techniques and survey effort are provided in Table 4-4.

As the Proposed Development is a wind farm, a Bird Utilisation Survey (BUS) program covering all relevant seasons across a 24-month period was incorporated into the field survey design, fulfilling requirements of the draft *Onshore Wind Farm Guidance under Australia's national environment law* (DCCEEW, 2024) and State Code 23. Field surveys were conducted during the dry and wet seasons, with four surveys completed in the wet season (December 2023, February 2024, December 2024 and February 2025) and five surveys completed in the dry season (May 2024, July/August 2024, May 2025, July 2025, and September/October 2025), thereby allowing sampling across seasonal variation.

A summary of each field survey is provided below:

- Four ecologists undertook a five-day field survey from 4 – 8 December 2023, with a total 200 person-hours on the ground. The field survey focused on vegetation assessments, habitat quality assessments, targeted fauna surveys (camera trapping, Anabats and koala scat and sign searches) and BUS;
- Four ecologists undertook a five-day field survey from 12 – 16 February 2024, with a total 200 person-hours on the ground. The field survey focused on vegetation assessments, habitat quality assessments, targeted fauna surveys (camera trapping, Anabats, koala scat and sign searches, spotlighting and call playback) and BUS;
- Four ecologists undertook a five-day field survey from 6 – 10 May 2024, with a total 200 person-hours on the ground. The field survey focused on vegetation assessments, habitat quality assessments, targeted fauna surveys (spotlighting and call playback) and BUS;
- Two ecologists undertook a five-day field survey from 29 July – 2 August 2024, with a total 100 person-hours on the ground. The field survey focused on BUS;
- Four ecologists undertook a six-day field survey from 2 – 7 December 2024, with a total 200 person-hours on the ground. The field survey focused on targeted fauna surveys (Anabats and harp trapping) and BUS;
- Four ecologists undertook a six-day field survey from 24 February to 1 March 2025, with a total 200 person-hours on the ground. The field survey focused on targeted fauna surveys (harp trapping) and BUS;
- Two ecologists undertook a five-day field survey from 26 – 30 May 2025, with a total of 100 person hours on the ground. The field survey focused on BUS;
- Six ecologists undertook a five-day field survey from 14 – 18 July 2025, with a total of 300 person hours on the ground. The field survey focused on habitat assessments (hollow transects), TEC verification surveys and BUS; and
- Eight ecologists undertook a six-day field survey from 29 September – 4 October 2025, with a total 480 person hours on the ground. The field survey focused on impact and proposed offset area Biocondition assessments and modified habitat quality assessments (MHQA), TEC verification, vegetation assessments and targeted fauna surveys (spotlighting and specialist mollusc surveys).

Based on an assessment of target species considered to potentially occur in the Project Area from the preliminary LoO, a field survey plan was developed to achieve adequacy for methods, seasonality and effort as defined in relevant State guidelines.

A depiction of the survey effort is provided in Figure 4-1, with bird and bat utilisation survey (BBUS) locations isolated on Figure 4-2. A description of survey techniques utilised is provided in the sections below.

TABLE 4-4 FIELD SURVEY EFFORT OF THE PROJECT AREA

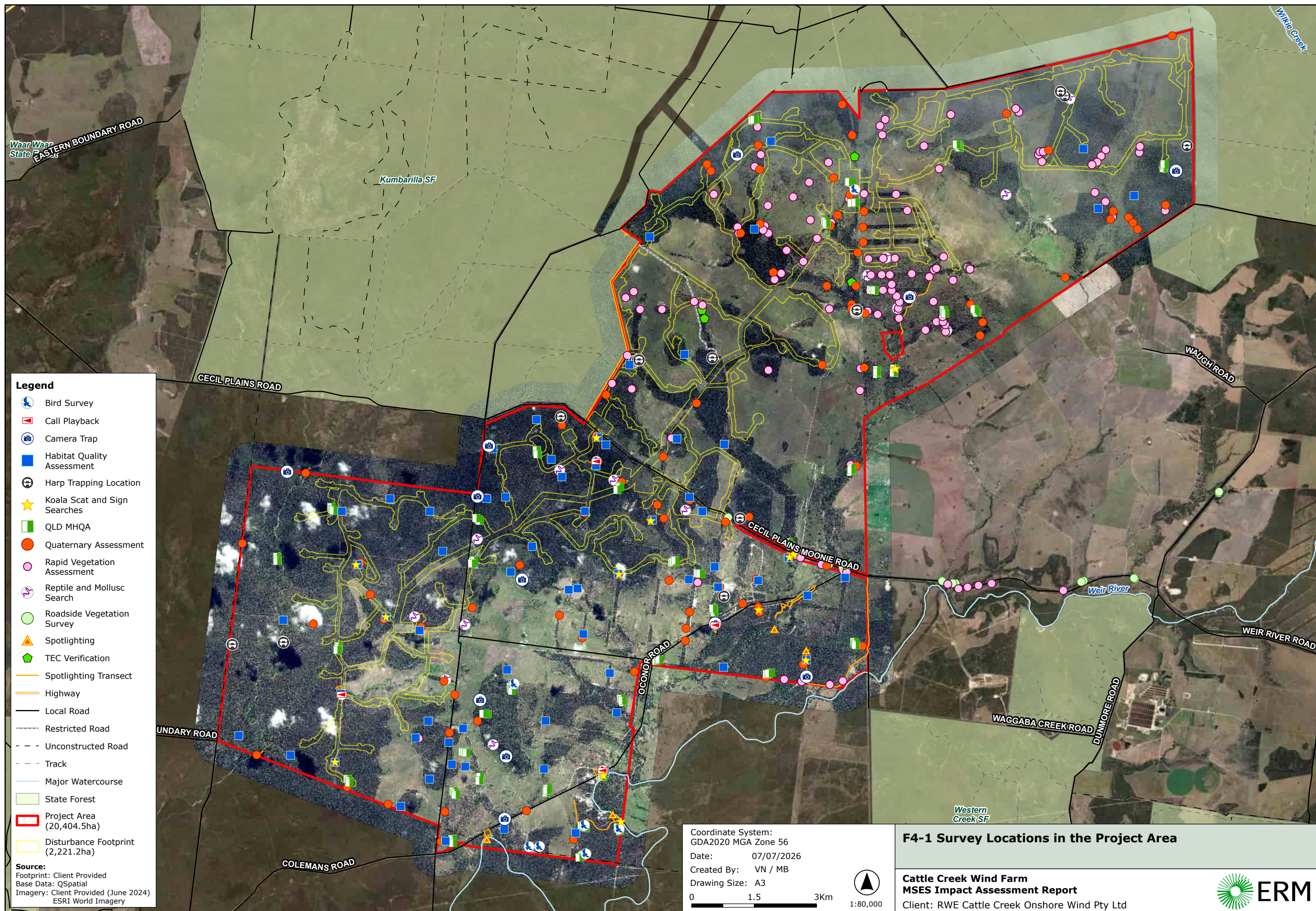
Timing	Target	Techniques	Survey Effort
4 - 8 December 2023	Habitat quality assessments	- Assessment of habitat features present relating to relative cover and abundance of nesting/shelter/basking sites, presence of aquatic habitats, presence of foraging resources, dominant canopy species, connectivity and disturbances; and - Survey locations also included opportunistic searches for conservation significant flora and fauna and their signs (e.g. faecal pellets).	46 habitat quality assessments.
	Vegetation quality assessments	- Review of vegetation community mapping and assessment of habitat distribution; - Representative sampling for RE verification using quaternary assessments in accordance with Neldner et al. (2023); and - Rapid vegetation assessments.	77 quaternary assessments; and 37 rapid vegetation assessments.
	Targeted fauna surveys	- Deployment of baited camera traps to target terrestrial mammals; - Deployment of Anabats to detect high-frequency bat-calls; and - Koala scat and sign searches.	- Five camera traps deployed for four consecutive nights; - One camera trap deployed for three consecutive nights; - Four Anabats deployed for four consecutive nights; - One Anabat deployed for three consecutive nights; and - Six koala scat and sign searches.
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Survey locations also included opportunistic searches for conservation significant flora and fauna.	22 BUS.

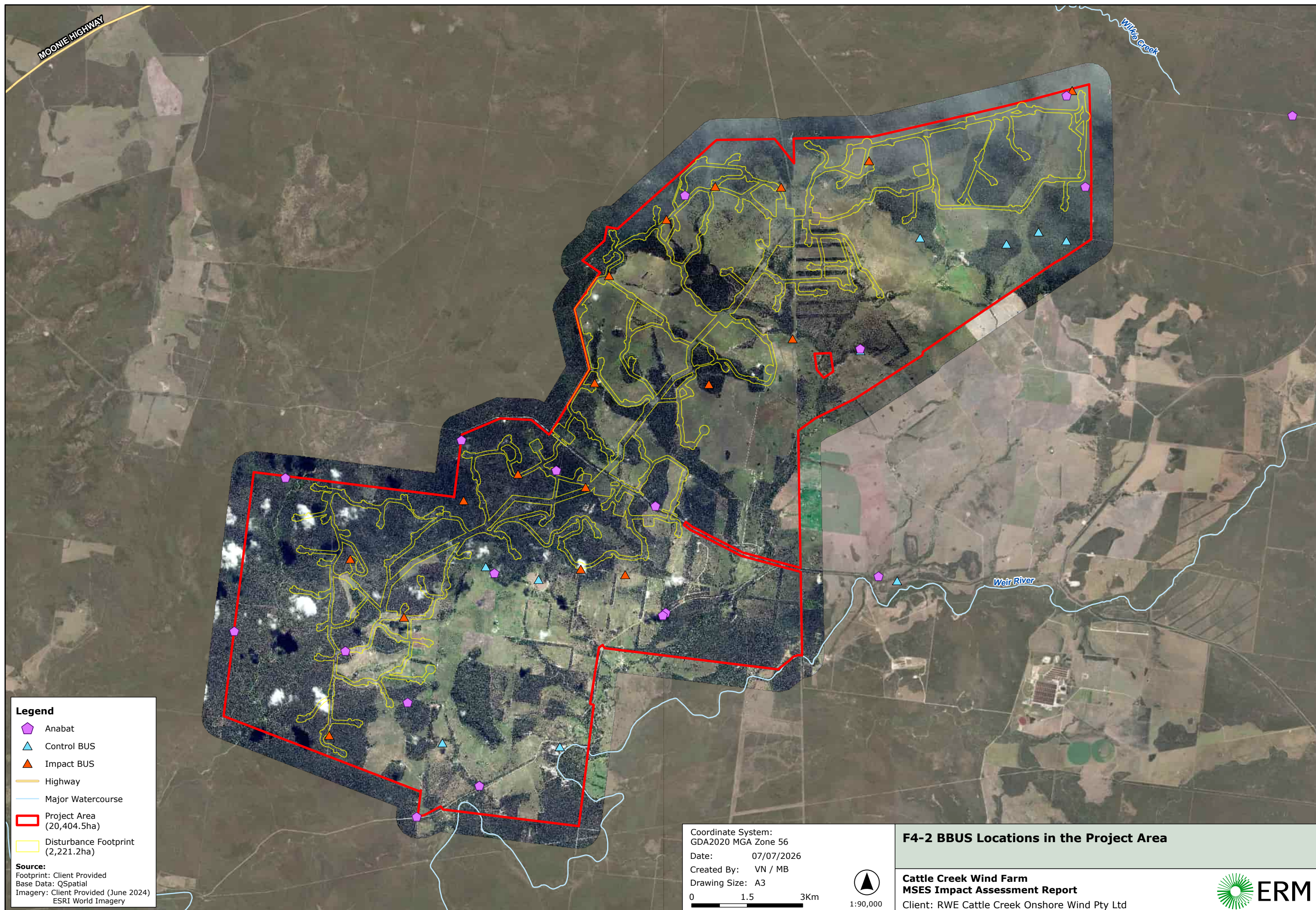
Timing	Target	Techniques	Survey Effort
12 - 16 February 2024	Habitat quality assessments	- Assessment of habitat features present relating to relative cover and abundance of nesting/shelter/basking sites, presence of aquatic habitats, presence of foraging resources, dominant canopy species, connectivity and disturbances; and - Survey locations also included opportunistic searches for conservation significant flora and fauna and their signs (e.g. faecal pellets).	24 habitat quality assessments.
	Vegetation quality assessments	- Review of vegetation community mapping and assessment of habitat distribution; and - Representative sampling for RE verification using quaternary assessments in accordance with Neldner et al. (2023).	35 quaternary assessments.
	Targeted fauna surveys	- Deployment of baited camera traps to target terrestrial mammals; - Deployment of Anabats to detect high-frequency bat-calls; - Koala scat and sign searches; - Spotlighting transects in areas of suitable habitat throughout the Project Area in accordance with conservation guidelines for target species; and - Call playback during spotlighting transects.	- One camera trap deployed for four consecutive nights; - Four camera traps deployed for three consecutive nights; - One camera trap deployed for 88 nights (collected in May 2024 survey period); - One Anabat deployed for four consecutive nights; - One Anabat deployed for 88 nights (collected in May 2024 survey period); - Three koala scat and sign searches; - Nine person hours of spotlighting over two nights; and - Two call playback sessions targeting koala.

Timing	Target	Techniques	Survey Effort
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Survey locations also included opportunistic searches for conservation significant flora and fauna.	28 BUS.
6 - 10 May 2024	Targeted fauna surveys	- Spotlighting transects in areas of suitable habitat throughout the Project Area in accordance with conservation guidelines for target species; and - Call playback during spotlighting transects.	16 person hours of spotlighting over 2 nights; and - Two call playback sessions targeting koala.
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Survey locations also included opportunistic searches for conservation significant flora and fauna.	44 BUS.
29 July – 2 August 2024	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Survey locations also included opportunistic searches for conservation significant flora and fauna.	33 BUS.
2 – 7 December 2024	Habitat quality assessments	- Assessment of habitat features present relating to relative cover and abundance of nesting/shelter/basking sites, presence of aquatic habitats, presence of foraging resources, dominant canopy species, connectivity and disturbances; and - Survey locations also included opportunistic searches for conservation significant flora and fauna and their signs (e.g. faecal pellets).	Two habitat quality assessments.
	Vegetation quality assessments	- Review of vegetation community mapping and assessment of habitat distribution; and - Representative sampling for RE verification using quaternary assessments in accordance with Neldner et al. (2023).	Three quaternary assessments.

Timing	Target	Techniques	Survey Effort
	Targeted fauna surveys	• Deployment of Anabats to detect high-frequency bat-calls; • Harp trapping; and • Threatened fauna transect targeting mollusc and reptile species.	• 10 Anabats deployed for 17 consecutive nights; • Four harp traps deployed over five nights; and • One diurnal targeted fauna transects targeting mollusc and reptile species alongside habitat assessments.
	BUS	• 20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; • Roaming bird surveys between survey areas; and • Survey locations also included opportunistic searches for conservation significant flora and fauna.	• 28 BUS.
24 – 1 February/March 2025	Targeted fauna surveys	• Harp trapping; and • Threatened fauna transect targeting mollusc and reptile species.	• Four harp traps deployed over five nights; and • 12 diurnal targeted fauna transects targeting mollusc and reptile species alongside habitat assessments.
	BUS	• 20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; • Roaming bird surveys between survey areas; and • Survey locations also included opportunistic searches for conservation significant flora and fauna.	• 27 BUS.
26 – 30 May 2025	BUS	• 20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; • Roaming bird surveys between survey areas; and • Survey locations also included opportunistic searches for conservation significant flora and fauna.	• 33 BUS.

Timing	Target	Techniques	Survey Effort
14 – 18 July 2025	Habitat quality assessments	Ground-truthing habitat features (tree species, diameter at breast height [DBH], hollow presence/absence and hollow width) for target species (greater glider, yellow-bellied glider and glossy black cockatoo).	30 hollow transects.
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Survey locations also included opportunistic searches for conservation significant flora and fauna.	32 BUS.
29 September – 4 October 2025	Vegetation quality assessments	- Review of vegetation community mapping and assessment of habitat distribution; - Representative sampling for RE verification using quaternary assessments in accordance with (Neldner, 2022); and - Rapid vegetation assessments.	34 quaternary assessments; and 80 rapid vegetation assessments.
	Targeted fauna surveys	- Targeted Brigalow woodland snail surveys by third party specialist; and - Spotlighting transects in areas of suitable habitat throughout the Project Area in accordance with conservation guidelines for target species.	43 specialist mollusc surveys; and - Seven person-hours of spotlighting over three nights.
	BioCondition assessment and MHQA	Assessment of vegetation structure and type, foraging and dispersal habitat values in accordance with the guidance on using the Modified Habitat Quality Assessment methodology provided by DCCEEW.	39 assessments





4.5.3 SURVEY TECHNIQUES

4.5.3.1 VEGETATION AND HABITAT QUALITY ASSESSMENTS

Vegetation community and habitat assessments were undertaken to describe the type and condition of the vegetation communities within the Project Area. The outcomes of the vegetation and habitat assessments were used to inform a final LoO assessment of MSES.

Vegetation communities and habitats were assessed using four survey types:

- Rapid vegetation assessments;
- Quaternary vegetation assessments as per Neldner et al. (2022);
- Habitat quality assessments; and
- BioCondition and MHQA.

Rapid Vegetation Assessments

Rapid vegetation assessments were used as a streamlined alternative to full quaternary vegetation assessments for confirming state-mapped REs and vegetation communities. At each point, only the minimum data necessary to confirm the dominant vegetation type and broad habitat characteristics were recorded (i.e. dominant canopy, shrub and ground cover species).

This rapid method provides sufficient confidence to ground-truth mapped REs and habitat types while reducing survey time. Data collected still contributes to understanding broad-scale ecological patterns, supports determination of potential MSES occurrence, and informs the LoO for MSES, but at a lower level of detail than full quaternary assessments.

Quaternary Vegetation Assessments

Quaternary assessments were used to ground-truth state-mapped REs and define vegetation communities, thus assisting in determining the presence of MSES. At each quaternary assessment point, additional data was collected on lower vegetation strata beyond what is required under the method defined in Neldner et al. (2022). This was collected to better inform the broad habitat type (BHT) mapping. The following parameters were assessed:

- Landform and soil; and
- Height and species in the emergent, tree, shrub, and ground cover layers.

Verifying REs assists with the determination of the presence of specific habitat types and ecological processes within the Project Area. It also informs the LoO for listed threatened species and ecological communities and is used to define BHTs used as the basis for MSES mapping related to vegetation community types. Quaternary level vegetation assessments were undertaken in accordance with Neldner et al. (2022).

Habitat Quality Assessments

Habitat assessments were undertaken to describe the condition of the habitats in the Project Area. Habitat quality assessments identify micro and macro habitat features (e.g. hollows, woody debris and presence of foraging resources) as well as other ecological values present specific to threatened species in order to identify presence or absence of viable habitat within the Project Area. Habitat assessments included recording the following features:

- Representative sampling of each habitat type;

- Representative sampling of each RE type;
- Assessment of wetland or water features (for example dams) where fauna may be frequented by fauna;
- Recording of topographical features (outcrops, escarpments or low points) that may provide variable habitat; and
- Defining boundaries of disturbed and undisturbed areas.

Parameters recorded at habitat assessment sample sites were likely to include (but not be limited to):

- Assessment of condition to determine if regrowth or remnant, as defined by the *Vegetation Management Act 1999*;
- Context in the landscape (i.e., connectivity, elevation, proximity to water);
- Condition (i.e., weeds and evidence of pest species, recruitment, erosion, evidence of disturbance);
- Breeding and roosting habitat features (i.e., hollows (size and density), den sites, nests, shedding bark, caves);
- Foraging resources (i.e., flowering tree species, other food trees, termite mounds, waterbodies);
- Presence of microhabitats (i.e., woody debris, leaf litter, rocky outcrop);
- Characteristics of any wetland features (i.e., presence of aquatic vegetation, water depth, soil or substrate type); and
- Indirect signs of threatened species (e.g., tracks, scats or scratches).

Incidental fauna observations are also collected at habitat assessment points. If any threatened or migratory species are detected, the details of the observation (including number of individuals, geographic coordinates, behaviour and surrounding habitat) were recorded.

Habitat assessments consider species requirements for species considered unlikely in the LoO (for example habitat suitability for molluscs and reptiles identified as unlikely during desktop review). These methods are used to inform the LoO and justify the presence/absence of suitable habitat for these species.

BioCondition and Modified Habitat Quality Assessment

Habitat quality was assessed in accordance with the BioCondition Assessment Framework for Terrestrial Biodiversity in Queensland (Eyre, et al., 2015) and The Guide for Determining Terrestrial Habitat Quality (DES, 2020).

BioCondition assessments are Queensland's standard framework for evaluating site condition, measuring site-based attributes against the RE 'benchmark'. This quantitative, site-based method is repeatable, applicable to vegetation in any condition, and produces a numerical score that can be interpreted as a biodiversity condition rating.

Alongside the BioCondition assessment, MHQA were undertaken to assess the overall quality of habitat for specific species. The MHQA is based on established Queensland methodology outlined in The Guide for Determining Terrestrial Habitat Quality (DES, 2020). This approach has been adapted to include additional assessment criteria for specific species to satisfy the requirements of the EPBC Act Offset Policy principles for a proposed land based offset for co-listed MSES and MNES to be delivered under the EPBC Act.

4.5.3.2 TARGETED SURVEYS FOR LISTED FLORA SPECIES

Threatened flora surveys were undertaken on an observational basis with meanders undertaken concurrently with quaternary vegetation sampling locations and habitat assessments in areas identified as potential habitat for listed flora species.

4.5.3.3 TARGETED SURVEYS FOR LISTED FAUNA SPECIES

Targeted surveys were undertaken for listed fauna identified from the desktop searches as potentially occurring within the Project Area. The following sections summarise the main techniques targeting listed mammals, birds, bats, and reptiles within the Project Area.

4.5.3.4 TERRESTRIAL AND ARBOREAL MAMMALS

The preliminary LoO assessment identified koala, greater glider (southern and central) (*Petauroides volans*), and yellow-bellied glider (south-eastern) (*Petaurus australis australis*) as known, likely or having potential to occur within the Project Area. A targeted survey approach has been implemented in consideration of relevant survey guidelines to assess the presence of terrestrial and arboreal species within the Project Area (DES, 2022) (Youngentob, Marsh, & Skewes, 2021) (DSEWPC, 2011).

Survey method and extent undertaken for the koala, greater glider (southern and central), yellow-bellied glider (south-eastern) are as follows:

Habitat Surveys

Searches for terrestrial and arboreal mammals involved microhabitat identification and searches for signs of the species. This occurred throughout the Project Area concurrently with habitat quality assessments in areas identified as potential habitat for listed mammals identified in desktop searches and by the most recent ground-truthed species habitat mapping. The Disturbance Footprint was also used to identify priority survey locations.

Habitat assessments for the greater glider and yellow-bellied glider were completed with a focus on hollow identification (dbh measurements and density estimates), to delineate potential denning habitat from foraging habitat as per the *Guide to greater glider habitat in Queensland* (Eyre, et al., 2022). Habitat mapping for gliding species was then informed by quantitative data focusing on large hollow-bearing trees, adopting a precautionary framework in accordance with the methodology outlined by Eyre et al. (2022). Further to this, 30 hollow-bearing tree transects (hollow transects) were carried out to further delineate habitat for the greater glider and yellow-bellied glider. These involved recording the number of trees greater than 30 cm dbh and the species and dbh of these trees, and the dimensions of any observable hollows in a 50 x 20 m transect grid.

Habitat assessments for koala were completed with a focus on primary and secondary food tree species as well as locally important koala trees (LIKT) as per *A review of koala habitat assessment criteria and methods* (Youngentob, Marsh, & Skewes, A review of koala habitat assessments criteria and methods, 2021).

Spotlighting Surveys

Spotlighting surveys were conducted as part of the February 2024, May 2024 and September 2025 field surveys. In the February 2024 survey period, three spotlighting transects were carried out over two nights for nine person hours of spotlighting. In the May 2024 survey

period, seven spotlighting transects were surveyed over two nights for 16 person hours of spotlighting. In the September 2025 survey period, four spotlighting transects were surveyed over three nights for seven person hours of spotlighting. In total, 32 person hours of spotlighting were completed in the three survey periods. Spotlighting targeting arboreal species was undertaken in accordance with relevant survey guideline requirements for koala, greater glider (southern and central) and yellow-bellied glider (south-eastern) (DES, 2022) (Youngentob, Marsh, & Skewes, 2021) (DSEWPC, 2011). Higher quality habitat areas for these species (as identified through habitat assessments) were targeted for spotlighting, as these areas contain a higher abundance of microhabitat features for these species (i.e. denning hollows for hollow dependent species) increasing the likelihood of detection of target species.

Call Playback Surveys

Call playback for koala was completed at the beginning of four of the spotlighting transects. Call playback was carried out in line with the methodology outlined in the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (DES, 2022) and involved a two-minute listening period, followed by a three-minute call playback period, then listening for calls for a further two minutes, followed by spotlighting.

Scat and Sign Surveys

Nine scat and sign searches were undertaken in suitable habitat for koala as per the *Survey Guidelines for Australia's Threatened Mammals* (DSEWPC, 2011). Scat searches are not a specific survey guideline recommendation for locating greater gliders, however this method has been listed in the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (DES, 2022) to locate cryptic and nocturnal species.

Camera Trapping Surveys

Camera trapping was undertaken in areas of suitable habitat for nocturnal terrestrial mammals. Camera traps were attached to trees or logs at suitable heights to detect the target species within that habitat type. A scented-lure bait of tuna, oats, honey and peanut butter was used as an attractant for terrestrial species. A total of 12 camera traps were deployed in 12 locations for a cumulative total of 127 camera trapping nights over the December 2023 and February 2024 survey events.

4.5.3.5 REPTILES

Targeted survey approaches were implemented with reference to survey guidelines to assess the presence of listed reptile species within the Project Area. Survey method and effort undertaken for listed reptile species are as follows:

Habitat Surveys

Searches for threatened reptiles involved microhabitat identification and searches for signs of the species. This occurred throughout the Project Area concurrently with habitat quality assessments in areas identified as potential habitat for listed reptiles identified in desktop searches and by the most recent ground-truthed species habitat mapping. The Disturbance Footprint was also used to identify priority survey locations.

Targeted Surveys

Further targeted reptile surveys involved a combination of diurnal hand searches, diurnal visual searches and nocturnal spotlight searches as per guideline requirements and/or recommendations.

Diurnal hand searches and visual searches involved overturning rocks, logs and debris and disturbing leaf litter in suitable habitat areas during optimal times of the day for the target species. Thirteen of these targeted fauna transects were undertaken during field surveys.

Nocturnal spotlight searches involved using head torches and spotlights to search suitable habitat areas, including roads and tracks, during optimal times after sunset. In total, 25 person hours of spotlighting was completed in the February and May 2024 survey periods, primarily alluvial, riparian areas that are the most connected habitat communities in the Project Area.

4.5.3.6 MOLLUSCS

Targeted survey approaches were implemented alongside species specific conservation advice for the Dulacca woodland snail and Brigalow woodland snail to assess the presence of listed mollusc species within the Project Area. Survey method and effort undertaken for listed mollusc species are as described in the following sections.

Habitat Surveys

Searches for threatened molluscs involved microhabitat identification and searches for signs of the species, particularly snail shells for potential juvenile or adults. This occurred throughout the Project Area concurrently with habitat quality assessments in areas identified as potential habitat for listed molluscs identified in desktop searches and by the most recent ground-truthed species habitat mapping. The Disturbance Footprint was also used to identify priority survey locations. Microhabitat features included dense piles of leaf litter and woody debris also in high densities, with preferences of reduced disturbance.

Targeted Surveys

Further targeted mollusc surveys involved searches as per conservation advice for the Dulacca woodland snail and Brigalow woodland snail. These involved the raking of accumulated leaves and overturning of woody debris conducted during favourable survey conditions for detection of the species, with 13 of these targeted fauna transects undertaken during field surveys.

While the potential for threatened mollusc habitat within the Project Area is greatly reduced due to land management practices (fire regimes reducing leaf litter and woody debris build up, consistent clearing events, high grazing impacts in some areas, non-native grasses such as *Cenchrus ciliaris* encroaching woodlands) resulting in little suitable microhabitat, additional targeted surveys were undertaken by third party specialists throughout the confirmed Disturbance Footprint to determine suitability of habitat.

Specialist Surveys

Third party specialist surveys for molluscs were carried out by Boobook Ecological Consulting.

The field survey methodology included diurnal active search methods which are suitable for detection of live and dead snails. This included rolling logs/rocks and other ground debris, raking leaf litter and dismantling bark piles. Depending on the amount of microhabitat available at each site, searches were generally completed within approximately 15-30 minutes.

A soil/leaf litter sample (approximately 1.5L) was taken at each site to search for juveniles or shell fragments of *Adclarkia spp.* Sorting of leaf litter was undertaken in laboratory conditions.

Confirmation of identification required microscopic examination of shells and comparison to reference voucher specimens which was undertaken at Boobook's laboratory. Had *Adclarkia spp.* been confirmed within the alignment, voucher specimens of dead shells would be third party identified and deposited within the Queensland Museum subject to landholder/client permission.

In total, 43 specialist mollusc surveys were completed in the September 2025 survey period.

4.5.3.7 BIRDS

Targeted survey approaches were implemented alongside survey guidelines to assess the presence of listed bird species within the Project Area. Survey method and effort undertaken for listed bird species are as follows:

Habitat Surveys

Searches for threatened birds involved microhabitat identification and searches for signs of the species throughout the Project Area concurrently with habitat quality assessments in areas identified as potential habitat for threatened birds identified in desktop searches and by the most recent ground-truthed species habitat mapping. The Disturbance Footprint was also used to identify priority survey locations.

Habitat assessments targeting south-eastern glossy black cockatoos were completed with a focus on hollow identification (dbh measurements and density estimates), to delineate potential habitat for the species. Further to this, 30 hollow transects were carried out to further delineate habitat for the glossy black cockatoo. These involved recording the number of trees greater than 50 cm dbh and the species and dbh of these trees, and the dimensions of any observable hollows in a 50 m x 20 m transect grid.

Bird Utilisation Surveys (BUS)

BUSs involve 20-minute fix point surveys to provide data based on the species present and their height, speed and direction of flight as stipulated by the Band Model and relevant guidelines (SNH, 2016) (Band, 2000) (DEWHA, 2017). Each BUS survey point was replicated at different times of the day across each survey period to account for bird utilisation during peak and trough periods of bird activity. Combined with seasonality surveys, this method allows for the greatest variety of statistical data that can be used for modelling and Before-After-Control-Impact (BACI) design. *The Onshore Wind Farm Guidance* (DCCEEW, 2024) outlines the need to improve the understanding of site (and surrounds) utilisation through survey work for each relevant species. The survey approach remains in accordance with the updated version *Onshore Wind Farm Guidance on the management of birds and bats for onshore wind farms* (DCCEEW, 2024).

Each fixed-point survey site was located to provide a search radius of approximately 100 m for small birds and up to 800 m for large birds. Searches primarily focused on threatened birds and birds most likely to be affected by the development, such as raptors (birds of prey) and large flocks of birds. This technical requirement for BUS is outlined in AusWind's Report, *Wind Farms and Birds: Interim Standards for Risk Assessment* (AWEA, 2005), the draft *Onshore Wind Farm Guidance under Australia's national environment law* (DCCEEW, 2024) and

Appendix 1 – *Ecological assessment methodology and bird and bat studies of the draft Planning guidance State code 23: Wind farm development* (DSDILGP, 2023).

The survey design for BUS surveys has also been implemented with reference to the *Onshore Wind Farm Guidance* (DCCEEW, 2024) which requires BUS to be completed over relevant seasons within a 24 month period prior to commissioning of a wind farm. BUS was completed from December 2023 to July 2025 and included four BUS each in both the wet and dry seasons within a 24-month period (more detail in Preliminary BBMP), therefore meeting this requirement despite only occurring only 17 months.

Survey Guidelines for Australia's threatened birds (DEWHA, 2017) outlines steps that aid in determining survey effort and timing, noting a particular focus on optimal timing for surveys of 'target' taxa. With the timing of surveys being critical to species detection, it is important that surveys be timed to maximise potential detection across the year. As such, four BUS events have been completed over each season in Queensland (post-wet and post-dry).

State Code 23 details the requirement for BUS for wind farm developments. Such surveys identify avian species, numbers present, height flown and site utilisation. All field investigations undertook BUS in accordance with the Band Model, at waterbodies and in open areas for birds of prey. Thus, the survey effort was performed in accordance with State Code 23 requirements.

The Onshore Wind Farm Guidance (DCCEEW, 2024) details the need to undertake a risk assessment for birds and bats following BUSs for the Study Area. This risk assessment must take into account the likelihood and consequences of events including collision with wind turbines and the impact of construction and operation on the Proposed Action causing changes in site utilisation by bird and bat species (DCCEEW, 2024).

The Onshore Wind Farm Guidance (DCCEEW, 2024) recommend that the BACI design principle for surveys where the Study Area is determined to support significant bird species is implemented. The aim of the BACI design is to compare environmental variables before and after human activity and between the area affected by the development (impact) and an unaffected area (control) (Stewart-Oaten, Murdoch, & Parker, 1986). In this instance, this would compare control and impact areas, before and after the construction of the Proposed Action, to determine if there are any avian impacts as a result of the Proposed Action. For the Proposed Action, impact sites are generally located within 500m of the proposed turbine locations. Control sites are defined as sites that are placed at a sufficient distance from the proposed turbine locations to obtain data outside the zone of influence of the turbines (> 500m) (as defined in State code 23). These areas will be revisited and resurveyed during the detailed design phase (pre-construction), during construction and after construction (operation phase) of the Proposed Action. Based on the current turbine layout, there are considered to be 9 control sites and 17 impact sites. Ultimately, the BACI design BUS sites will be finalised prior to construction activities and will include a diversity of habitat types to ensure a whole, representative depiction of the Study Area is obtained.

Further detail on how the BUS program undertaken in the Project Area meets relevant State and Commonwealth requirements is provided in the Preliminary BBMP (Appendix E).

Woodland Surveys

Of the 26 unique fixed-point BUS locations, 10 were woodland surveys. These surveys were conducted in woodland or riparian habitats and were relevant for listed threatened species such as diamond firetail (*Stagonopleura guttata*), glossy black cockatoo (*Calyptorhynchus lathami lathami*) and southern whiteface (*Aphelocephala leucopsis*) as well as diurnal woodland and riparian bird species. These locations were of higher habitat quality than the highly disturbed paddocks in the Project Area and are thus useful in identifying a diversity of bird species, both threatened and non-threatened.

Waterbody Surveys

Of the 26 unique fixed-point BUS locations, six were waterbody surveys. Waterbody surveys were relevant for the listed threatened species such as Latham's snipe (*Gallinago hardwickii*) and squatter pigeon (southern) (*Geophaps scripta scripta*) as well as aquatic species and woodland species utilising the waterbody. Observations were made from a stationary position, and birds were identified by call detection and visual observations. The Project Area contained several artificial waterbodies, likely to act as important water sources in the landscape, particularly during dry conditions.

Vantage Surveys

Of the 26 unique fixed-point BUS locations, 10 were vantage surveys. Vantage surveys were relevant for the listed threatened species such as white-throated needletail (*Hirundapus caudacutus*) and fork-tailed swift (*Apus pacificus*) as well as other birds of prey with potential to be impacted by the Proposed Development. Vantage surveys were undertaken at vantage points (i.e. large plateaus and extensively cleared areas), where birds of prey are known to soar and circle over open areas utilising thermals and orographic currents. These locations generally give a vista of several kilometres (due to an absence of tree and canopy cover) depending on weather conditions, so that raptor species may be observed within an approximate 2km buffer of the BUS location.

Broadcast Surveys

Broadcast surveys were the listed threatened species such as diamond firetail (*Stagonopleura guttata*). Broadcast surveys for diamond firetail were conducted during regular diurnal survey activities.

4.5.3.8 BATS

Targeted survey approaches were implemented alongside survey guidelines to assess the presence of listed bat species within the Project Area. Survey method and effort undertaken for listed bat species are as follows.

Habitat surveys

Searches for threatened bats involved microhabitat identification and searches for signs of the species. This occurred throughout the Project Area concurrently with habitat quality assessments in areas identified as potential habitat for threatened bats identified in desktop searches and by the most recent ground-truthed species habitat mapping. The Disturbance Footprint was also used to identify priority survey locations.

Acoustic Surveys

Acoustic microbat surveys were undertaken to characterise bat activity within and surrounding the Project Area, with ultrasonic bat detectors (Anabat) deployed during the wet seasons of December 2023, February 2024 and December 2024, together with targeted harp trapping in December 2024. Surveys were intentionally focused on the wet season, which represents the period of highest microbat activity and species detectability in Queensland as a result of increased insect availability and warmer nocturnal temperatures. This approach is consistent with the Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (DES, 2022), which recognise that acoustic surveys conducted during periods of peak activity provide a robust and conservative measure of species presence and relative activity, and do not prescribe mandatory multi-season sampling where sufficient effort is achieved during optimal conditions.

Importantly, State Code 23 does not specify a requirement for bat surveys to be undertaken across multiple seasonal periods, instead requiring that sufficient ecological information is collected to demonstrate that impacts to bats can be appropriately avoided, mitigated and managed. The survey effort completed aligns with the performance-based assessment framework of State Code 23 by focusing on periods when bat activity, and therefore potential interaction with wind turbines, is greatest, providing a precautionary assessment of risk.

This approach is also consistent with the draft Onshore Wind Farm Guidance (DCCEEW, 2024), which identifies wet-season and warm-weather acoustic monitoring as best practice for establishing baseline bat activity at wind farm sites and supports survey designs that prioritise periods of highest risk rather than uniformly sampling across seasons with consistently low activity levels. On this basis, the wet-season acoustic and trapping surveys completed are considered sufficient to characterise microbat presence and activity within the Project Area and to inform impact assessment and mitigation under both State and Commonwealth approval frameworks.

Twenty seven Anabats were placed throughout the relevant areas within the Project Area and collected data on bat calls which resulted in the collection of 281 survey nights of data. Anabats were placed across representative vegetation and habitat types and included riparian woodlands, *Callitris* spp. woodlands, ironbark woodlands on rocky escapements and farm dams. The detectors were specifically positioned to be facing potential flight paths and/or were located in proximity to roosting habitats (i.e., hollows or rocky overhangs) and/or water sources (i.e. farm dams). The survey locations were selected to give the greatest likelihood of detecting an abundance and diversity of bat species.

The detectors were secured onto trees at approximately 1.8 m above the ground. They were collected and the information recorded was then analysed by a specialist to determine the species recorded.

Harp Trapping Surveys

In December 2024, four harp traps were deployed over five nights, yielding 14 trap nights. Inclement weather during this period limited access to some traps, preventing them from being opened in the evening therefore limiting the number of consecutive trap nights to 14. In February 2025, a second survey was conducted, with four harp traps deployed over five nights for a total of 20 trap nights. Trapping was used to determine the potential presence of threatened bat species that cannot be accurately determined through ultrasonic detection.

Harp traps were placed across representative vegetation and habitat types and included riparian woodlands, *Callitris* spp. woodlands, ironbark woodlands on rocky escarpments and

farm dams. Harp traps were constructed to be facing potential flight paths or in proximity to roosting habitats (i.e., hollows or rocky overhangs) and/or water sources (i.e. farm dams). The survey locations were selected to give the greatest likelihood of trapping an abundance and diversity of bat species. Harp traps were erected in the late afternoon and opened at dusk. Bats were then collected and identified in the early morning.

4.5.4 CLIMATIC CONDITIONS

Survey conditions for the 48 days of survey from December 2023 to October 2025 were largely consistent with expected averages for rainfall and temperature within the Toowoomba region. A comparison of weather conditions between 2023 and 2025 against monthly mean maximum daily temperatures and average monthly rainfall totals is presented in Figure 4-3 and Figure 4-4.

In December 2023, 79.0 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, which is below the mean average (of the last 20 years) of 89.9 mm. The mean maximum temperature during December 2023 (34.1°C) was higher than the December average of 31.8°C. These observations together indicate that the survey period was hotter and drier than it has been historically. Weather observations at the nearest weather station with the available data, Dalby, for each day of the December 2023 survey period are presented in Table 4-5

In February 2024, 34.2 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, which is well below the mean average (of the last 20 years) of 77.0 mm. The mean maximum temperature during February 2024 (31°C) was very similar to the February average of 31.7°C. These observations together indicate that the survey period was far drier than it has been historically. Weather observations at the nearest weather station, Dalby, with the available data for each day of the February 2024 survey period are presented Table 4-6.

In May 2024, 23.8 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, which is slightly below the mean for May (of the last 20 years) of 37.7 mm. The mean maximum temperature during May 2024 (23.3°C) was very similar to the typical average of 23.2°C. These observations together indicate that the survey period was in line with historical climatic conditions. It should be noted that adverse weather conditions were experienced on 8 May 2024 during the survey period, with substantial rainfall in upstream catchments to create flash flooding within the Project Area. Weather observations at the nearest weather station, Dalby, with the available data for each day of the May 2024 survey period are presented in Table 4-7

In July/August 2024, the mean maximum temperature for the survey period, being 18.3°C, was slightly lower than the mean maximum temperatures for July (19.8°C) and August (22°C). Similarly, the mean minimum temperature, being -3.1°C, was also below the mean minimum temperature for July (5.4°C) and August (4.1°C). The July/August survey period did not experience any rainfall. Weather observations at the nearest weather station with the available data (Dalby) for each day of the July/August 2024 survey period are presented in Table 4-8.

In December 2024, 127.4 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, which is above the mean average (of the last 20 years) of 89.9 mm. The mean maximum temperature during December 2024 (32°C) was higher than the December average of 31.8°C. These observations together indicate that the survey period was hotter and wetter than it has been historically. Weather observations at the nearest weather station, Dalby, with the available data for each day of the December 2024 survey period are presented in Table 4-9

In February 2025, 39.8 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, with 35.2 mm occurring within one day. The mean maximum temperature during February 2025 (31.9°C) was lower than the maximum temperature recorded during the survey period (32.7°C). Similarly, the mean minimum temperature for the month (17.7°C) was lower than minimum recorded during field surveys (14.3°C). These observations indicate that the survey period was cooler than it has been historically. Weather observations at the nearest weather station, Dalby, with the available data for each day of the February/March 2025 survey period are presented in Table 4-10.

In May 2025, 44.2 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, with 31.4 mm falling within one day. The mean maximum (23.8°C) and minimum (10.5°C) temperature for May 2025 coincided with those temperatures recorded during the survey period. Weather observations at the nearest weather station, Dalby with the available data for each day of the May 2025 survey period are presented in Table 4-11.

In July 2025, 43.0 mm of rain was recorded at the nearest weather station, Dalby Airport, with data for this month, with 24.8 mm falling within one day. The mean maximum (20.2°C) and minimum (3.4°C) temperature for July 2025 coincided with those temperatures recorded during the survey period. Weather observations at the nearest weather station, Dalby, with the available date for each day of the July 2025 survey period are presented in Table 4-12.

In September 2025, 9.4 mm of rainfall was recorded at the nearest weather station, Dalby Airport, with data for this month, with 8.6 mm falling in one day. The mean maximum temperature for the survey period, being 31.2°C, was similar to the mean maximum temperatures for September (26.4°C) and October (32.8°C). Similarly, the mean minimum temperature, being 9.1°C, corresponded with the mean minimum temperature for September (8.2°C) and October (14.9°C). Weather observations at the nearest weather station, Dalby, with the available date for each day of the September 2025 survey period are presented in Table 4-13.

TABLE 4-5 DAILY WEATHER OBSERVATIONS AT DALBY WEATHER STATION DURING DECEMBER 2023 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
04/12/2023	17.7	34.5	0	28.1	54	W	7	33.9	22	WSW	15
05/12/2023	19.7	32.7	0	26.7	58	NW	6	31.8	38	SE	7
06/12/2023	19.6	35.7	0	26.6	61	NW	9	34.9	35	SE	15
07/12/2023	18.2	36.6	0	30.0	35	E	17	35.8	24	ENE	26
08/12/2023	16.8	35.0	0	27.7	42	ESE	17	34.3	29	E	26

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-6 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING FEBRUARY 2024 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
12/02/2024	18.1	31.3	0	26.3	59	E	24	30.1	45	E	24
13/02/2024	17.0	28.5	0	24.7	71	ENE	20	27.7	62	ENE	26
14/02/2024	19.0	31.8	0	25.2	70	Calm		27.4	66	NW	19
15/02/2024	20.6	29.6	23.0	23.8	87	ESE	13	29.2	55	E	17
16/02/2024	20.7	28.8	0	24.1	77	E	24	25.2	69	E	31

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-7 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING MAY 2024 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
06/05/2024	11.3	24.5	0	19.8	80	ENE	13	22.5	65	ENE	20
07/05/2024	7.2	23.5	3.6	18.1	81	ESE	22	20.5	70	E	24
08/05/2024	10.0	22.4	0.4	18.5	69	ESE	24	21.0	62	ESE	28
09/05/2024	10.1	22.9	0	18.7	75	ENE	28	20.6	60	ESE	26
10/05/2024	9.5	23.0	0	18.6	70	ENE	28	21.0	48	ESE	26

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-8 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING JULY/AUGUST 2024

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
29/07/2024	-4.0	16.2	0	6.5	74	SW	13	16.0	29	SW	28
30/07/2024	-4.4	17.2	0	6.2	77	Calm		16.6	25	S	19
31/07/2024	-2.5	19.0	0	9.1	60	SSE	4	18.7	27	SSW	15
01/08/2024	-2.5	19.1	0	10.2	64	SSE	66	18.3	29	SSE	13
02/08/2024	-2.0	20.0	0	9.4	69	SSE	2	19.4	24	SSW	11

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-9 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING DECEMBER 2024 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
02/12/2024	20.3	32.4	0.2	26.9	67	N	13	30.7	49	NNE	22
03/12/2024	19.7	28.5	0	24.6	80	N	24	28.2	58	N	17
04/12/2024	21.0	31.3	0	25.4	67	NNW	7	30.5	51	ENE	13
05/12/2024	20.8	32.5	0	26.9	67	Calm		31.5	51	ESE	24
06/12/2024	18.6	31.9	0	26.2	59	NE	19	31.6	44	ESE	22
07/12/2024	18.7	33.8	0	25.0	68	N	7	32.6	35	WNW	11

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-10 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING FEBRUARY/MARCH 2025

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
24/2/2025	18.0	33.4	0	26.2	63	ENE	22	32.7	34	ENE	19
25/2/2025	17.6	32.5	0	25.2	63	ESE	22	31.7	32	ESE	28
26/2/2025	17.6	32.3	0	25.7	61	ESE	28	31.9	34	E	20
27/2/2025	14.3	32.4	0	25.3	59	E	28	31.5	30	ESE	24
28/2/2025	14.7	32.7	0	25.8	56	E	20	31.9	34	ESE	28
01/03/2025	15.7	15.7	0	26.7	52	E	30	32.4	32	ESE	30

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-11 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING MAY 2025 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
26/05/2025	14.8	31.3	0	19.9	75	ESE	6	31.0	28	NNW	20
27/05/2025	16.4	26.8	0	21.1	83	NW	28	23.3	60	WSW	35
28/05/2025	7.6	20.4	0	13.1	57	SSW	13	19.6	34	SW	9
2/05/2025	10.9	17.8	0	13.2	67	SE	9	17.3	51	SW	9
30/05/2025	12.0	16.0	0.8	12.2	93	S	9	15.8	80	SE	13

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-12 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING JULY 2025 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
14/07/2025	-1.5	21.7	0	11.7	51	NW	11	21.1	22	W	20
15/07/2025	-0.3	22.8	0	10.8	52	NW	6	21.5	25	WSW	15
16/07/2025	1.8	24.5	0	12.7	57	E	9	22.5	26	SSW	4
17/07/2025	5.5	23.5	0	16.2	77	E	9	23.0	44	N	17
18/07/2025	12.6	20.8	1.4	16.0	92	NW	17	17.0	74	WSW	30

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 4-13 DAILY WEATHER OBSERVATIONS AT DALBY AIRPORT STATION DURING SEPTEMBER/OCTOBER 2025 FIELD SURVEYS

Date	Daily Temp		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp	RH	Dir	Spd	Temp	RH	Dir	Spd
	°C	°C		°C	%		km/hr	°C	%		km/hr
29/09/2025	9.9	33.1	0	25.6	44	WNW	13	32.7	10	SSW	15
30/09/2025	8.3	33.1	0	22.4	58	NNW	9	32.5	18	WNW	17
01/10/2025	12.8	32.0	0	24.8	52	N	22	30.9	32	NNW	22
02/10/2025	9.0	31.9	0	24.3	26	S	9	31.1	15	W	26
03/10/2025	9.2	28.0	0	20.1	18	S	24	26.8	9	S	22
04/10/2025	5.1	29.1	0	19.5	35	SSE	9	27.9	20	E	20

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

FIGURE 4-3 COMPARISON OF SURVEY PERIOD MEAN MONTHLY TEMPERATURE AGAINST HISTORIC AVERAGES

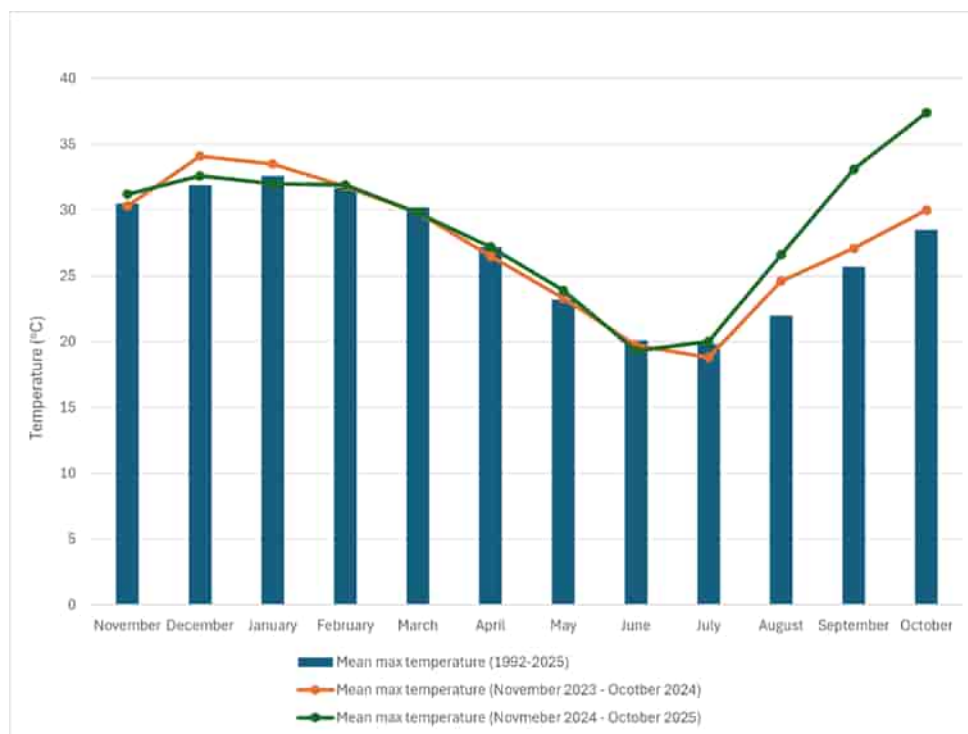
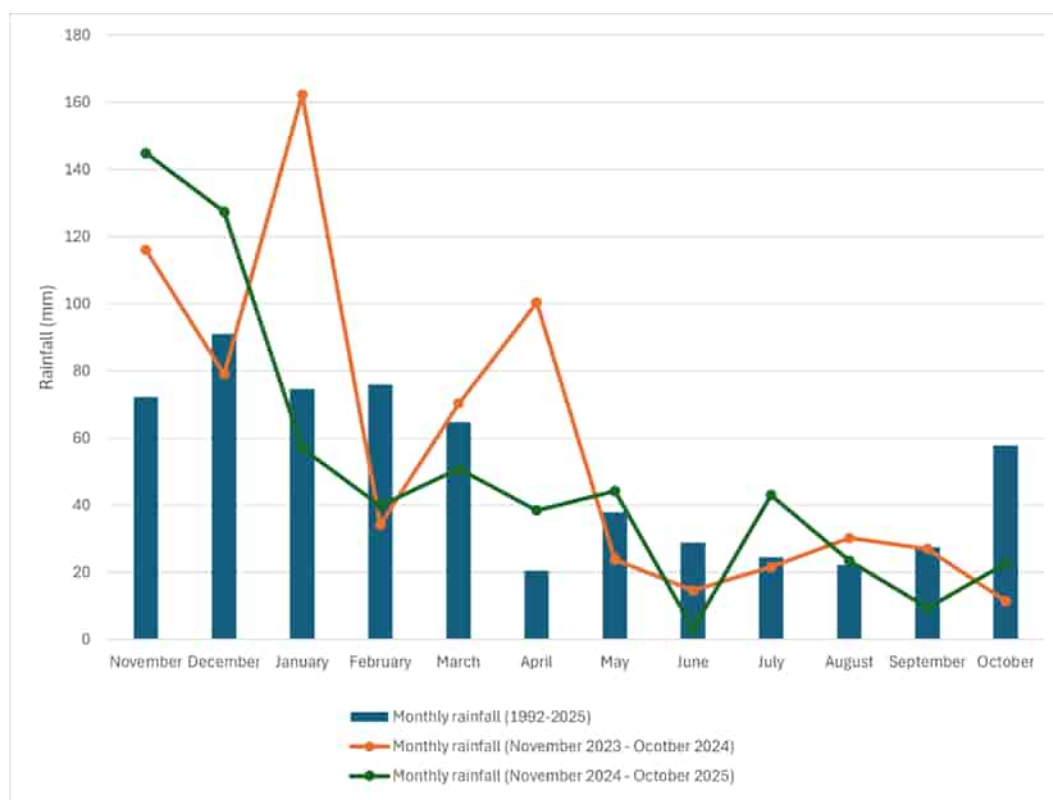


FIGURE 4-4 COMPARISON OF SURVEY PERIOD MEAN MONTHLY RAINFALL AGAINST HISTORIC AVERAGES



4.5.5 SURVEY ADEQUACY

Table 4-14 presents a survey adequacy assessment for the protected species that were identified during desktop assessment as having the potential to occur has been undertaken for the field survey effort completed within the Project Area.

TABLE 4-14 SURVEY ADEQUACY ASSESSMENT

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Listed Threatened Plants			
Tara wattle (<i>Acacia lauta</i>) Vulnerable	Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DES, 2020) - Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available; - The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed; and - There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.	149 quaternary vegetation assessments; and 72 habitat quality assessments.	Survey effort considered adequate This species has not been observed during field surveys, despite suitable habitat being identified and surveyed.
<i>Prostanthera</i> sp. Dunmore (D.M. Gordon 8A) Vulnerable	Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DES, 2020) Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available;	149 quaternary vegetation assessments; and 72 habitat quality assessments.	Survey effort considered adequate This species has not been observed during field surveys, despite suitable habitat being identified and surveyed.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	- The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed; and - There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.		
Kogan waxflower <i>(Philotheca sporadica)</i> Endangered	Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DES, 2020) - Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available; - The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed; and - There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.	149 quaternary vegetation assessments; and 72 habitat quality assessments.	Survey effort considered adequate. Species was observed during field surveys.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
<i>Rutidosia glandulosa</i> Near Threatened	Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DES, 2020) - Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available; - The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed; and - There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.	149 quaternary vegetation assessments; and 72 habitat quality assessments.	Survey effort considered adequate This species has not been observed during field surveys, despite suitable habitat being identified and surveyed.
<i>Rutidosia lanata</i> Near Threatened	Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DES, 2020) Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available;	149 quaternary vegetation assessments; and 72 habitat quality assessments.	Survey effort considered adequate This species has not been observed during field surveys, despite suitable habitat being identified and surveyed.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	- The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed; and - There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.		
<i>Westringia parvifolia</i> Vulnerable	Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DES, 2020) - Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available; - The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed; and - There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.	149 quaternary vegetation assessments; and 72 habitat quality assessments.	Survey effort considered adequate This species has not been observed during field surveys, despite suitable habitat being identified and surveyed.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Listed Threatened Birds			
Diamond firetail (<i>Stagonopleura guttata</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) - There are no targeted survey guidelines for this species; - Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended; and - Active searches for microhabitat features is recommended.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 28 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records. May 2025: 33 BUS individual BUS; and - Opportunistic records.	Survey effort considered adequate Survey effort was conducted in a range of habitats throughout the Project Area by suitably qualified ecologists, including suitable habitat of grassy eucalyptus woodlands and grasslands. No observation of the species occurred during field surveys however suitable habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
		July 2025: 32 BUS individual BUS; and - Opportunistic records. September/October 2025 34 quaternary vegetation assessments; and - Opportunistic records.	
Glossy black cockatoo (<i>Calyptorhynchus lathami</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) - Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended; and - Active searches for microhabitat features is recommended. Targeted species survey guidelines: glossy black cockatoo (<i>Calyptorhynchus lathami</i>) (Hourigan, 2012). - Diurnal bird surveys – conducted on foot by walking transects particularly in areas with <i>Allocasuarina</i> trees, waterbodies suitable for drinking sites and large hollow-bearing eucalypts (during the breeding season); and - Searching for foraging and nesting signs – walking transects searching for discarded, chewed she-oak	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 28 individual BUS; and - Opportunistic records.	Survey effort considered adequate Survey effort was conducted in a range of habitats throughout the Project Area by suitably qualified ecologists, including woodlands of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>, by suitably qualified ecologists. Survey effort was conducted during breeding season (March-August) and no evidence of hollow utilization was captured Two individuals were recorded during February 2023 field surveys, and a further four individuals were recorded during July 2025 field surveys.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	seed cones ('orts') beneath <i>Allocasuarina</i> trees. The minimum survey effort for glossy black cockatoo (south-eastern) is: • Diurnal bird surveys – five hours for a minimum of one day; and • Searching for foraging and nesting signs – 20 hours for a minimum of four days.	February/March 2025: • 27 individual BUS; and • Opportunistic records. May 2025: • 33 BUS individual BUS; and • Opportunistic records. July 2025: • 32 BUS individual BUS; • 30 hollow transects; and • Opportunistic records. September/October 2025 • 34 quaternary vegetation assessments; and • Opportunistic records.	
Latham's snipe (<i>Gallinago hardwickii</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) • There are no targeted survey guidelines for this species however DEWHA have advice of surveying efforts for shorebirds; • Observation using telescope from vantage points overlooking suitable foraging or roosting habitat at the appropriate period of the tidal cycle; and • Diurnal area search in appropriate habitat in and around the Project Area,	December 2023: • 77 quaternary vegetation assessments; • 46 habitat quality assessments; • 22 individual BUS; and • Opportunistic records. February 2024: • 35 quaternary vegetation assessments; • 24 habitat quality assessments; • 28 individual BUS; and • Opportunistic records. December 2024: • 3 quaternary vegetation assessments; • 2 habitat quality assessments; • 28 individual BUS; and • Opportunistic records.	Survey effort considered adequate Survey effort was conducted in a range of habitats throughout the Project Area by suitably qualified ecologists, including waterbodies. Surveys were conducted during the appropriate species migration period to Australia (DCCEEW, 2025). No observation of the species occurred during field surveys however potential habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	including flushing surveys in particular for snipe and painted snipe. Species Profile and Threats Database: Gallinago hardwickii – Latham's Snipe, Japanese Snipe (DCCEEW, 2024) - There are no targeted survey guidelines for this species however DCCEEW have advice of surveying efforts; - Latham's Snipe can be surveyed by performing area searches or line transects in suitable habitat; - Mist-netting can also be used to capture birds, and potentially to derive capture-recapture estimates to estimate population sizes; - In Australia, surveys should be conducted between October and February, which is the period between the species' arrival and departure in Australia; and - Surveys are best conducted during the day, as the snipe appears to disperse from roosting areas at dusk and then return before or at dawn.	February/March 2025: 27 individual BUS; and - Opportunistic records.	
Southern whiteface (<i>Aphelocephala leucopsis</i>)	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments;	Survey effort considered adequate Survey effort was conducted in a range of habitats throughout the Project Area by suitably qualified

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Vulnerable	listed as threatened under the EPBC Act (DEWHA, 2017) - There are no targeted survey guidelines for this species; - Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended; and - Active searches for microhabitat features is recommended.	22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 28 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records. May 2025: 33 BUS individual BUS; and - Opportunistic records. July 2025: 32 BUS individual BUS; and - Opportunistic records.	ecologists, including open woodlands (containing eucalypts). No observation of the species occurred during field surveys however potential habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
		September/October 2025 34 quaternary vegetation assessments; and - Opportunistic records.	
Squatter pigeon (southern) <i>(Geophaps scripta scripta)</i> Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) - Squatter pigeon (southern) surveys should be conducted by area searches or transect surveys in suitable habitat; - Additionally, flushing surveys are considered likely to be useful, however are not the preferable method; and - Optimal survey conditions are likely between May to late October, and juveniles are predominantly detected during June.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 28 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records.	Survey effort considered adequate Survey effort was conducted in a range of habitats throughout the Project Area by suitably qualified ecologists, including patches of eucalypt woodlands and open forests close to permanent bodies. No observation of the species occurred during field surveys however suitable habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
		May 2025: 33 BUS individual BUS; and - Opportunistic records. July 2025: 32 BUS individual BUS; and - Opportunistic records. September/October 2025 34 quaternary vegetation assessments; and - Opportunistic records.	
White-throated needletail (<i>Hirundapus caudacutus</i>) Vulnerable	Species Profile and Threats Database: <i>Hirundapus caudacutus</i> – White-throated needletail (DCCEEW, 2025) - There are no targeted survey guidelines for this species however DCCEEW have advice of surveying efforts; - The species are primarily aerial and occur at great elevations. When flying at lower altitudes they are readily detectable; - Systematic surveys are difficult due to the species mobility and ability to cover immense distances in a day; and - Any surveys must be conducted between October and April in northern and eastern Australia, and between December and March in south-eastern Australia.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 28 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records.	Survey effort considered adequate Survey effort was conducted in a range of habitats throughout the Project Area by suitably qualified ecologists, including vantage points. Records within 50 km of the Project Area are concentrated in December to February (ALA, 2025), meaning that these are the optimal times for survey. Surveys coincided with this time, with BUS undertaken in December and February. No observation of the species occurred during field surveys however suitable aerial foraging habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Listed Threatened Mammals			
Corben's long-eared bat (<i>Nyctophilus corbeni</i>) Vulnerable	Survey guidelines for Australia's threatened bats (DEWHA, 2010) Corben's long-eared bat should be surveyed using capture techniques. - Passive acoustic detection – Bat detectors can be used to identify areas used by long-eared bats, even if they cannot be identified to species level. Acoustic detection can then be followed up with an appropriate level of trapping; and - Trapping – Mist nets and harp traps should be placed in woodland, mallee, and forest, given that the species forages below the tree canopy, often to ground level. Equipment should be placed both in open flyways and within cluttered vegetation. Effort for this method is not precisely stated, but studies have found that the use of 20 or more traps a night for increasing successful detection of bat species (Schulz, 1999). Planning guidance State Code 23: Wind farm development (DSDILGP, 2023) - State Code 23 recommends the use of survey techniques including mist nets and/or bat detection systems that record	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 4 Anabats deployed for 4 consecutive nights (total 16 nights); 1 Anabat deployed for 3 consecutive nights (total 3 nights); and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 1 Anabat deployed for 4 consecutive nights (total 4 nights); 1 Anabat deployed for 88 nights (total 88 nights); 9 person hours of spotlighting over 2 nights; and - Opportunistic records. May 2024: 16 person hours of spotlighting over 2 nights; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 10 Anabats deployed for 17 consecutive nights (total 17 nights); 4 harp traps deployed over 5 nights (total 14 nights); and - Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments were conducted, which identified potential foraging and roosting habitat present within the Project Area. Anabats were deployed in suitable habitat of well-vegetated areas such as eucalypt forest and in the appropriate seasons, totaling 281 recording nights. A <i>Nyctophilus</i> sp. call was recorded as 'possible' at detectors deployed across the Project Area. 34 harp trapping nights were carried out in suitable habitat for the species, meeting the recommended guideline. Harp trapping failed to detect the species, though non-threatened <i>Nyctophilus</i> spp. were identified.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	and analyse echolocation calls of bats.	February/March 2025: 4 harp traps deployed over 5 nights (total 20 nights); and - Opportunistic records. September/October 2025 34 quaternary vegetation assessments; and - Opportunistic records.	
Koala (<i>Phascolarctos cinereus</i>) Endangered	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (DES, 2022) - Requires two-person, 30-minute spotlight searches of 100 x 100 m survey site. This can include spotlighting up one side of the 100 x 100 m area and then spotlighting back the other side of the 100 x 100 m area; and - Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrats. A review of Koala habitat assessment criteria and methods (Youngentob, Marsh, & Skewes, A review of koala habitat assessment criteria and methods, 2021) The koala habitat assessment criteria and methods specify koala surveys are to be completed by a case-by-case scenario, however general methods include:	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 6 koala scat and sign searches; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 3 Koala scat and sign searches; 9 person hours of spotlighting over 2 nights; - Call playback at 2 locations; and - Opportunistic records. May 2024: 16 person hours of spotlighting over 2 nights; - Call playback at 2 locations; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; and - Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments were conducted, which identified suitable habitat present within the Project Area. Scat and sign searches were conducted at nine locations. Spotlighting was conducted in suitable koala habitat and vegetation communities, totaling 25 hours and 4 nights of survey effort. Call playback was undertaken prior to spotlighting at 4 locations Koala scat and sign searches at 9 locations No observation of the species occurred during field surveys, however suitable habitat was detected within the Project Area, and scat was observed in the centre and the south of the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	Direct observations: • Direct observations should be undertaken between August and January for peak activity; • Transect and point surveys (most commonly strip transects); • Nocturnal spotlighting at smaller sites to determine species presence (detecting reflected eye shine) and density; • Trained koala detection dogs; • Mark-resight or mark-recapture; • Thermal detection drones; • Radio tracking; and • Camera trapping in areas where fresh scats and/or scratches have been recorded. Indirect observations: • Scats – spot assessment technique (SAT) involving looking at food trees for presence of koala scats; • Scats – rapid-SAT; and • Scats – koala optimised Rapid Assessment. Methodology: • Scats – balanced koala scat survey; • Scats – faecal standing crop method;	September/October 2025 • 34 quaternary vegetation assessments; • Seven person hours of spotlighting over three nights; and • Opportunistic records.	

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	- Scats – trained scat detection dogs; - Scats – genetic sampling from faecal pellets; - Call playback; - Passive acoustics; - Scratches; and - Landscape nutritional quality surveys.		
Greater glider (southern and central) (<i>Petauroides volans</i>) Endangered	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (DES, 2022) - Requires two-person, 30-minute spotlight searches of 100 x 100 m survey site. This can include spotlighting up one side of the 100 x 100 m area and then spotlighting back the other side of the 100 x 100 m area. - Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrats. Survey Guidelines for Australia's Threatened Mammals (DSEWPC, 2011) - Bright moonlight aids in detecting greater glider (southern and central); and - Spotlighting should be at least two (2) 200 m transects per 5 ha sites. It is also recommended there	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessment locations; 9 person hours of spotlighting over 2 nights; - Opportunistic records May 2024: 16 person hours of spotlighting over 2 nights; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; and - Opportunistic records. July 2025: 30 hollow transects; and - Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments were conducted, which identified potential denning, breeding, foraging and dispersal habitat present within the Project Area. Scat and sign searches were conducted during habitat quality assessments in suitable habitat. Spotlighting was conducted in suitable glider habitat and vegetation communities, totaling 25 hours and 4 nights of survey effort. However, did not meet targeted survey guidelines for coverage. Survey technique and effort is considered adequate to conservatively map habitat. No observation of the species occurred during field surveys however potential habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	be 100 m between survey transects.	September/October 2025 34 quaternary vegetation assessments; - Seven person hours of spotlighting over three nights; and - Opportunistic records.	
Yellow-bellied glider (south-eastern) (<i>Petaurus australis australis</i>) Vulnerable	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (DES, 2022) - Call playback – each call should be played for three minutes, followed by a two-minute listening period and a five-minute spotlight period; - Two-person, 30-minute spotlighting search of 100 x 100 m survey site. This can include spotlighting up one side of the 100 x 100 m survey site and then spotlighting back the other side of the 100 x 100 m survey site; and - Feeding sign searches can coincide with habitat assessments where sap feeding trees are present, as per those listed in the guideline. Survey Guidelines for Australia's Threatened Mammals (DSEWPC, 2011) - The survey guidelines for Australia's Threatened Mammals (DSEWPC, 2011a) specify yellow-bellied glider (south-eastern) surveys should be completed by spotlighting	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessment locations; 9 person hours of spotlighting over 2 nights; and - Opportunistic records. May 2024: 16 person hours of spotlighting over 2 nights; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; and - Opportunistic records. July 2025: 30 hollow transects; and - Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments were conducted, which identified potential denning, breeding, foraging and dispersal habitat present within the Project Area. Scat and sign searches were conducted during habitat quality assessments in suitable habitat. Spotlighting was conducted in suitable glider habitat and vegetation communities, totaling 25 hours and 4 nights of survey effort. However, did not meet targeted survey guidelines for coverage. Survey technique and effort is considered adequate to conservatively map habitat. No observation of the species occurred during field surveys however potential habitat was detected within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	along transects, tracks or roads whilst listening for vocalization; and The survey guidelines further mention call playback and daytime searches for potential den sites in hollow-bearing trees and signs of activity (e.g., V-shaped sap feeding scars) as adequate detection methods.	September/October 2025 34 quaternary vegetation assessments; - Seven person hours of spotlighting over three nights; and - Opportunistic records.	
Short-beaked echidna (<i>Tachygloussus aculeatus</i>) Special Least Concern	No prescribed survey guideline.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; and - Opportunistic records. May 2024: - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; and - Opportunistic records. July 2025: - Opportunistic records. September/October 2025 34 quaternary vegetation assessments; and - Opportunistic records.	Survey effort considered adequate Species considered known to occur, two recent WildNet records within the Project Area from 2021.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Threatened Reptiles			
Yakka skink (<i>Egernia rugosa</i>) Vulnerable	EPBC Act - Draft Referral guidelines for the nationally listed Brigalow Belt reptiles (DCCEEW, 2024) • Diurnal searches overturning woody debris, rocky debris, raking of leaf litter, looking under peeling bark minimum 1.5 hectares per person over a minimum of three days; • Spotlighting areas that are water inundated like gilgais, riparian zones, wetlands and surrounding areas; and • Elliot cage trapping and cage trapping adjacent to potential burrows. Yakka skink, <i>Egernia rugosa</i>. Targeted species survey guidelines (Ferguson & Mathieson, 2014) • Diurnal searches 20 minutes per hectare; • Distant observation scanning area; • Camera traps 12 camera trap nights per colony (only at areas identified as potential denning and not confirmed); and • Funnel trapping 60 trap nights per colony (only at areas identified as potential denning and not confirmed).	December 2023: • 77 quaternary vegetation assessments; • 46 habitat quality assessments; and • Opportunistic records. February 2024: • 35 quaternary vegetation assessments; • 24 habitat quality assessments; • Nine person hours of spotlighting over two nights; and • Opportunistic records. May 2024: • 16 person hours of spotlighting over two nights; and • Opportunistic records. December 2024: • Three quaternary vegetation assessments; • Two habitat quality assessments; • One diurnal targeted mollusc and reptile survey; and • Opportunistic records. February/March 2025: • 12 diurnal targeted mollusc and reptile surveys; and • Opportunistic records. September 2025 • 34 quaternary vegetation assessments; • Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments as well as targeted fauna transects were conducted within the Project Area No suitable habitat was identified during field surveys due to the absence of microhabitat features and severe habitat degradation and fragmentation. No observation of the species occurred during field surveys within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Dunmall's snake (<i>Furina dunmalli</i>) Vulnerable	EPBC Act - Draft Referral guidelines for the nationally listed Brigalow Belt reptiles (DCCEEW, 2024) • Diurnal searches overturning woody debris, rocky debris, raking of leaf litter, looking under peeling bark minimum 1.5 hectares per person over a minimum of three days; • Spotlighting areas that are water inundated like gilgais, riparian zones, wetlands and surrounding areas; • Pitfall trapping and Elliot trapping; and • Opportunistic surveys of roads.	December 2023: • 77 quaternary vegetation assessments; • 46 habitat quality assessments; and • Opportunistic records. February 2024: • 35 quaternary vegetation assessments; • 24 habitat quality assessments; • Nine person hours of spotlighting over two nights; and • Opportunistic records. May 2024: • 16 person hours of spotlighting over two nights; and • Opportunistic records. December 2024: • Three quaternary vegetation assessments; • Two habitat quality assessments; • One diurnal targeted mollusc and reptile survey; and • Opportunistic records. February/March 2025: • 12 diurnal targeted mollusc and reptile surveys; and • Opportunistic records. September 2025 • 34 quaternary vegetation assessments; • Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments as well as targeted fauna transects were conducted within the Project Area No suitable habitat was identified during field surveys due to the absence of microhabitat features and severe habitat degradation and fragmentation. Spotlighting was conducted in potential habitat and vegetation communities, totaling 32 hours and seven nights of survey effort. No observation of the species occurred during field surveys within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Grey snake (<i>Hemiaspis damelii</i>) Endangered	Targeted species survey guidelines – grey snake (<i>Hemiaspis damelii</i>) (Rowland, 2012) - Spotlighting suitable cracking clay and gilgai habitat. - Spotlighting roads at night. - Active diurnal searches targeting sheltering sites and microhabitat features. - Pitfall and funnel trapping.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; - Nine person hours of spotlighting over two nights; and - Opportunistic records. May 2024: 16 person hours of spotlighting over two nights; and - Opportunistic records. December 2024: - Three quaternary vegetation assessments; - Two habitat quality assessments; - One diurnal targeted mollusc and reptile survey; and - Opportunistic records. February/March 2025: 12 diurnal targeted mollusc and reptile surveys; and - Opportunistic records. September 2025 34 quaternary vegetation assessments; - Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments as well as targeted fauna transects were conducted within the Project Area No suitable habitat was identified during field surveys due to the absence of microhabitat features and severe habitat degradation and fragmentation. Spotlighting was conducted in potential habitat and vegetation communities, totaling 32 hours and seven nights of survey effort. No observation of the species occurred during field surveys within the Project Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Threatened Invertebrates			
Brigalow woodland snail (<i>Adclarkia cameroni</i>) Endangered	Conservation Advice <i>Adclarkia cameroni</i> brigalow woodland snail (TSSC, 2016) Suggested technique is raking accumulated leaves and over turning logs, looking for living specimens and shells of dead individuals.	December 2023: • 77 quaternary vegetation assessments; • 46 habitat quality assessments; and • Opportunistic records. February 2024: • 35 quaternary vegetation assessments; • 24 habitat quality assessments; and • Opportunistic records. December 2024: • 3 quaternary vegetation assessments; • 2 habitat quality assessments; • 1 diurnal targeted mollusc and reptile survey; and • Opportunistic records. February/March 2025: • 12 diurnal targeted mollusc and reptile surveys; and • Opportunistic records. September/October 2025 • 34 quaternary vegetation assessments; • 43 specialist mollusc surveys; and • Opportunistic records.	Survey effort considered adequate Diurnal habitat quality assessments as well as targeted fauna transects were conducted within the Project Area No suitable habitat was identified during field surveys due to the absence of microhabitat features and severe habitat degradation and fragmentation. No observation of the species occurred during field surveys within the Project Area.

4.6 VEGETATION COMMUNITY AND HABITAT MAPPING

To map habitat for protected species known, likely or potentially occurring, the Project Area was classified into BHTs. BHTs were identified based on vegetation community type and structure ground-truthed during field surveys. Where the type or extent of vegetation communities in the Project Area was not ground-truthed, RE mapping was used in conjunction with aerial imagery and Project Area knowledge to map BHTs. These BHTs were used to map habitat for protected species, based on the specific habitat requirements and preferences of the species/communities. BHTs within the Project Area are outlined in Section 5.2.2.

While species mapping is loosely based on BHTs, some species require more specialised mapping that considers factors beyond BHTs i.e. proximity to waterbodies and as such, some species habitat is 'associated' rather than 'entirely' a BHT. This nuance lies within different threatened species habitat requirements related to their breeding, foraging, roosting and dispersal requirements as well as considerations of connectivity and records in the broader region.

4.7 PRECAUTIONARY APPROACH

The field and desktop assessment undertaken provides an overview of the ecological values that exist within the Project Area. Surveys were undertaken throughout the Project Area to gain a comprehensive understanding of species, vegetation communities, and habitat features that are known, likely or have the potential to occur. Sampling methods were distributed across the Project Area to obtain a spread of survey locations across nine survey events spanning multiple seasons within a 24-month period.

The DCCEEW Onshore Wind Farm Guidance identifies 24 months of multi-season site utilisation surveys as best practice, while allowing flexibility where seasonal coverage and uncertainty are adequately addressed through survey design. The completed BUS program achieves this intent through repeated, seasonally representative surveys across multiple years, providing a robust baseline dataset suitable for impact assessment and BACI-based monitoring. Consistent with State Code 23, the spatial distribution of 26 survey locations and repeated surveys across seasons and times of day are sufficient to characterise bird utilisation relevant to collision risk and turbine siting. On this basis, the BUS effort is considered sufficient and defensible under both State Code 23 and DCCEEW (2024)

The use of a combination of field survey data and desktop information has achieved the requirements of relevant legislative and policy documents (Section 3) and relevant survey guidelines (Section 4.5.1) to identify ecological values within the Project Area.

A precautionary approach has been taken throughout the entire desktop and field survey methodology and through the discussion of MSES known, likely or potentially occurring in the Project Area. This is because the absence of a species from a database list or lack of observation of a species through field surveys does not confirm its absence from the Project Area if suitable habitat is present. The lack of existing records from databases is more likely to indicate a low historic sampling effort in the region, as opposed to an absence of MSES.

The precautionary approach was applied at the preliminary LoO phase, which resulted in targeted surveys being conducted for a wide range of species initially considered to have the potential to occur.

The precautionary approach was then applied during the final LoO, where survey adequacy for some MSES may not have been met, or there isn't sufficient evidence to rule out a MSES potential presence in the Project Area, despite an absence of records.

Finally, the precautionary approach is also applied as the habitat mapping phase for MSES, by assuming that habitat may be present unless there is field-based evidence from data collection demonstrating that it is not.

5. ECOLOGICAL VALUES

The following section presents the ecological values of the Project Area based on the findings from the desktop review and field surveys.

5.1 LANDSCAPE CONTEXT

The Project Area is located within the Brigalow Belt South bioregion as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) (version 7) framework. The Brigalow Belt South bioregion comprises a mixed landscape, including flat alluvial plains and undulating to hilly areas with low ridges and deep valleys. Vegetation is predominantly mixed eucalypt woodland, with areas of Brigalow scrubs and open Mitchell grasslands. The Brigalow Belt South bioregion experiences a hot to warm sub-humid climate, with rainfall during the summer. Land use within the Brigalow Belt South bioregion is predominantly agricultural (cattle) grazing, comprising approximately 80%.

The Project Area is situated within the Inglewood sandstones sub-bioregion within the Brigalow Belt South bioregion. The Inglewood sandstone sub-bioregion is characterized by a geological landscape dominated by sandstone which results in coarse, well-draining soils often with distinct protruding rocky outcrops and escapements (Queensland Government, 2018b). The vegetation communities that grow in this sub-bioregion are therefore adapted to well-draining nutrient-poor soils. Communities such as dry sclerophyll woodlands and shrublands (dominated by *Eucalyptus* spp. and *Acacia* spp.) are common (DETSI, 2013).

The topography of the Project Area is predominantly flat to undulating with small, sporadic occurrences of ironstone jump ups. The incline and decline of these rises contain ironbark woodland along the ridges. Patches of open forest and woodland are occasionally present in open expanses of grazing land and native vegetation regrowth.

There are four dominant land zones in the Project Area as per the Land Zones of Queensland (Wilson & Taylor, 2012):

- 3 – recent Quaternary alluvial systems;
- 5 - tertiary-early Quaternary loamy and sandy plains and plateaus;
- 7 - cainozoic duricrusts; and
- 9 - fine grained sedimentary rocks.

Land zone 3 is generally low-lying and found along creek and river systems and therefore contains taller and older vegetation communities as these areas are not typically cleared. Land zone 5 is found along sandy flats and undulating plains adjacent to land zone 3, with vegetation communities that have a dense understorey. Land zone 7 occurs sporadically throughout the Project Area, and these areas generally contain some form of rocky jump-up or escapement where the duricrust protrudes upwards. Land zone 9 is found as flat or undulating terrain in the Project Area, sometimes with cattle-degraded gilgai's that hold water and fertility. Large expanses of this land zone have been cleared for pasture grasses due to the fertility and water-holding capacity of these areas.

The Project Area is located in the Surat Basin, which has porous, highly productive aquifers (CSIRO & National Resource Information Centre, BRS, 1991). There are no mapped flood lines within the Project Area as per Queensland Globe mapping.

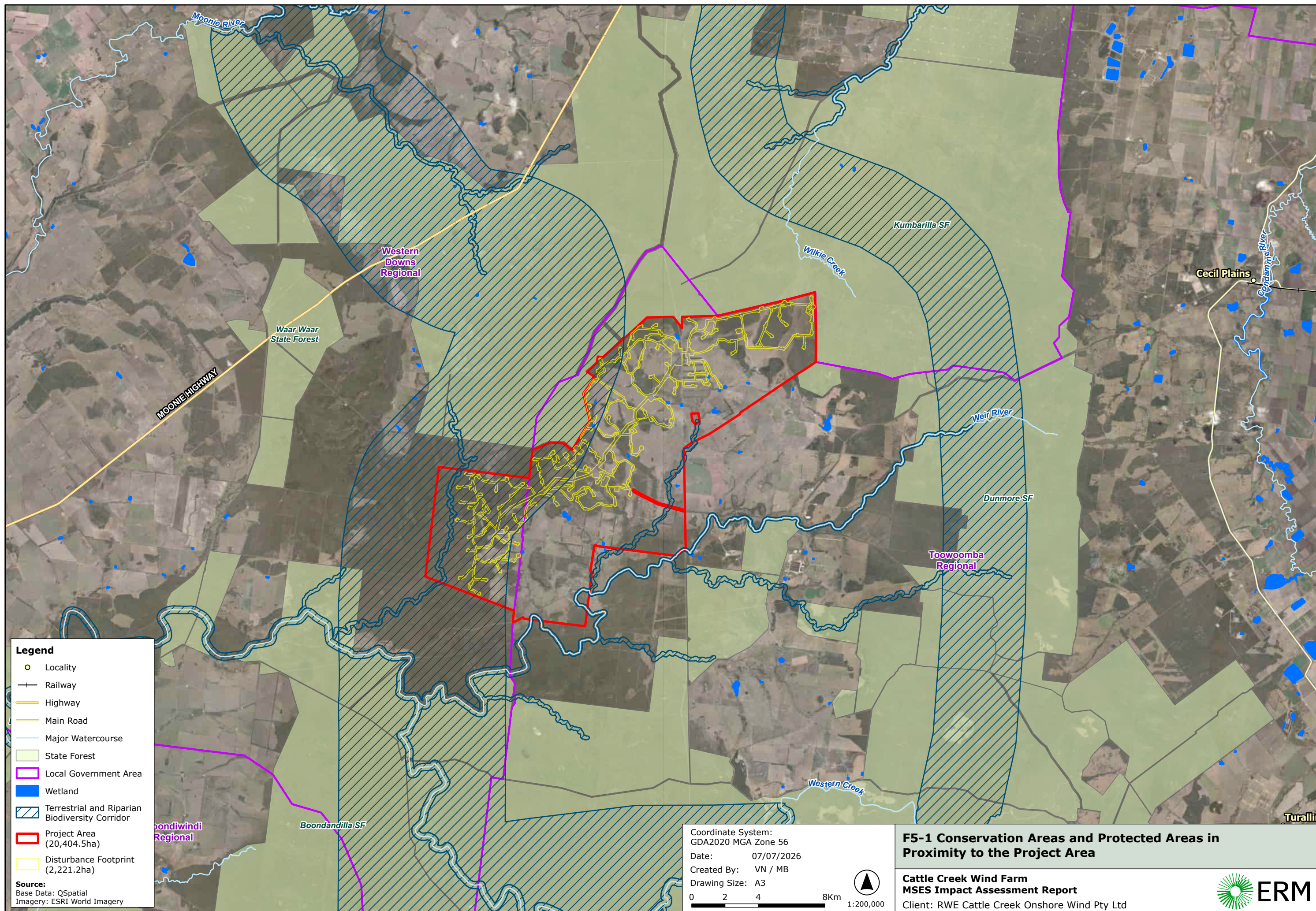
The Project Area hosts several lacustrine wetlands, which are either partly or entirely anthropogenically modified for the purpose of holding water during dry periods. Additionally, the Project Area is intersected by the following River and creeks:

- Weir River;
- Cattle Creek; and
- Waar Waar Creek.

There are no protected areas within the Project Area. The Project Area directly adjoins the Kumbarilla State Forest along the northern to north-western border of the Project Area. The Project Area is also within the locality (10 km) of several other State Forests, namely:

- Waar Waar State Forest, approximately 12 km to the west;
- Boondandilla State Forest, approximately 5 km to the south-west;
- Dunmore State Forest, approximately 10 km to the east; and
- Western Creek State Forest approximately 5 km to the south-east.

The nearby and neighboring protected areas are displayed in Figure 5-1.



5.2 VEGETATION COMMUNITIES

5.2.1 REGIONAL ECOSYSTEMS

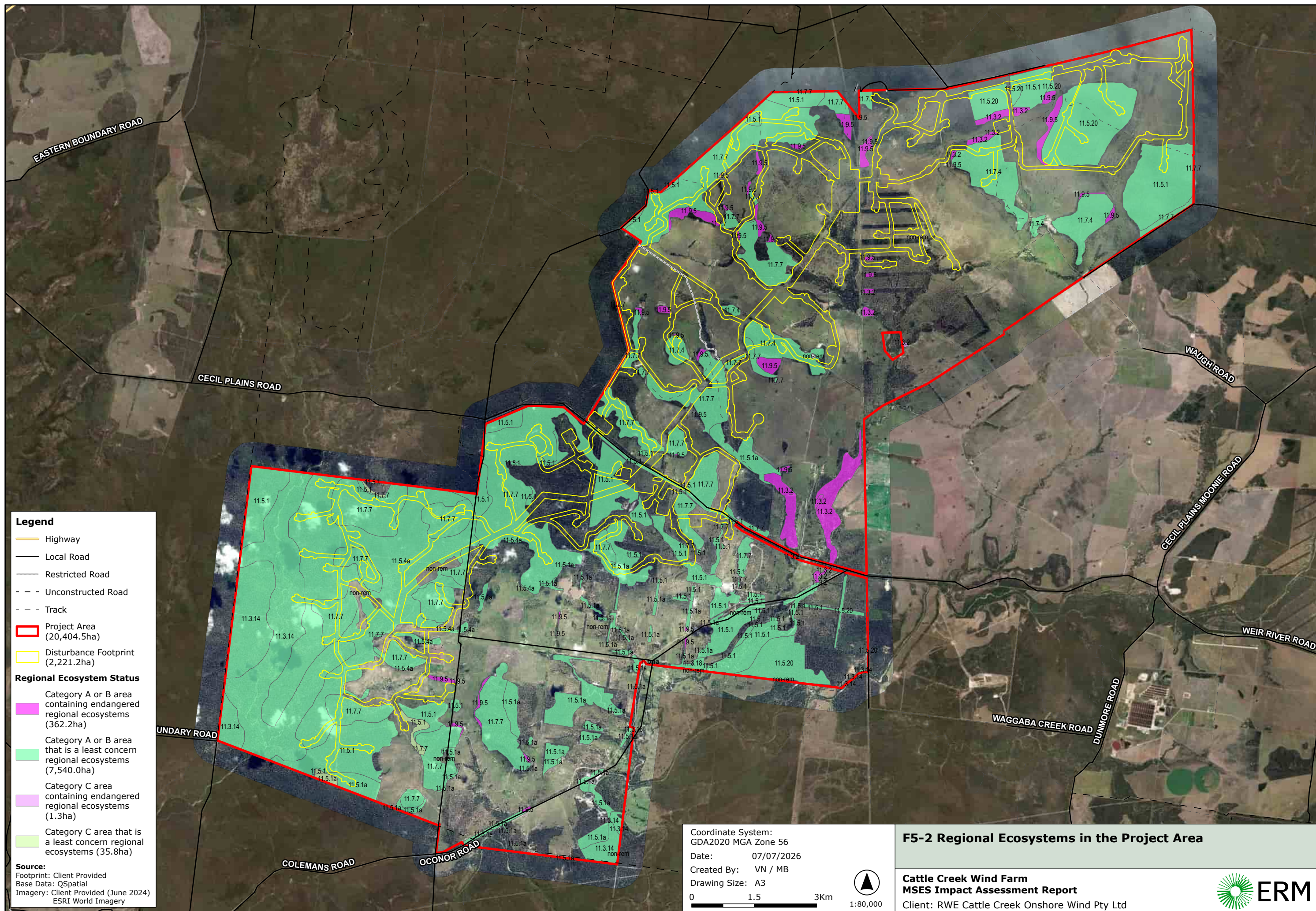
As part of the desktop assessment of the Project Area, RE mapping (Version 13.1) undertaken by the Queensland Government was reviewed to identify the types of vegetation communities that may occur in the Project Area. RE mapping also offers an insight into the environmental state of the Project Area, more specifically as to the degree of clearing activities that have been historically undertaken. Reviewing RE mapping also assisted with designing the field survey program by, for example, targeting REs known to be associated with TECs that may occur in the Project Area.

A summary of the Queensland Government mapped REs present within the Project Area is provided in Table 5-1 and are presented in Figure 5-2.

TABLE 5-1 STATE REGIONAL ECOSYSTEMS IN THE PROJECT AREA

REs	Short Description	VM Act Class	VM Structure Category	Area (ha)
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of Concern	Sparse	173.0
11.3.14	<i>Eucalyptus</i> spp., <i>Angophora</i> spp., <i>Callitris</i> spp. woodland on alluvial plains	Least Concern	Sparse	889.2
11.3.18	<i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium	Least Concern	Sparse	10.5
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least Concern	Sparse	119.2
11.5.1	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	Least Concern	Sparse	1,368.6
11.5.1a	<i>Eucalyptus populnea</i> woodland with <i>Allocasuarina luehmannii</i> low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones.	Least Concern	Sparse	476.9
11.5.4	<i>Eucalyptus chloroclada</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains and/or remnant surfaces	Least Concern	Sparse	111.9
11.5.4a	<i>Callitris glaucophylla</i> +/- <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland. Occurs on Cainozoic plains with deep sandy soils.	Least Concern	Sparse	1,165.5
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> and/or <i>E. woollsiana</i> +/- <i>E. crebra</i> woodland on Cainozoic sand plains	Least Concern	Sparse	558.2
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> woodland on Cainozoic lateritic duricrust	Least Concern	Sparse	723.8

REs	Short Description	VM Act Class	VM Structure Category	Area (ha)
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks	Least Concern	Sparse	14.8
11.7.7	<i>Eucalyptus fibrosa subsp. nubilis</i> +/- <i>Corymbia</i> spp. +/- <i>Eucalyptus</i> spp. woodland on Cainozoic lateritic duricrust	Least Concern	Sparse	2,137.3
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on fine-grained sedimentary rocks	Endangered	Mid-dense	190.6
Non-remnant				12,465.3
Total				20,404.8*
*Total area does not equal 20,404.5 ha (Project Area) due to rounding of individual RE areas.				



5.2.2 BROAD HABITAT TYPES

The Project Area has been classified into ten BHTs, defined based on vegetation type, structure, and habitat features. Importantly, seven of these BHTs (those that form natural, native vegetation communities) have been sub-divided into either a remnant or non-remnant (regrowth) state, primarily based on their maturity, to further refine the habitat mapping approach.

BHTs were identified based on vegetation community type and structure ground-truthed during field surveys. BHTs have been continuously refined as more data has been collected during the field surveys between December 2023 and October 2025. More detail on the BHT mapping methodology is provided in Section 4.6 where survey methodology is discussed. Where the type or extent of vegetation communities in the Project Area was not ground-truthed, RE mapping was used in conjunction with aerial imagery and Project Area knowledge to accurately define the extent of BHTs. These BHTs were used to map habitat for listed threatened and/or migratory species and threatened communities, based on the specific habitat requirements and preferences of the species/communities.

The field surveys identified that the BHTs in the Project Area vary in condition. Those associated with the historical clearing and grazing such as grasslands are in poorer condition showing degradation due to ongoing cattle grazing, erosion, and the presence of introduced flora species. Furthermore, the field surveys identified that certain areas within the Project Area, particularly to the west, have recently experienced high degrees of dieback. The BHTs and the area within the Project Area are summarised in Table 5-2, and a more detailed description of their vegetation communities' classifications and habitat attributes are provided in Table 5-3. Mapping of the extent of BHTs across the Project Area is provided in Figure 5-3.

TABLE 5-2 SUMMARY OF BROAD HABITAT TYPES AND AREA WITHIN PROJECT AREA

Broad Habitat Type	Area (ha)
Cleared land	4,225.1 ha
Agricultural land	5,642.8 ha
Riparian open forests to woodland	1,165.9
Ironbark open forests to woodland on hilly terrain	2,526.2
Ironbark and smooth-barked apple woodland	3,067.6
Poplar box grassy woodland	653.5
Gum-topped box open forests to woodland	682.9
Buloke and poplar box open forests to woodland	1,565.7
Belah with or without brigalow open forests to woodlands	809.3
Permanent waterbodies	65.7
<i>*Total area does not equal 20,404.5 ha (Project Area) due to rounding of individual BHT areas.</i>	

These BHTs have also been considered for how they provide foraging, breeding, roosting, and dispersal functions for listed threatened species that are known, likely, or have the potential to occur within the Project Area.

TABLE 5-3 BROAD HABITAT TYPES WITHIN THE PROJECT AREA

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
Cleared Land: Large expanses of cleared land > 300 m wide that have been historically used for agriculture (predominantly cattle farming) with a distinct absence of trees. 4,225.1 ha.	Tree layer: Absent, or highly scattered with trees greater than 100 m apart. Shrub layer: Very sparse to absent. Occasional regrowth patches, typically of <i>Acacia</i> spp (wattles). Ground microhabitat layer: Native and non-native grasses occur, as well as native and non-native forbs.	The habitat provides minimal value for most taxa due to the extensive clearing and grazing. Very rare paddock trees may provide resting and breeding habitat for smaller avian species. The inconsistency of canopy and hollow bearing trees provide limited to no habitat availability for arboreal mammals. The ground layer may provide shelter in the form of long grass and occasional woody debris for reptiles and small mammals.	

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
Agricultural land with sparse eucalypts or other paddock trees: Similar to cleared land BHT, but with presence of occasional paddock trees. Includes isolated road reserves. Includes completely cleared areas if they are less than 300 m wide between patches of remnant or regrowth vegetation. 5,642.8 ha.	Tree layer: Very sparse, but includes remnant paddock trees, such as eucalypts, cypress-pine (<i>Callitris</i> spp.) and wattles. Shrub layer: Very sparse to absent. Ground microhabitat layer: Native and non-native grasses occur, as well as native and non-native forbs.	Provides minimal habitat value for most taxa due to the extensive clearing and grazing. Occasional paddock trees may provide resting and breeding habitat for smaller avian species. The inconsistency of canopy and hollow bearing trees provides limited to no habitat availability for arboreal mammals. The ground layer may provide shelter in the form of long grass and occasional woody debris for reptiles and small mammals.	
Riparian Open Forests to Woodland Primarily on Sandplains or Depositional Plains: Fringes sandy creeks and rivers, and they are generally remnant riparian zones with large eucalypts. 1,165.9 ha	Tree layer: Smooth-barked eucalypts, such as river red gum (<i>Eucalyptus tereticornis</i>), dominate riparian zones, often existing as emergents up to 20 m tall. The primary canopy can also include species such as poplar box (<i>E. populnea</i>) or narrow-leaved ironbark (<i>E. crebra</i>). These remnant trees are often large and mature. A distinct sub-canopy also occurs in some areas, which is made of white cypress-pine (<i>Callitris</i>	Some of the older trees in this BHT contain large hollows suitable for larger arboreal mammals and birds. Additional sheltering resources include sandy banks, loose or shed bark, woody debris, or complex ground cover. Foraging resources are also diverse and abundant, in some areas more than others, and include mistletoe, flowering trees, shrubs, and belah fruits.	

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
	<i>glaucophylla</i>) or buloke (<i>Allocasuarina luehmannii</i>). Shrub layer: Diverse in structure and species composition. Frequent species include numerous wattles, wilga (<i>Geijera parviflora</i>), mistletoes, <i>Sida</i> spp. and recruits of the tree layer. Ground microhabitat layer: As with shrub layer, this microhabitat layer is diverse in structure and species composition. Grasses, sedges, and rushes all occur, as well as numerous native and non-native forbs.	Fauna usage of this BHT is evident through macropod scats, scratch marks on smooth-barked trees, and bird nests. This BHT provides high habitat value to most fauna, especially considering that these areas are primary water sources in the wet season.	
Ironbark Open Forests to Woodland on Hilly Terrain: Found on sun-exposed, stony, elevated hills and slopes within the Project Area. Soils in these areas are generally shallow and well-draining. 2,526.2 ha	Tree layer: With a canopy height of between 7 m and 10 m, this BHT is dominated by blue-leaved ironbark (<i>Eucalyptus fibrosa subsp. nubilis</i>), And narrow-leaved ironbark), with gum-topped box (<i>E. moluccana</i>) sometimes occurring. White cypress-pine and black wattle (<i>Acacia leiocalyx</i>) occur in the sparse understorey. Shrub layer: Between 1 m and 2 m of moderate density of species such as triangle-leaved hop-bush (<i>Dodonaea</i>	Trees in this area are often mature, but low growing and stunted. As a result, the canopy cover is typically quite low and inconsistent. Sheltering resources in these areas include small hollows, loose bark and coarse woody debris. These microhabitats provide value to birds, small mammals, and reptiles that are acclimated to dry, rocky habitats.	

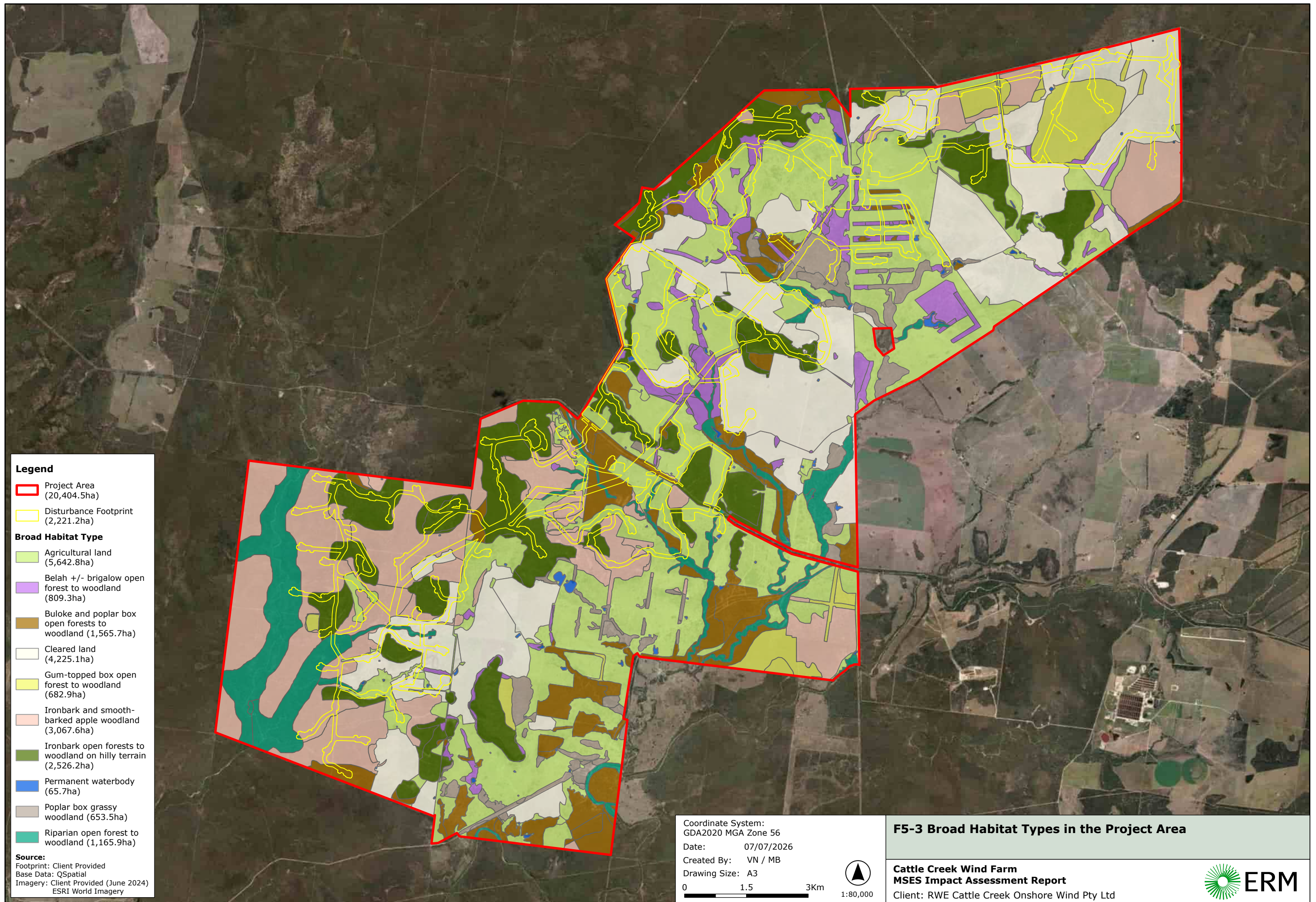
BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
	<i>triangularis</i>), black wattle, crowded-leaf wattle (<i>Acacia conferta</i>) and wilga. Ground microhabitat layer: The ground layer up to 0.5 m is largely native, with species such as barbed-wire grass (<i>Cymbopogon refractus</i>), and rough saw-sedge (<i>Gahnia aspera</i>). The substrate is sandy and rocky with large logs and woody debris.	The diverse, moderately dense shrub layer is likely to provide suitable foraging and sheltering habitat to a range of reptiles, mammals, and birds. The hilly terrain is likely to provide favorable orographic currents that are known to be utilized by birds of prey for soaring and scanning for prey. Thus, this BHT is likely to provide suitable habitat for a range of species.	
Ironbark and Smooth-Barked Apple Woodland with Cypress-Pine and/or Buloke Understory: Occurring in flat or undulating areas on sandy and/or loamy plains. Typically located along the fringes of surrounding nature reserves. 3,067.6 ha	Tree layer: A variable upper canopy height ranging between 10 m and 20 m of predominantly ironbarks interspersed with smooth-barked apple (<i>Angophora leiocarpa</i>), and a sub-canopy of white cypress-pine with or without buloke, and mixed eucalypts. Shrub layer: Density varies from sparse to moderate with moderate species richness. Typical species include triangle-leaved hop-bush, wattles, and rice flower (<i>Ozothamnus diosmifolius</i>).	Trees in this BHT are often tall, mature and have various sizes of hollows suitable to a range of arboreal mammals as well as birds and reptiles. Additional sheltering resources such as thick bark, coarse woody debris and substantial ground cover. The diverse, moderately dense shrub layer is likely to provide foraging and sheltering habitat to a range of reptiles, mammals and birds. This BHT sometimes exists as bordering vegetation	

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
	Ground microhabitat layer: The ground cover has a moderate density of generally native grasses with dominant wire grasses (<i>Aristida</i> spp.). Leaf litter is typically low, with more habitat value provided in fallen woody debris and small hollows.	from the surrounding nature reserves so these areas are of moderate to high quality. Signs of fauna usage exists in the form of scats, diggings and bird nests.	
Poplar Box Grassy Woodland: Occurs in disjunct, isolated patches throughout the Project Area. Some patches constitute poplar box grassy woodland on alluvial plains TEC. 653.5 ha	Tree layer: Canopy cover is mostly greater than 10%, with a canopy approximately 10 m tall dominated by poplar box. Maturity of trees in the canopy vary depending between and within patches. May have a sparse understory of white cypress-pine and buloke. Shrub layer: Does not constitute high levels of biodiversity, and is usually characterized by recruiting poplar box, wilga, or white cypress-pine with or without buloke. Ground microhabitat layer: Generally high levels of ground cover. While native species do occur, edge effects and incursions of non-native grasses and forbs from neighboring pasturelands occur.	Canopy cover is low and does not provide a great deal of shelter to any species. That being said, hollows in this habitat are a valuable sheltering resource. Homogeneity in the shrub and ground layer does not offer much benefit to species, but the presence of native species promotes native fauna occurrence. Signs of fauna usage exists in the form of scats, diggings and bird nests. This BHT is likely to be suitable for a range of taxa, but not for strictly arboreal mammals or other species that require large expanses of wooded vegetation for foraging or shelter.	

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
Gum-topped Box Open Forests to Woodland: Occurs on dark sandy soils as patches of advanced regrowth or thin remnant vegetation. 682.9 ha	Tree layer: With a canopy among the tallest of the Project Area and tree heights ranging between 10 m and 18 m tall across different patches. Canopy species include gum-topped box, narrow-leaved grey box (<i>Eucalyptus woollsiana</i>), and narrow-leaved box (<i>E. microcarpa</i>). A sub-canopy with recruiting eucalypts, cypress-pine, and buloke may also be present. Shrub layer: Sparse to moderately dense shrub layer, including species such as buloke, cypress-pine, wilga, and other shrubs. Ground layer: Soil type is dark and sandy, which supports species in creating a dense ground layer that has a range of tussock grasses and forbs.	This BHT generally occurs as advanced regrowth rather than mature forest or woodland. As such, hollows are limited, and the major sheltering resource is peeling and fallen bark supporting a range of reptiles and insects, but is less valuable to mammals. Loose bark on the ground as well as dense and diverse vegetative ground cover is useful to a range of species for sheltering and foraging. Signs of fauna usage exists in the form of scats, diggings and bird nests.	

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
Buloke and Poplar Box Open Forests to Woodland with Varied Shrubby Understory: This is an abundant BHT present across the Project Area, often in scattered, isolated, or regrowth form. 1,565.7 ha	Tree layer: Buloke is the dominant tree species, forming a distinct sub-canopy. Poplar box and narrow-leaved ironbark also commonly occur in the upper canopy, which is more open than the sub-canopy. Canopy and sub-canopy height varies across the Project Area, but the upper stratum may reach up to 18 m. White-cypress pine is another common occurring tree in this BHT. Shrub layer: A range of species occur in this layer, which can also range in height between 1 m and 4 m. Common species include wattles, wilga, false sandalwood (<i>Eremophila mitchellii</i>), and recruits of the tree layer. Ground microhabitat layer: Diverse within and between sites, but wire grasses, rough saw-sedge and Mayne's pest (<i>Glandularia aristigera</i>) are all frequent. Moderate leaf litter cover and soil is usually a mixture of sand, clay, and loam.	Buloke as the dominant species does not encourage persistence of many large mammalian or bird species, especially given that their branches are not preferable for nest building. Furthermore, buloke does not hollow favourably. Therefore, this BHT does not provide high levels of suitable habitat value for larger fauna despite an abundance of food resources, such as buloke fruit and Eucalyptus flowers. Comparatively, smaller species are likely to favor this BHT given the density of the flora, particularly in providing shelter from predators, as well as abundant food resources. Other sheltering resources in this BHT include coarse woody debris and peeled bark. Thus, it can be seen that the utility of this BHT varies significantly between taxa.	

BHT and Occurrence in the Project Area	Structure	Habitat Features / Condition	Photographic Example
Belah With or Without Brigalow Open Forests to Woodlands: Occurring on a range of soil types and is highly fragmented and isolated in the broader landscape. This BHT sometimes constitutes brigalow open forest to woodland TEC. 809.3 ha	Tree layer: Belah dominates and occurs in most patches, though brigalow (<i>Acacia harpophylla</i>) dominates or co-dominates some patches. Poplar box may occasionally occur, though infrequently. Shrub layer: Generally sparse or containing scattered woodland shrubs, such as wilga, false sandalwood, wild orange, (<i>Capparis canescens</i>) and recruiting brigalow. Ground microhabitat layer: Ground cover is more sparse than in other BHTs in the Project Area, but largely native with some non-natives, such as <i>Opuntia</i>. Leaf litter is prominent.	This BHT is productive for a range of different fauna types, including woodland birds, a range of reptiles, microbats, and terrestrial mammals. Abundant sheltering resources include high canopy cover and individual tree shade, loose bark, coarse woody debris, leaf litter, cracks in soil, and small hollows when eucalypts occur. Food sources include belah fruit, shrubs, and ground species producing flowers and fruit.	
Permanent Waterbodies: Farm dams and ephemeral creeks are scattered throughout the Project Area, as well as several large man-made wetlands. 65.7 ha	Tree layer, shrub layer, and ground microhabitat layer: This BHT refers explicitly to water sources. Different water sources will have different fringing vegetation communities.	Water sources, such as those found across the Project Area, act as a key refuge for a range of fauna that may occur in and around the Project Area. Notably, this BHT is important to migratory waders that may occur in the Project Area, especially given that these species rely on water sources for foraging.	



Legend

- Project Area (20,404.5ha)
- Disturbance Footprint (2,221.2ha)

Broad Habitat Type

- Agricultural land (5,642.8ha)
- Belah +/- brigalow open forest to woodland (809.3ha)
- Buloke and poplar box open forests to woodland (1,565.7ha)
- Cleared land (4,225.1ha)
- Gum-topped box open forest to woodland (682.9ha)
- Ironbark and smooth-barked apple woodland (3,067.6ha)
- Ironbark open forests to woodland on hilly terrain (2,526.2ha)
- Permanent waterbody (65.7ha)
- Poplar box grassy woodland (653.5ha)
- Riparian open forest to woodland (1,165.9ha)

Source:

Footprint: Client Provided
Base Data: QSpatial
Imagery: Client Provided (June 2024)
ESRI World Imagery

Coordinate System:
GDA2020 MGA Zone 56

Date: 07/07/2026

Created By: VN / MB

Drawing Size: A3

0 1.5 3Km



1:80,000

F5-3 Broad Habitat Types in the Project Area

Cattle Creek Wind Farm
MSES Impact Assessment Report

Client: RWE Cattle Creek Onshore Wind Pty Ltd



5.3 CURRENT AND HISTORICAL LAND USE

The Project Area has historically been used for agricultural purposes, predominantly cattle grazing, which continues to be the primary land use. Some cropping also occurs, primarily to produce cattle fodder. These historical and current land uses in the Project Area have prevented recovery of native ecological communities throughout the majority of Project Area. There is an expansive patch of remnant vegetation in the west of the Project Area, though parts of this patch have been affected by severe dieback. There are other scattered remnant and regrowth patches throughout the Project Area that exist in a highly fragmented state. Cleared areas are dominated by pastured land, sparse shrubs and juvenile regrowth. Additionally, the riparian fringing woodlands are limited to creek lines where they are sparse and thin as a result of grazing activities and historic clearing.

The Project Area is adjacent to Kumbarilla State Forest along the north to north-west, and there are several other State Forest's within 15 km. There is a Queensland terrestrial biodiversity corridor mapped immediately to the west of the Project Area, the buffer of which overlaps into the Project Area. Terrestrial biodiversity corridors are mapped by the Queensland Government where there are large areas of remnant vegetation that maintain ecological processes at a landscape scale. The vegetation along the southern boundary is also largely undisturbed, which continues into the Project Area. The area directly east of the Project Area is the most disturbed, with historical land use also being predominantly agricultural. Overall, the surrounding landscape contains large expanses of remnant vegetation which have been impacted by historical agricultural disturbances. Beyond these large remnant patches, anthropogenic disturbances become more severe with very few large remnant patches of vegetation remaining in the Darling Downs region.

The intact remnant communities within, and immediately adjacent to, the Project Area are generally in good ecological condition. Although some vegetation communities within the Project Area are highly fragmented, the landscape retains a moderate level of connectivity, both among internal patches and with the large areas of intact remnant vegetation adjoining the site.

5.4 FLORA DIVERSITY

A total of 173 flora species from 55 families and 133 genera were identified during the surveys within the Project Area. The plant families to represent the most taxa were Poaceae (33 species), Fabaceae (24 species) and Myrtaceae (21 species).

Field surveys identified 31 introduced species, which represented 18% of the total flora species identified.

One threatened flora species has been recorded within the Project Area during field surveys completed by ERM, which is Kogan waxflower (*Philotheca sporadica*), listed as near threatened under the NC Act. There is also a Wildnet record of *Westringia parvifolia* (vulnerable under the NC Act and the EPBC Act) in the Project Area, though there is a high spatial uncertainty associated with this record, with no recorded observations of this species during field surveys.

The full list of flora species identified during field surveys is included in Appendix D, along with species with Wildnet records in the locality.

5.5 FAUNA DIVERSITY

5.5.1 AVIFAUNA

A total of 5,261 individual birds were recorded during the field surveys, totaling 162 bird species within the Project Area. These species make up 21 orders, 54 families and 111 genera, with Passeriformes showing the highest diversity (85 taxa or 52.8% of the recorded avifauna), followed by Psittaciformes (12 taxa or 7.4% of the recorded avifauna) and Pelecaniformes (nine taxa or 5.6% of the recorded avifauna).

Only two invasive species, common myna (*Acridotheres tristis*) and common starling (*Sturnus vulgaris*), were recorded, representing only 1.9% of the avifauna species. Further information on invasive fauna species is provided in Section 5.4.3.2.

Additionally, one EPBC Act and NC Act listed species, glossy black cockatoo was identified within the Project Area during field surveys. Further information on the species is provided within Section 5.3.3.1.

A full list of these bird species is provided within Appendix D, along with species WildNet records in the locality.

Woodland and Open-forest Species

Most of the bird species recorded (~75) are woodland species that generally fly below heights of 50 m and conduct their breeding, foraging and roosting behaviours within canopy height. These species are considered generalists, although preferred habitat is considered open to sparse woodlands dominated by Eucalyptus and Acacia spp., often with small hollows and minor habitat complexities for nesting and roosting activities (BirdLife, 2019). These species also generally prefer areas with an abundance of bark types and woody debris so their food source of insects and small reptiles is available in abundance and variety. Additionally, woodlands often are associated with a moderate grass layer which provides another level of habitat complexity for smaller bird species to use for shelter as well as foraging (BirdLife, 2019). These species are generally not at risk from windfarm operations, as they aren't high-flying species and are habitat generalists, meaning they aren't vulnerable to minor degrees of habitat fragmentation and disturbance.

Raptors

A total of eight raptor species were observed within the Project Area, none of which are threatened under the EPBC Act or NC Act, but are listed as Least Concern (LC) under the latter:

- Australian hobby (*Falco longipennis*);
- Black kite (*Milvus migrans*);
- Black-shouldered kite (*Elanus axillaris*);
- Brown falcon (*Falco berigora*);
- Nankeen kestrel (*Falco cenchroides*);
- Spotted harrier (*Circus assimilis*);
- Wedge-tailed eagle (*Aquila audax*); and
- Whistling kite (*Haliastur sphenurus*).

All of these species were observed flying greater than 50 m high (except for the Australian hobby). Due to observations within typical rotor swept areas (RSAs) of wind turbine generators and their tendency to fly at these heights, these species will be considered as part of the bird and bat risk assessment, which is required under the Onshore Wind Farm Guidance (DCCEEW, 2023) and State Code 23. These raptor species mostly prefer woodland and open area habitats (Olsen, 1995) and often fly at heights above 50 m to hunt for prey on the ground in open/cleared areas or within woodlands and sparse open forests.

5.5.2 MAMMALS

A total of 17 mammalian species have been confirmed to occur within the Project Area through desktop records (WildNet) and field surveys. These mammalian species make up six orders, 13 families and 25 genera. Six invasive mammalian species were confirmed to occur within the Project Area through desktop records through this assessment, including:

- European cattle (*Bos taurus*);
- Feral pig (*Sus scrofa*);
- Domestic dog (*Canis familiaris*);
- Feral cat (*Felis catus*);
- House mouse (*Mus musculus*); and
- Black rat (*Rattus rattus*).

A full list of these mammal species is provided within Appendix D.

Microbats

Microbat species have been identified throughout the Project Area through the use of Anabats and harp trapping. A total of 20 microbat species had calls detected as 'definite', 'probable' or 'possible' within the Project Area based on data collected from Anabat detectors during field surveys. A total of nine (all but one species also detected on Anabats) species were captured during harp trapping efforts. In total, 16 species were confirmed to occur in the Project Area, all of which were expected to be present within the region. These 16 species make up three families, and nine genera within the order Chiroptera. The results of Anabat echolocation analysis are summarised in Table 5-4, and the full analysis report is provided as Appendix C. The results of harp trapping are provided in Table 5-5.

There were two listed threatened bat species identified in the EPBC Act protected matters search tool (PMST) as potentially occurring within the Project Area, Corben's long-eared bat (*Nyctophilus corbeni*) and the large-eared pied-bat (*Chalinolobus dwyeri*). No threatened species have been confirmed to occur within the Project Area, though there were a number of 'potential' calls for the *Nyctophilus* genus, one species of which is listed under the EPBC Act and NC Act, Corben's long-eared pied bat (*Nyctophilus corbeni*). Harp trapping was carried out to further evaluate the likelihood of this species occurrence and to determine the *Nyctophilus* species utilising the potential habitat in the Project Area.

Four harp traps were deployed over five nights for a total of 14 trap nights during the December 2024 survey effort and four harp traps were deployed over five nights for a total of 20 trap nights February 2025 survey effort. This effort is considered adequate against the Survey guidelines for Australia's threatened bats (DEWHA, 2010), as it exceeds the recommended survey effort of four harp traps for five nights. It is noted that this effort is

recommended for survey areas less than 50 ha, hence the bolstered survey effort across two separate field surveys. 105 individual bats were captured, belonging to nine different species. The capture of 12 *Nyctophilus* sp. individuals that were identified as the more common *Nyctophilus* spp. (lesser long-eared bat and greater long-eared bat) reduces the likelihood that Corben's long-eared bat occurs in the Project Area. Ultimately, as an adequate survey effort that has been carried out to target Corben's long-eared bat, and non-threatened *Nyctophilus* spp. were identified, Corben's long-eared bat is considered unlikely to occur in the Project Area.

Wattled bats such as those recorded (Gould's wattled bat, hoary wattled bat, little pied bat and chocolate wattled bat) can generally be found in a wide range of habitats, including forests and woodlands and typically roost in tree hollows. These species prefer a diet of moths and beetles, but will eat other insects if available (Churchill, 2008).

Bent-winged bats, such as that recorded (large bent-wing bat) occupy well-timbered habitats, often in wetter areas or in close proximity to water features. These species typically roost in caves or other man-made structures and show a dietary preference for moths (Churchill, 2008).

Free-tailed bats, such as those recorded (northern free-tailed bat and eastern free-tailed bats) are high-and-fast flying insectivorous species that roost in large tree hollows or houses. Their habitat selection is primarily based on food abundance. Specifically, the species recorded in the Project Area habitat includes open forests, woodlands and agricultural lands (Hall, 2009).

Broad nosed bat species, such as those recorded (inland broad nosed bat and little broad-nosed bat) are found in arid grasslands, woodlands, swamps and a diverse range of other habitats. These species is quite adaptable and may roost in fence post hollows in arid zones to walls of buildings in wetter areas. They're only requirement is access to water as it usually inhabits warmer environments. These species are insectivorous (Hall, 2009).

The yellow-bellied sheath-tail bat is found in nearly all habitats, utilising large tree hollows for roosting (Hall, 2009).

The white-striped freetail bat occupies urban areas, woodland shrubland, open agricultural landscapes with scattered stands of trees, grassland and deserts. They are insectivores (Churchill, 2008).

The forest bats recorded are considered insectivorous. The large forest bat occurs near sandstone or volcanic escarpments, inhabiting tropical mixed woodland, wet and dry sclerophyll forest. Forests that do not provide natural roosting sites (i.e., Caves or large rock overhangs) do not provide habitat for this species. The other forest bat recorded, the little forest bat, prefers tall and open riparian forests. The species roosts in tree hollows in this habitat, or buildings (Hall, 2009).

TABLE 5-4 SUMMARY OF ANABAT ECHOLOCATION ANALYSIS

Scientific Name	Common Name	EPBC Act Status	NC Act Status	December 2023 Likelihood	February 2024 Likelihood	December 2024 Likelihood
<i>Austronomus australis</i>	White-striped freetail-bat	NOC	LC	Definite	Definite	Definite
<i>Chalinolobus gouldii</i>	Gould's wattled bat	NOC	LC	Definite	Definite	Definite
<i>Chalinolobus morio</i>	Chocolate wattled bat	NOC	LC	Definite	Definite	Definite
<i>Chalinolobus nigrogriseus</i>	Hoary wattled bat	NOC	LC	Definite	Definite	Definite
<i>Chalinolobus picatus</i>	Little pied bat	NOC	LC	Definite	Probable	Definite
<i>Miniopterus orianae oceanensis</i>	Large bent-wing bat	NOC	LC	Definite	Definite	Definite
<i>Nyctophilus corbeni</i>	Corben's long-eared bat	V	VU	Possible	Possible	Possible
<i>Nyctophilus geoffroyi</i>	Lesser long-eared bat	NOC	LC	Possible	Possible	Possible
<i>Nyctophilus gouldi</i>	Greater long-eared bat	NOC	LC	Possible	Possible	Possible
<i>Ozimops lumsdenae</i>	Northern free-tailed bat	NOC	LC	Definite	Probable	Definite
<i>Ozimops petersi</i>	Inland free-tailed bat	NOC	LC	NR	NR	Definite
<i>Ozimops ridei</i>	Eastern free-tailed bat	NOC	LC	Possible	Probable	Possible
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath tail bat	NOC	LC	Definite	Definite	Definite
<i>Scoteanax rueppellii</i>	Greater-broad nosed bat	NOC	LC	NR	NR	Definite
<i>Scotorepens balstoni</i>	Inland broad-nosed bat	NOC	LC	Probable	Probable	Probable
<i>Scotorepens greyii</i>	Little broad-nosed bat	NOC	LC	Definite	Definite	Probable
<i>Scotorepens sp. (Parnaby)</i>	Central-eastern broad-nosed bat	NOC	LC	Probable	Probable	Possible
<i>Vespadelus regulus</i>	Southern forest bat	NOC	LC	NR	NR	Probable
<i>Vespadelus troughtoni</i>	Large forest bat	NOC	LC	Probable	Possible	Probable

Scientific Name	Common Name	EPBC Act Status	NC Act Status	December 2023 Likelihood	February 2024 Likelihood	December 2024 Likelihood
<i>Vespadelus vulturnus</i>	Little forest bat	NOC	LC	Definite	Definite	Probable

Note: V = Vulnerable; LC = Least Concern; NOC = Not of Concern
NR = not recorded

TABLE 5-5 RESULTS SUMMARY OF HARP TRAPPING

Scientific Name	Common Name	EPBC Act Status	NC Act Status	December 2024 Captures	February 2025 Captures
<i>Chalinolobus gouldii</i>	Gould's wattled bat	NOC	LC		12
<i>Chalinolobus picatus</i>	Little pied bat	NOC	LC		7
<i>Nyctophilus gouldi</i>	Greater long-eared bat	NOC	LC	8	5
<i>Nyctophilus geoffroyi</i>	Lesser long-eared bat	NOC	LC	4	8
<i>Ozimops ridei</i>	Eastern free-tailed bat	NOC	LC		10
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tailed bat	NOC	LC		21
<i>Scotorepens greyii</i>	Little broad-nosed bat	NOC	LC	1	20
<i>Vespadelus braverstoki</i>	Inland forest bat	NOC	LC		3
<i>Vespadelus vulturnus</i>	Little forest bat	NOC	LC	4	
Unidentified species (not <i>Nyctophilus</i> sp.)	N/A	N/A	N/A	1	1

Note: V = Vulnerable; LC = Least Concern; NOC = Not of Concern

5.5.3 REPTILES

A total of 24 reptile species have been confirmed to occur within the Project Area through desktop and field records within the last 20 years. These reptile species make up one order, eight families and 21 genera, including species of turtle, gecko, monitor, snake and skink.

No threatened species have been recorded within the Project Area.

A full list of these reptile species is provided within Appendix D.

5.5.4 AMPHIBIANS

A total of 15 amphibian species have been confirmed to occur within the Project Area through desktop and field records within the last 20 years. These amphibian species make up one order, four families and seven genera.

No threatened species have been recorded within the Project Area.

A full list of these amphibian species is provided within Appendix D.

5.6 ABIOTIC PROCESSES

Abiotic factors in an ecosystem include any non-living elements of the environment that influences the way organisms and ecosystems function. These may include sunlight, temperature, nutrient availability, soil and geological processes. One primary abiotic factor, water availability, was observed as having a notable impact on ecosystems in the Project Area as several patches of vegetation showed signs of moderate to severe dieback. Dieback was particularly evident towards the west of the Project Area, where several large patches of remnant vegetation have experienced dieback. A reduction in water availability may not be the cause of this, as other factors can cause dieback (ie. disease or deliberate tree poisoning), but it is likely to have played a role.

No other abiotic factors are considered to have a pronounced effect on ecosystems within the Project Area, but *State Code 16* requires that salinity expression areas are identified.

Salinity expressions areas are defined as containing more than one of the following salinity indicators:

1. Plant species tolerant of saline conditions, shallow water tables or poor drainage (waterlogging);
2. Wet area in lower parts of the landscape or bare soil (soil scalding);
3. Dieback of larger trees in low, wetter parts of the landscape (outside drought conditions or the effects of fire);
4. Salt accumulations on the surface (often white and powdery, sometimes crystalline); and
5. Areas of shallow groundwater.

There were no areas in the Project Area expressing more than one of these salinity indicators. Some salinity-tolerant species were observed, such as spiny saltbush (*Rhagodia spinescens*) and white feather honeymyrtle (*Melaleuca decora*) but these species are also common in non-saline areas. These species were not noted to occur in areas that show other indicators of salinity expression listed above.

The closest recorded bores indicating groundwater depth are located ~20 km to the north-east and east, which are ~340 m to ~370 m above sea level (asl) which is comparable to majority of the Project Area, which is ~320 - ~380 m asl. The groundwater depths indicated at these bores (RN 42231277, RN 42230091 and RN 42230092) ranges from 17 to 41 m, indicating that there are unlikely to be any shallow groundwater areas in the Project Area (Business Queensland, 2023). However, these bores indicate that the groundwater in the region is saline.

5.7 APPLIED PRECAUTIONARY PRINCIPLE

The precautionary principle has been applied throughout this assessment for ecological values where survey guidelines for conservation significant species have not been met or whereby impacts may be unclear for species or groups of taxa not confirmed within the Project area or where the impacts to those species or groups may be relatively unknown.

As outlined in Section 4.4, the LoO presented in Appendix B is an assessment of the presence of conservation significant species whereby species considered 'known' or 'likely' to occur are carried through the impact assessment. Species considered as having the 'potential' to occur are also carried through for impact assessment and are afforded similar levels of assessment to known values to ensure a conservative approach to assessing impact on MSES. Impact assessments considers the full suite of impacts to taxon groups, as well as specific impacts to 'known', 'likely' and 'potential' species.

The following NC Act protected species are considered to have 'potential' to occur within the Project Area due to a combination of distribution, potential habitat supporting individuals or a population, or prescriptive survey guidelines not being met (as further outlined in Table 4-14). In the case where ambiguity surrounds species presence, the precautionary principle is applied to ensure that these species are carried through impact assessment and considered for management and mitigation actions, and offsets under the significant residual impact guidelines. The precautionary principle has been applied to the following fauna species:

- Greater glider (southern and central) (*Petauroides volans*);
- Yellow-bellied glider (south-eastern) (*Petaurus australis australis*);
- Southern whiteface (*Aphelocephala leucopsis*);
- Latham's snipe (*Gallinago hardwickii*);
- Squatter pigeon (southern) (*Gephaps scripta scripta*); and
- Fork-tailed swift (*Apus pacificus*).

Potential habitat for these species has been considered to be an MSES as it meets the definition of habitat for an animal that is critically endangered wildlife, endangered wildlife or vulnerable wildlife or a special least concern animal. For listed threatened flora species with potential habitat, these do not meet the definition of an MSES, as under Schedule 2 of the *Environmental Offsets Regulation 2014*, areas that contain these threatened plants are considered an MSES.

Where a species is denoted as unlikely to occur within Appendix B, it should be noted that a justification is provided for that species within the LoO and robust evidence provided in adequacy comments (Section 4.5.5 and Table 4-14) or through a lack of observed and predicted necessary components for regular and consistent occurrence or occupation of the Project Area. Where a species is determined unlikely to occur, it is not carried through to the impact assessment.

Of the potentially occurring protected plant species, Tara wattle, *Prostanthera* sp. Dunmore, *Rutidosia glandulosa* and *Rutidosia lanata*, are included based on habitat suitability. However, as per the *Environmental Offsets Regulation 2014 Schedule 2(6)*, they are not considered MSES as these areas of suitable habitat in the Project Area are not known to contain the species.

5.8 MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE

MSES are defined within the *Environmental Offsets Regulation 2014*. The MSES within the Project Area are summarised in Table 5-6 and discussed in the following sections.

TABLE 5-6 MSES SIGNIFICANCE IN THE PROJECT AREA

MSES	Relevance to the Proposed Development
Regulated Vegetation	Category B Endangered or Of Concern RE is present in the Project Area as 362.2 ha. Category B RE that intersects with a wetland as shown on the vegetation management wetlands map does not occur in the Project Area. Category B essential habitat is present within the Project Area as 0.8 ha. Category B RE within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature – 529.5 ha is present within the Project Area.
Connectivity Areas	Remnant and regrowth vegetation within the Project Area is well connected at times. The main connectivity areas within the locality are to the west of the Project Area. There are also one Queensland terrestrial biodiversity corridor and two riparian biodiversity corridors that have buffers intersecting the Project Area.
Wetlands and Watercourses	In accordance with the Development Assessment Mapping System (DAMS) mapping, there are no wetlands or watercourses mapped as high ecological significance (HES), or high ecological value (HEV), within the Project Area.
Designated Precincts in Strategic Environmental Areas	In accordance with the DAMS mapping, no Regional Interest areas are recorded over the Project Area. This mapping is in accordance with the Regional Planning Interests Act 2014 which governs the framework for Strategic Environmental areas.
Protected Wildlife Habitat	State-mapped protected wildlife habitat includes 1.5 ha of the Project Area. Additionally, habitat for one listed threatened flora species and 10 listed threatened / special least concern fauna species, was ground-truthed and mapped within the Project Area (see Section 5.8.3: • Diamond firetail – known to occur (8,352.4 ha); • Glossy black cockatoo – known to occur (736.1 ha); • Koala – known to occur (16,113.8 ha); • Short-beaked echidna – known to occur (entire Project Area); • Kogan waxflower – known to occur (4.8 ha); • White-throated needletail – likely to occur (aerial across Project Area); • Greater glider (southern and central) – potential to occur (4,785.4 ha); • Yellow-bellied glider (south-eastern) – potential to occur (2,036.5 ha); • Southern whiteface – potential to occur (726.7 ha); • Latham's snipe – potential to occur (65.7 ha);

MSES	Relevance to the Proposed Development
	- Squatter pigeon (southern) – potential to occur (9,734.9 ha); and - Fork-tailed swift – potential to occur (aerial across Project Area).
Protected Areas	There are no national parks, conservation parks or protected areas under the NC Act within the Project Area. The closest protected area is Kumbarella State Forest to the direct north-east of the Project Area, which is connected to the Project Area via vegetation corridors.
Declared Fish Habitat Areas and Highly Protected Zones of State Marine Parks	In accordance with DAMS mapping, there are no declared fish habitat areas within the Project Area.
Waterways Providing Fish Passage	In accordance with DAMS mapping, there are low to major waterways for water barrier works within the Project Area.
Marine Plants	There are no marine plants within the Project Area.
Legally Secured Offset Areas	There are no legally secured offset areas within the Project Area.

5.8.1 REGULATED VEGETATION

There are several categories of regulated vegetation that are protected as MSES as defined in Schedule 2 of the *Environmental Offsets Regulation 2014 (Offsets Regulation)*. These include prescribed REs that are:

- Endangered or Of Concern RE;
- RE that intersects with a wetlands as shown on the vegetation management wetlands map;
- An area of essential habitat on the essential habitat map for Critically Endangered, Endangered, or Vulnerable wildlife;
- An area of essential habitat on the essential habitat map for an animal that is critically endangered wildlife, endangered wildlife or vulnerable wildlife or a plant that is critically endangered wildlife, endangered wildlife or vulnerable wildlife; and
- located within a defined distance from the defining banks of a relevant watercourse identified on the vegetation management watercourse and drainage feature map.

A prescribed RE is defined as 'a regional ecosystem, other than a regional ecosystem mentioned in the *Vegetation Management Act 1999 (VM Act)*, section 8(b), located in a category B area on the regulated vegetation management map, to the extent the ecosystem contains remnant vegetation.'

The presence of the above categories of regulated vegetation in the Project Area is discussed in the following Sections.

5.8.1.1 CATEGORY B AREA OF ENDANGERED OR OF CONCERN RE

For the purposes of this MSES IAR, a category B area is an area that:

- Contains remnant vegetation; and
- The chief executive decides to show on the regulated vegetation management map as a category B area.

Of Category B areas, those that are REs listed as Endangered or Of Concern (as per the *VM Act*) are considered MSES as regulated vegetation. Regulated vegetation mapping reveals that there is 362.2 ha of Endangered category B areas, and no Of Concern category B areas. RE 11.3.2, which is Of Concern, has 11.9.5 as a secondary RE which is Endangered, so it is included in the Endangered category.

5.8.1.2 ESSENTIAL HABITAT

Essential habitat identifies habitat for Endangered, Vulnerable, and Near Threatened wildlife, also known as 'protected wildlife' and is prescribed under the NC Act (DES, 2020b). Essential habitat is protected as MSES when it is also Category B RE. The Project Area contains 0.8 ha of Category B RE that is essential habitat for the pale imperial hairstreak (*Jalmenus eubulus*). This species has been considered unlikely to occur as the record is not considered recent being in 1999.

5.8.1.3 CATEGORY B RE INTERSECTING A WATERCOURSE

Category B RE intersecting with a *VM Act* watercourse or drainage feature is protected as regulated vegetation under the *VM Act*. Watercourses of different stream orders are subject to varying buffer zone protections under the *VM Act* (Riparian Protection Zones (RPZ)). *State Code 16* Table 2 states that the RPZ buffer widths are as follows:

- RPZ includes 10 m from the defining bank of a Stream Order 1 or 2 watercourse or drainage feature;
- RPZ includes 25 m from the defining bank of a Stream Order 3 or 4 watercourse or drainage feature; and
- RPZ includes 50 m from the defining bank of a Stream Order 5 or higher, watercourse or drainage feature.

Within the Project Area, the watercourses are identified as stream orders 1 to 5. A total of 529.5 ha of regulated vegetation intersecting a watercourse has been mapped within the Project Area.

5.8.1.4 CATEGORY B RE INTERSECTING A WETLAND

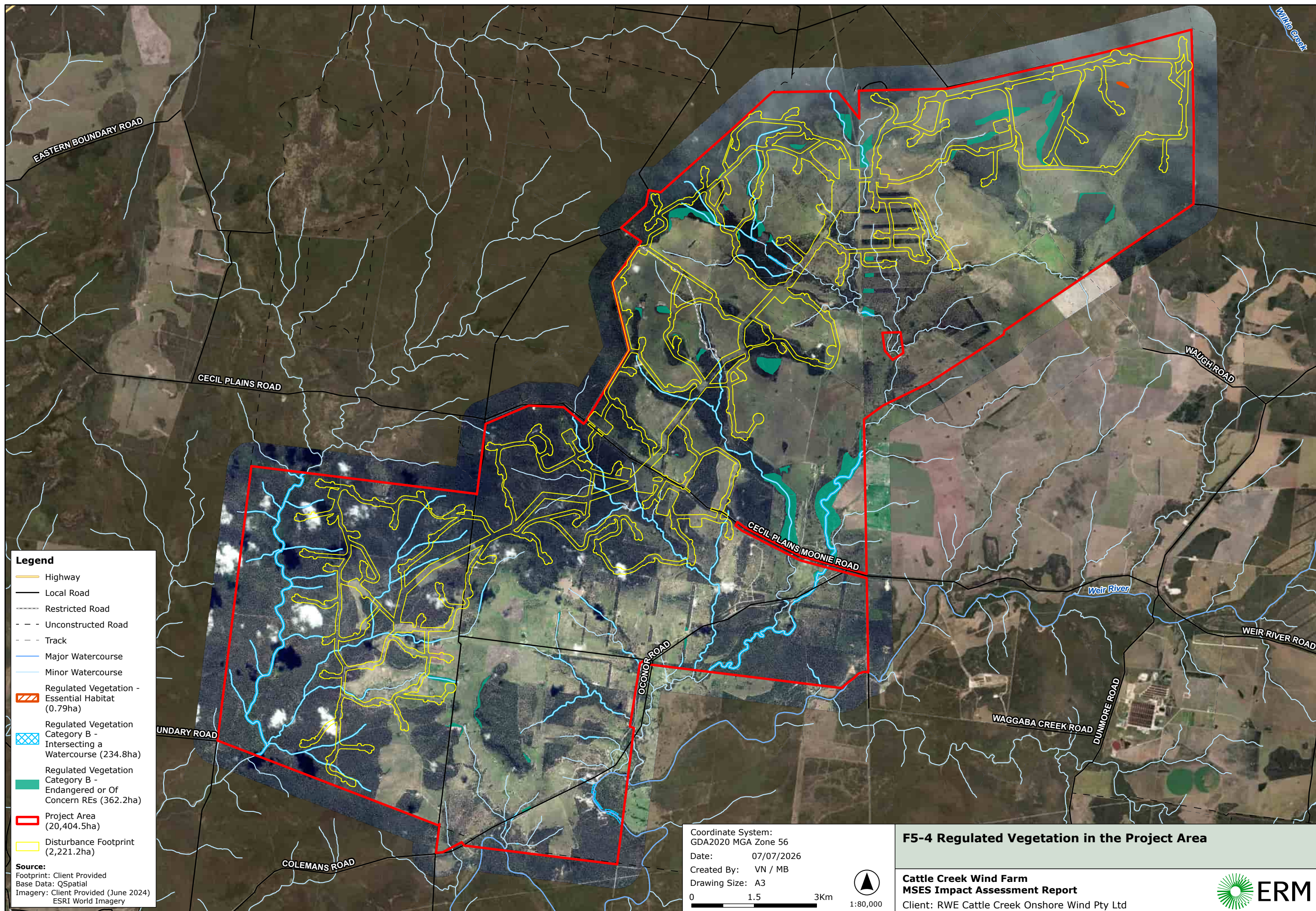
Category B RE within 100 m of a wetland that is mapped on the vegetation management wetlands map is regulated vegetation that is protected as a MSES. As there are no wetlands in, or within 100 m of the Project Area, there is no regulated vegetation of this category in the Project Area.

5.8.2 CONNECTIVITY AREAS

Connectivity areas are an MSES that relates to the change of the ecosystem tract in the context of the local and regional landscape. An impact on connectivity areas is not relative to a determinant or prescribed MSES layer (such as essential habitat, or watercourses) but expressed as areas of remnant vegetation outside urban areas containing prescribed REs that are required for ecosystem functioning.

The Project Area contains Category B vegetation. Of the Category B area in the Project Area, 7,540.0 ha is Least Concern RE and 362.2 ha is Endangered RE. Connectivity is assessed against the relative change that the development footprint will create from removal of Category B vegetation as opposed to the development not occurring. The rate of change to this vegetation is then assessed for significance.

Whilst not explicitly identified as an MSES, there is also a Queensland terrestrial biodiversity corridor that occurs along the western border of the Project Area, with the buffer overlapping into the Project Area. Cattle Creek and the Weir River are also riparian biodiversity corridors which intersect the Project Area.



5.8.3 PROTECTED WILDLIFE HABITAT FOR NC ACT LISTED SPECIES

The LoO outcomes for listed threatened species are displayed in Table 5-7 for any conservation significant species with a likelihood of 'known', 'likely' or 'potential' to occur. Species considered 'unlikely' are outlined in Appendix B which assesses all threatened species.

TABLE 5-7 NC ACT LISTED SPECIES LIKELIHOOD OF OCCURRENCE SUMMARY

Species	NC Act	Likelihood of Occurrence
Birds		
Glossy black cockatoo (south-eastern) (<i>Calyptorhynchus lathami lathami</i>)	V	Known
Diamond firetail (<i>Stagonopleura guttata</i>)	V	Known
White-throated needletail (<i>Hirundapus caudacutus</i>)	V	Likely
Southern whiteface (<i>Aphelocephala leucopsis</i>)	V	Potential
Latham's snipe (<i>Gallinago hardwickii</i>)	V	Potential
Squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)	V	Potential
Fork-tailed swift (<i>Apus pacificus</i>)	SLC	Potential
Mammals		
Koala (<i>Phascolarctos cinereus</i>)	E	Known
Short-beaked echidna (<i>Tachyglossus aculeatus</i>)	SLC	Known
Greater glider (southern and central) (<i>Petauroides volans</i>)	E	Potential
Yellow-bellied glider (south-eastern) (<i>Petaurus australis australis</i>)	V	Potential
Flora		
Kogan Waxflower (<i>Philotheca sporadica</i>)	E	Known
Tara wattle (<i>Acacia lauta</i>)*	V	Potential
<i>Prostanthera</i> sp. Dunmore (D.M. Gordon 8A)*	V	Potential
<i>Rutidosia glandulosa</i> *	NT	Potential
Woolly wrinklewort (<i>Rutidosia lanata</i>)*	NT	Potential
<i>Westringia parvifolia</i> *	V	Potential
NC Act Status: E = Endangered, V = Vulnerable, NT = Near Threatened, SLC = Special Least Concern		
* = these flora species have not been observed in the Project Area, and are therefore not considered an MSES as per Schedule 2 of the Environmental Offsets Regulation 2014.		

5.8.3.1 FLORA SPECIES

The LoO assessment in Appendix B evaluates the likelihood of all plants identified in desktop research occurring in the Project Area. Table 4-14 discusses the survey guidelines, effort and adequacy for each NC Act listed threatened flora species identified in desktop searches. As mentioned in Section 5.7 and above in Table 5-7, several plant species protected under the NC Act that are considered to have the potential to occur in the Project Area are not considered MSES as per the *Environmental Offsets Regulation 2014 Schedule 2(6)*. Therefore, these species have not been discussed further.

The following section describe the presence of the only NC Act protected flora species known to occur in the Project Area, Kogan waxflower.

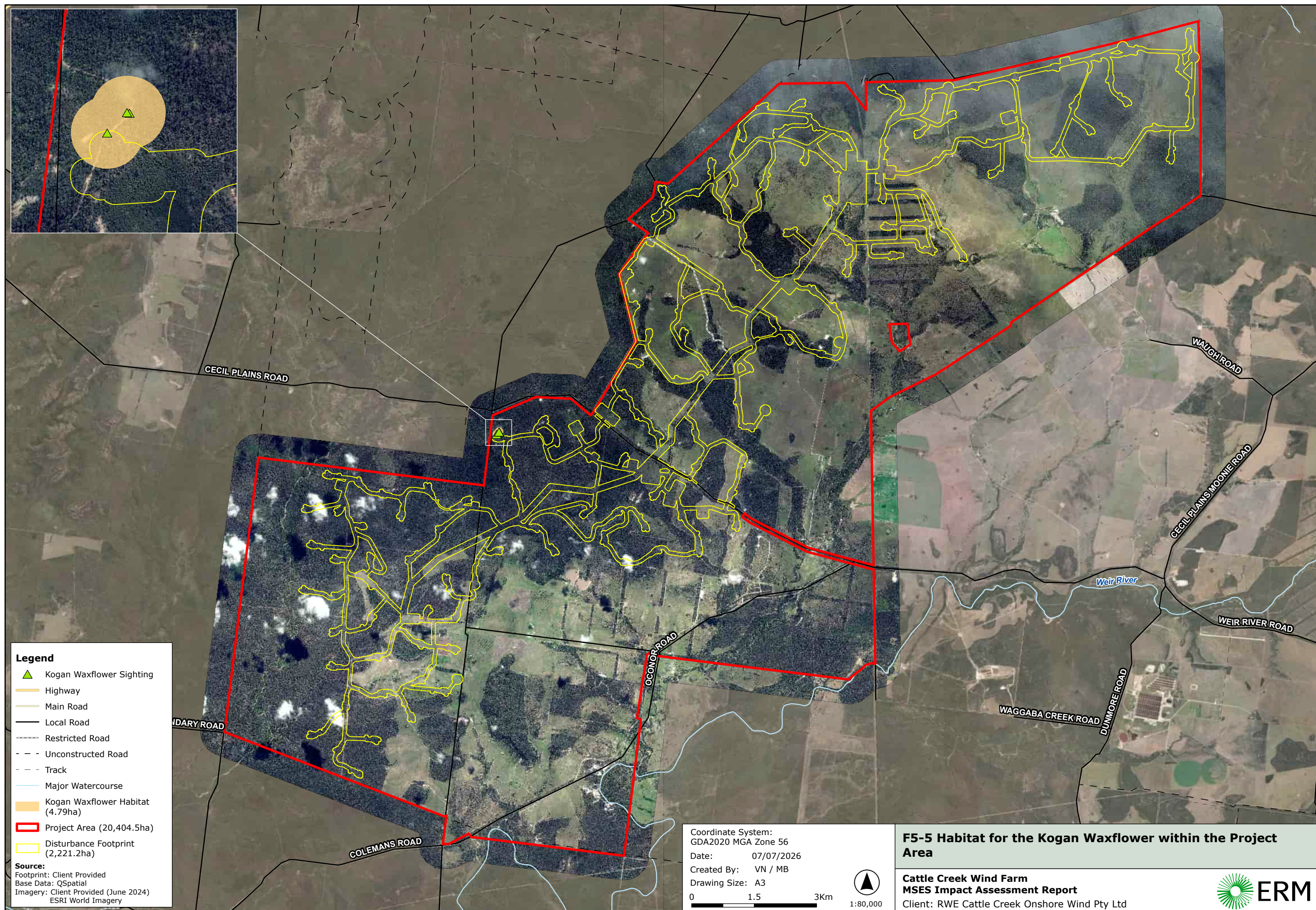
Kogan Waxflower

Kogan waxflower (*Philothea sporadica*) is listed as Endangered under the NC Act and has been concluded as known to occur within the Project Area as per the LoO assessment (Appendix B) as it was directly observed during field surveys in the Project Area. The species was observed on two occasions, within 100 m of one another, both on land zone 7 (Cainozoic duricrusts – ironstone jump-ups).

Kogan waxflower has a restricted distribution between Milmeran and Chinchilla, extending west to Tara. There are recent records within the Project Area, concentrated where Cecil Plains-Moonie Road intersects the Project Area. There are sporadic occurrences of the species to the north and west of the Project Area as well. In addition to this, the species was observed in the centre-west of the Project Area by ERM ecologists.

The species is found on residual hills from cretaceous sandstones, which often have undulating to flat topographies. Vegetation communities associated with Kogan waxflower include open to closed shrublands and close woodlands with Yarron wattle (*Acacia burrowii*), *Eucalyptus exserta*, narrow-leaved ironbark (*E. crebra*), blue-leaved ironbark (*E. fibrosa nubilis*) and white cypress pine (*Callitris glaucophylla*) (DCCEEW, 2018).

Habitat for the Kogan waxflower in the Project Area has been mapped to include a 100 m buffer around the known observations of the species in line with the Flora Survey Guidelines (DES, 2020) definition of 'supporting habitat'. This surmounts to 4.8 ha of supporting habitat for the species in the Project Area which is mapped on Figure 5-5.



5.8.3.2 FAUNA SPECIES

The LoO assessment in Appendix B evaluates the likelihood of all NC Act protected fauna species identified in desktop research occurring in the Project Area. Table 4-14 discusses the survey guidelines, effort and adequacy for each NC Act listed protected fauna species identified in desktop searches. The following Sections describe the presence of NC Act listed fauna species in the Project Area, and the availability of habitat for each that is considered known, likely or potentially occurring.

Diamond Firetail

The diamond firetail (*Stagonopleura guttata*) is listed as Vulnerable under the NC Act. This species was concluded as known to occur within the Project Area as per the LoO assessment (Appendix B). This conclusion is drawn from recent records of diamond firetail in the Project Area and the presence of suitable habitat, with no sightings of the species during the ecological surveys completed by ERM over the survey period.

The diamond firetail occupies most of the south-east mainland of Australia from south-east QLD to Eyre Peninsula in South Australia. The species has undergone a significant range reduction in Queensland, formerly distributed as far north as Cardwell. A record of the species is found in the centre of the Project Area, near Kumbarilla State Forest, from 2021 and several other records in the locality from 2021 and 2022 exist. Due to this, the Project Area is considered to be within the species known distribution.

The diamond firetail utilises a range of habitat types, from eucalypt, acacia and casuarina woodlands and open forests to lightly timbered habitats such as farmland and grassland with scattered trees, but the species is more likely to persist in areas with remnant vegetation, as a diversity of native grasses with different maturity patterns supports the species year-round. Invasive flora (particularly exotic annual grasses) are a key threat to the species, as they lower the availability of suitable native grass species that provide food. The species is also more likely to persist in agricultural land affected by sheep, rather than cattle or crop (DCCEEW, 2023). Studies have shown that they prefer areas with low tree densities, few large logs and little leaf litter cover but high grass cover.

The diamond firetail builds its nests in areas where their eggs and nestlings are somewhat safeguarded (i.e., in the base of raptor bird nests or in foliage of prickly shrubs). They roost in dense shrubs or small roosting nests (DCCEEW, 2023).

Breeding for the diamond firetail in the Project Area has been mapped to include the following BHTs:

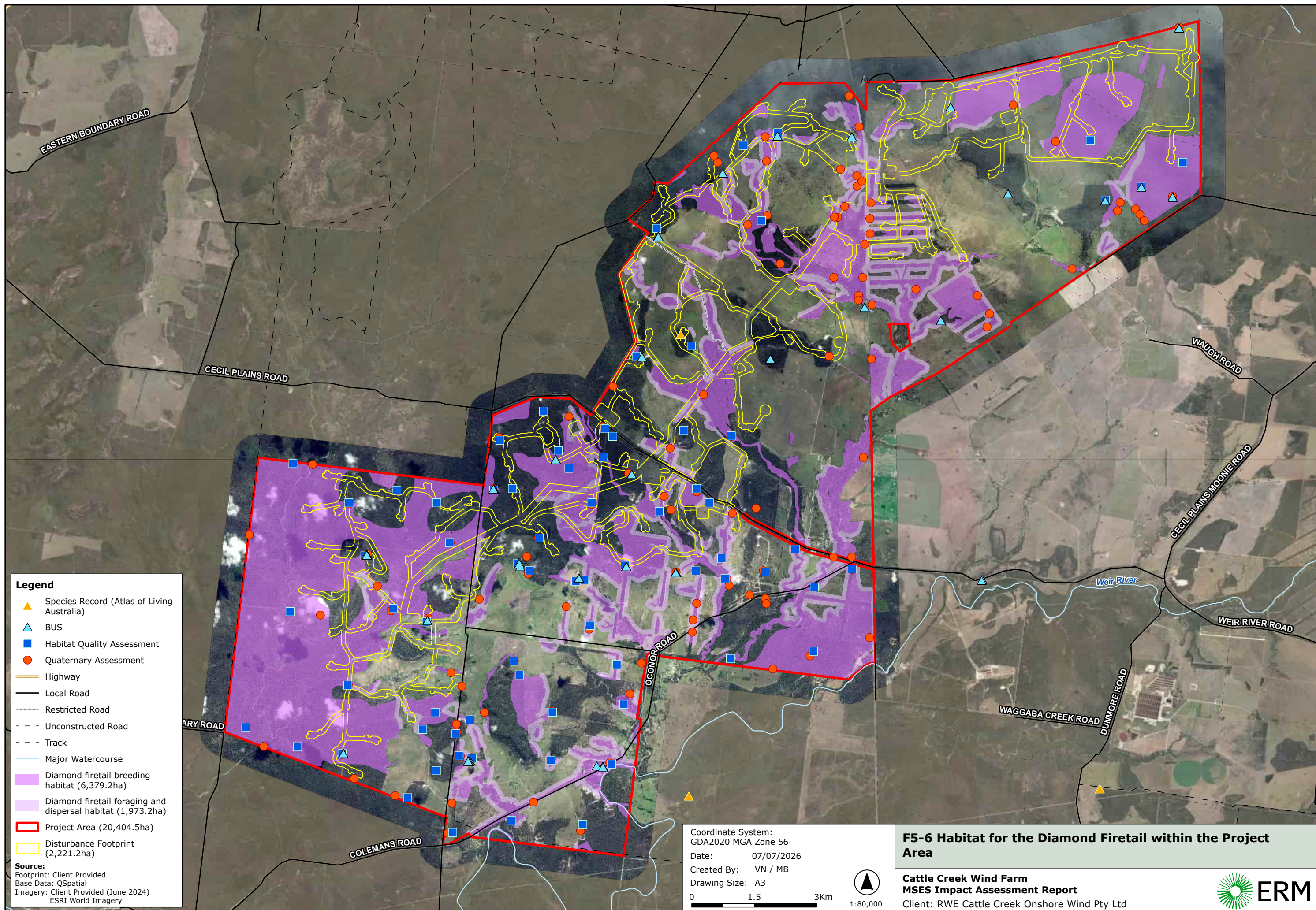
- Riparian open forest to woodland;
- Ironbark and smooth-barked apple open forest to woodland;
- Poplar box grassy open woodlands;
- Gum-topped box open forest to woodland; and
- Belah with or without brigalow open forests to woodlands.

Foraging and dispersal habitat for the diamond firetail has been mapped to include agricultural land within 100 m of breeding habitat. A 100 m buffer has been applied as non-native grasses (which are a threat to the species) become more prevalent in areas with higher degrees of agricultural impact, which reduces the likelihood of the species using the large expanses of agricultural land in the Project Area.

Although containing some suitable habitat features for the species, the other BHTs are not mapped as habitat for the species for the following reasons:

- Cleared land – absence of any trees;
- Ironbark woodland on hilly terrain – these areas generally have lots of large logs and less grass cover than the other habitat types;
- Buloke and poplar box open forest to woodland – this species prefers low tree densities, and this is a highly treed habitat type; and
- Permanent waterbodies – while the diamond firetail may drink from farm dams, they are not considered a foraging resource.

There is 6,379.2 ha of breeding habitat, and 1,973.2 ha of foraging and dispersal habitat mapped in the Project Area as shown on Figure 5-6.



Glossy Black Cockatoo (South-Eastern)

The glossy black cockatoo (south-eastern) (glossy black cockatoo) (*Calyptorhynchus lathami lathami*) is listed as Vulnerable under the NC Act. This species was concluded as known to occur within the Project Area as per the LoO assessment (Appendix B), due to several observations of glossy black cockatoo within the Project Area during survey events.

The glossy black cockatoo occurs in south-eastern Australia, from Mitchell in Queensland, through to East Gippsland in Victoria. Their distribution is continuous through the Great Dividing Range, however becomes scattered towards the west (DCCEEW, 2022).

The glossy black cockatoo is a specialist species, evidenced by their breeding and foraging habitat requirements. The species requires large hollows in living or dead eucalypt trees for breeding and nesting activities. The most commonly used tree species for breeding and nesting is narrow-leaved ironbark (*Eucalyptus crebra*) however other species used include blue-leaved ironbark (*E. fibrosa nubilis*), Blakely's red gum (*E. blakelyi*) and river red gum (*E. camaldulensis*). The species typically nests within one kilometre of foraging habitat, and within 200 m of a permanent water source (DCCEEW, 2022). The Conservation Advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo) states that hollows for the glossy black cockatoo have the following traits (DCCEEW, 2022):

- > 8 m above ground;
- Located in branches >30 cm in diameter;
- Branch or stem no more than 45° from vertical; and
- Minimum entrance diameter of >15 cm.

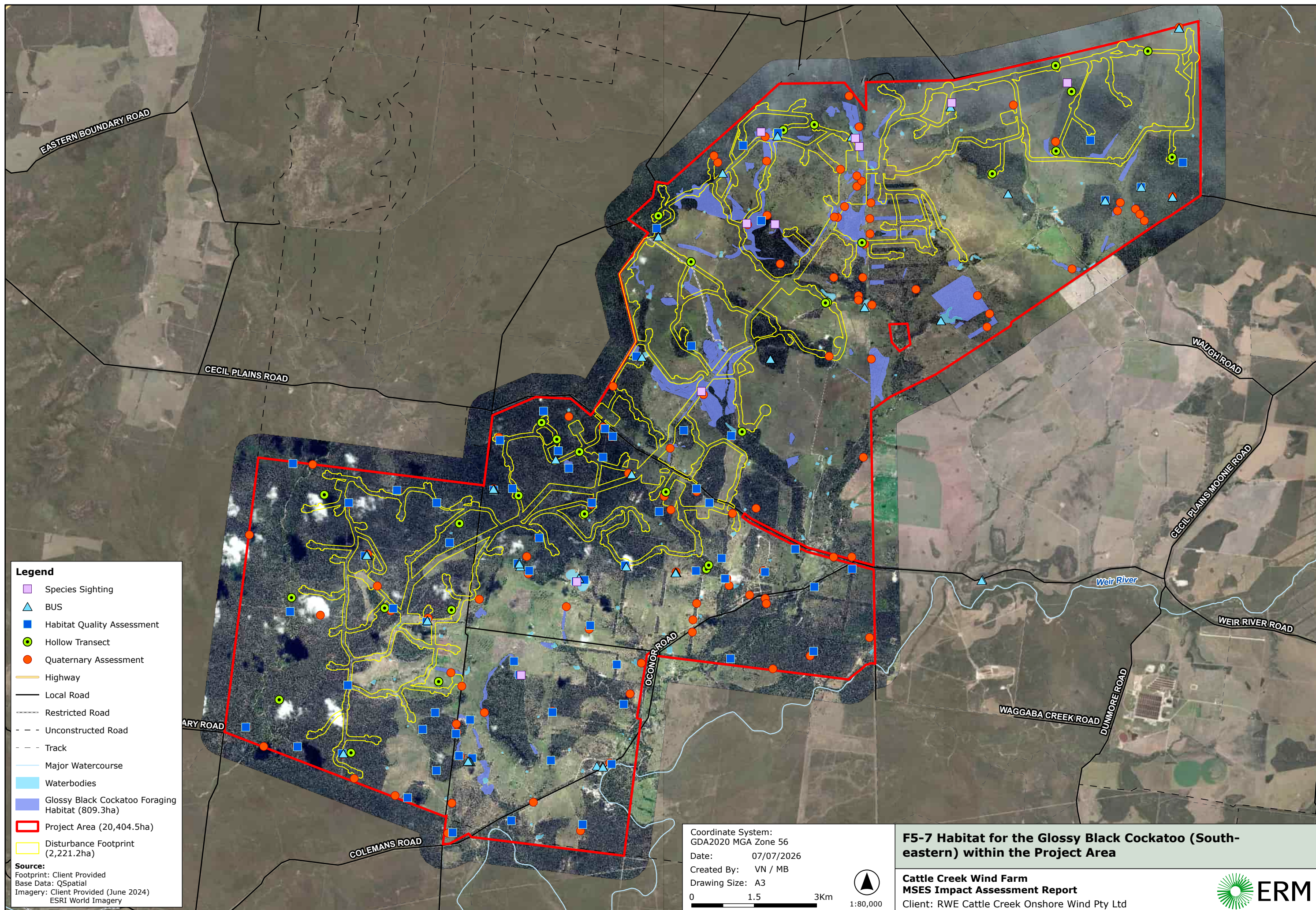
The species feeds on only nine species of she-oaks, making it an extreme foraging specialist. In one region, birds are expected to only feed on one or two of these nine species. Of the nine species, three occur in the Project Area, these being belah (*Casuarina cristata*), stringybark she-oak (*Allocasuarina inophloia*) and buloke (*Allocasuarina luehmannii*). Belah is considered to be an important tree species for the glossy black-cockatoo (south-eastern) in inland NSW, which is comparable to the Project Area (as it is inland of the Great Dividing Range in south Queensland). Black sheoak (*A. littoralis*) and forest sheoak (*A. torulosa*) are the preferred trees in south-east Queensland. Buloke and stringybark she-oak however, is not considered an important food tree (DCCEEW, 2022).

There is not expected to be any nesting and breeding habitat in the Project Area (as hollow transects did not identify any large trees meeting the dimensions listed above), however, suitable foraging and dispersal habitat is present. Belah is considered to be the only feed tree in the Project Area, which is evidenced by the observation of chewed orts in one of the areas the species was observed. Buloke and stringybark she-oak is not considered to be a feed tree in the Project Area, as they are not an important food tree, and are only used in some areas of Australia (DCCEEW, 2022). Foraging habitat in the Project Area has been mapped to include areas that contain suitable foraging trees, specifically belah. This includes the belah with or without brigalow open forests to woodlands BHT.

Belah was also rarely recorded in the riparian open forest to woodland BHT, however this BHT has not been mapped as foraging habitat as belah was only observed in two of the 10 quaternary vegetation assessments in this BHT.

Some small, isolated patches of belah trees are also likely to occur in the agricultural land BHT and have the potential to be used for foraging by the species. These have not been mapped however, as BHT mapping has not been prepared to this scale

There has been a total of 736.1 ha of foraging habitat mapped in the Project Area which is shown on Figure 5-7.



White-throated Needletail

The white-throated needletail (*Hirundapus caudacutus*) is listed as Vulnerable under the NC Act. This species was concluded as likely to occur within the Project Area as per the LoO assessment (Appendix B). This conclusion is drawn from recent records of white-throated needletail in the locality and the species broad use of all habitat types for aerial foraging.

The white-throated needletail is widespread in eastern and south-eastern Australia, with the species being recorded in all coastal regions of Queensland, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains (TSSC, 2019).

The species typically arrives in Australia from September through to early November, most commonly entering via the Torres Strait. Historical records suggest that first arrivals are generally observed in late October, though this can range from early September to late December. After reaching northern Australia, the species disperses southward along both sides of the Great Dividing Range in Queensland and New South Wales during October and November. During February and March, numbers recorded in Queensland and New South Wales often increase again as birds begin their northward return migration, with most departing Australia between mid-March and April. As such, their abundance in Australia generally peaks between December and March, though distribution across regions remains patchy. A small number may occasionally remain in Australia over the breeding season. In the broader region of the Project Area, their occurrence peaks between December and February.

During the time the white-throated needletail is within Australia, the species mostly remains aerial, foraging above a variety of habitats as it moves along the eastern coast of Australia, before returning to preferred breeding locations across Asia in autumn. They are more commonly recorded foraging above open wooded areas, though may also forage beneath the canopy between trees. Around farmland, white-throated needletail are often recorded above partly cleared fields or remnant vegetation at the edge of paddocks (TSSC, 2019).

The Conservation Advice for white-throated needletail (TSSC, 2019) identifies this broad range of suitable foraging habitat as the following:

White-throated Needletail forages at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland, mudflats [...] or coastal saltworks. Large tracts of native vegetation, particularly forest, may be a key habitat requirement for species.

Areas of updraughts, such as ridges, cliffs or sand-dunes [...] or along the edges of low-pressure systems, which both lift their food sources and assist with their flight, are preferred for foraging purposes as well, with the species potentially following these systems across Australia.

The species roosts in trees amongst dense foliage in the canopy or in hollows.

The species has been observed to roost in trees amongst dense foliage in the canopy or in hollows (TSSC, 2019), although the degree to which the species roost in trees is potentially over-emphasised and poorly understood. Roosting has been recorded rarely in Australia, for example Tarburton (2021) identified 10 published roosting records ranging from 1902 to 2001 and 20 in journals, newsletters and direct reports citing visual evidence of the species landing in Australia. Twenty-four of these observations were of birds roosting/landing after sunset. A

recent roosting observation of white-throated needletail was made in the Pilliga Forest in NSW (Vanderduys, Macdonald, & Pavey, 2024), though this observation may be associated with a failed attempt at predation by a brown falcon (*Falco berigora*). Evidence suggests roosting is extremely rare in Australia and specific roosting habitat is not known.

Based on the above discussion, there is not considered to be any specific habitat requirements present in the Project Area. Consequently, no habitat has been mapped for the white-throated needletail. Instead, the aerial space above the Project Area is likely to be used for foraging.

Koala

The koala (*Phascolarctos cinereus*) is listed as Endangered under the NC Act. The species is known to occur within the Project Area as per the LoO assessment (Appendix B). This is the result of indirect observations made during survey events, in which koala scat was identified during habitat searches.

The koala occurs in eastern Australian eucalypt forests and woodlands. The koala's distribution is not continuous across this range, occurring in several subpopulations that are separated by cleared land or unsuitable habitat. Within Queensland, koalas occur as far north as the Einasleigh Uplands and Wet Tropics bioregions with records to the south and west in the Desert Uplands, Central Mackay Coast, Mitchell Grass Downs, Mulga Lands, Brigalow Belt North, Brigalow Belt South, and South Eastern Queensland (DAWE, 2022).

Under the revised Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE, 2022 (DAWE, 2022), habitat for the koala is described as follows:

'both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the Koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement'

A review of koala habitat assessment criteria and methods (Youngentob, Marsh, & Skewes, 2021) states that koala food trees are typically considered to be those of the following genera: *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Melaleuca*. Youngentob et al. (2021) has further identified LIKT for the Brigalow Belt bioregion. A LIKT is a species of tree regularly browsed by koalas (in a particular region) such that it can be considered a substantial portion of the koala's diet (Youngentob, Marsh, & Skewes, 2021). LIKT that occur within the Project Area include river red gum (*Eucalyptus camaldulensis*), narrow-leaved ironbark (*E. crebra*), Queensland peppermint (*E. exserta*), blue-leaved ironbark (*E. fibrosa*), narrow-leaved grey box (*E. macrocarpa*), gum-topped box (*E. moluccana*), poplar box (*E. populnea*) and river red gum (*E. tereticornis*).

Koalas move between food trees and shelter trees on a daily basis, and as such, shelter trees are considered an essential resource to the species for thermoregulation and predator evasion (DAWE, 2022). Koalas show preference for large, shady trees and have been observed utilising a range of tree species for shelter (e.g. cypress-pine, brigalow and paperbarks). Additionally, koalas have been observed in lone paddock trees, showing their capacity to disperse long distances. Youngentob et al. (2021) has also identified ancillary habitat trees for koala in the Brigalow Belt, and those that occur in the Project Area include: brigalow (*Acacia harpophylla*), pink bloodwood (*Corymbia intermedia*) and gum-topped ironbark (*E. decorticans*).

Habitat for the koala in the Project Area can be delineated into breeding, foraging and core dispersal habitat, and safe intervening ground matrix. A summary of these habitat types is provided in Table 5-8. Breeding, foraging and core dispersal habitat are areas that are integral to the ongoing survival of the koala in the region, as these areas are used for all life functions including reproduction, foraging, sheltering and dispersal. Breeding, foraging and core dispersal habitat includes eucalypt forest and woodlands that contain an abundance of LIKT that would regularly support all these activities. Breeding, foraging and core dispersal habitat also includes areas that may lack a high density of LIKT, but contain ancillary habitat trees with occasional LIKT. Table 5-8 lists the BHTs in the Project Area that meet these criteria.

Safe intervening ground matrix defined by DAWE (2022) includes areas that enable long-range koala dispersal between isolated patches of breeding, foraging and core dispersal habitat. These areas generally have a bare, or grassy ground layer with limited shrub cover to enable ground movement by koalas. They do not contain any barriers to dispersal (ie. waterbodies or koala-proof fencing) and generally contain scattered occurrences of koala LIKT or ancillary habitat trees for transient shelter and foraging. Table 5-8 lists the BHTs in the Project Area that meet these criteria.

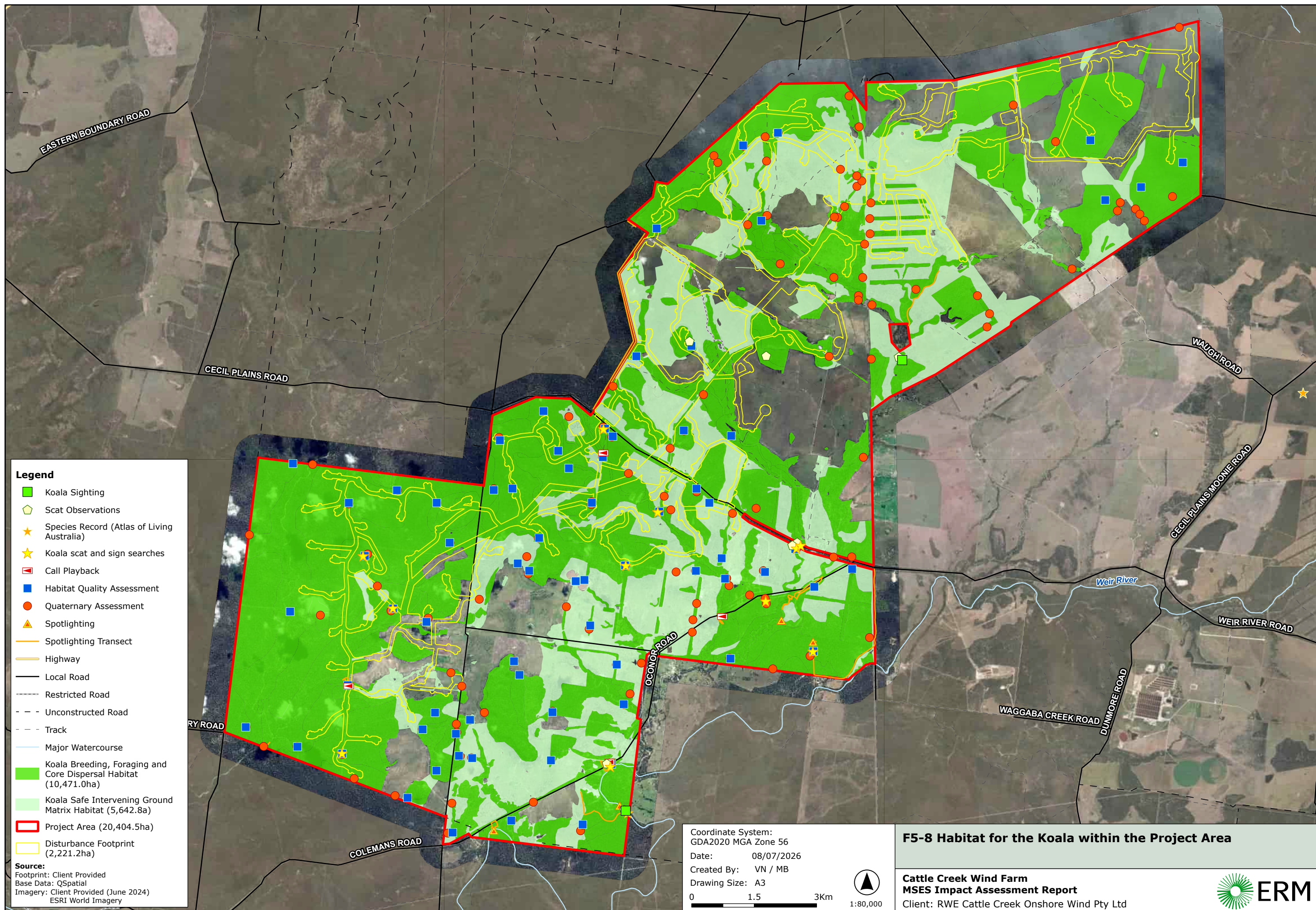
The permanent waterbodies BHT is excluded from habitat mapping as koalas are a strictly terrestrial species. The cleared land BHT is excluded as habitat as these areas are either cultivated crop land or large expanses of treeless grazing paddock greater than 300 m wide, that koalas are highly unlikely to disperse across. Tacla et al. (2025) found that mean nighttime distance travelled for koalas was between 102 and 143 m for males (male koalas move more than females and koalas move greater distances at night) and Barth et al. (2020) found that 85% of daily koala movements were less than 100 m, which indicates that koala are unlikely to travel a distance greater than 300 m at any one time.

Habitat for the koala is mapped on Figure 5-8.

TABLE 5-8 SUMMARY OF KOALA HABITAT IN THE PROJECT AREA

	Breeding, Foraging and Core Dispersal Habitat	Safe Intervening Ground Matrix
Description	Areas that contain an abundance of LIKT and have suitable vegetation composition and structure to facilitate all koala life functions: • Reproduction; • Foraging; • Movement; • Dispersal; and • Sheltering.	Areas that contain scarcely distributed LIKT and/or ancillary habitat trees that may be used for lower-order koala life functions such as sheltering and dispersal.
Mapping Approach	The following BHTs: • Riparian open forests to woodland; • Ironbark open forests to woodland on hilly terrain; • Ironbark and smooth-barked apple open forests to woodland; • Poplar box grassy open woodland; and • Gum-topped box open forests to woodland;	The following BHTs: • Agricultural land.

	Breeding, Foraging and Core Dispersal Habitat	Safe Intervening Ground Matrix
	• Buloke and poplar box open forests to woodland; and • Belah with or without brigalow open forests to woodlands.	
Amount in Project Area	10,471.0 ha	5,642.8 ha



Short-beaked Echidna

The short-beaked echidna (echidna) (*Tachyglossus aculeatus*) is listed as Special Least Concern under the NC Act, and is considered known to occur within the Project Area as per the LoO assessment (Appendix B). This likelihood consideration is a result of recent desktop records in the Project Area and locality.

The short-beaked echidna is Australia's most widespread native mammal, being found in almost all habitats, from snow-covered mountains to deserts, as well as urban areas. Echidnas are usually found among rocks, in hollow logs and in holes among tree roots. During rainy or windy weather, they often burrow into the soil or shelter under bushes and tussocks of grass (Baker & Gynther, 2023).

In this case, habitat for the species includes the entire Project Area and has not been mapped.

NC Act Protected Fauna Species With Potential to Occur

The LoO assessment (Appendix B) identified six NC Act protected fauna species that have the potential to occur within the Project Area. Potential habitat for these species in the Project Area is described in Table 5-9.

TABLE 5-9 POTENTIAL HABITAT SUMMARY FOR NC ACT LISTED FAUNA WITH THE POTENTIAL TO OCCUR

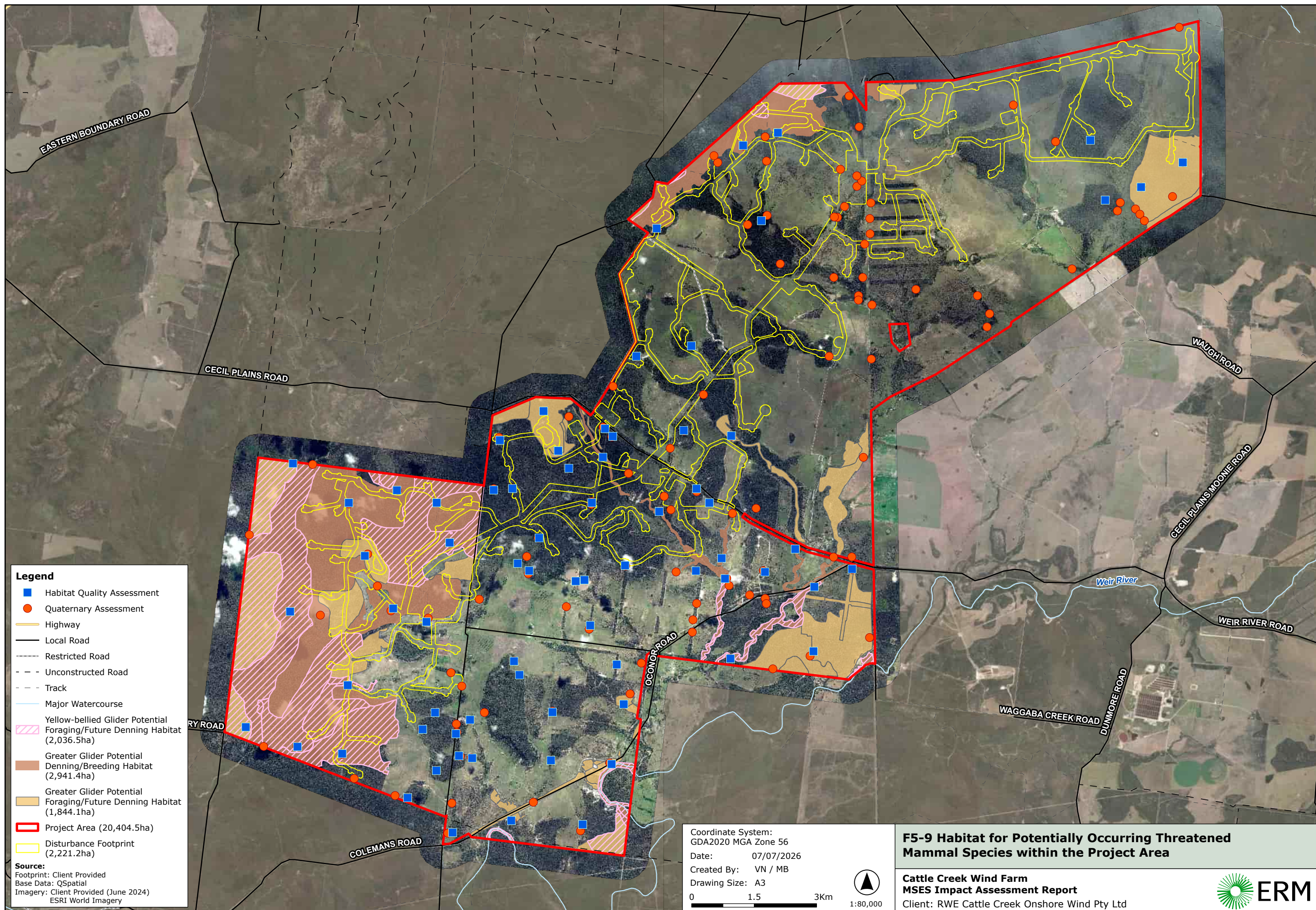
Species	NC Act	Habitat Description	Potential Habitat Mapped within the Project Area	Total Habitat
Mammals				
Greater glider (southern and central) (<i>Petauroides volans</i>)	V	Greater glider habitat consists of tall, montane <i>Eucalyptus</i> forests with mature hollow-bearing trees (Eyre, et al., 2022). Eyre, et al. (2022) lists the species habitat as REs with confirmed greater glider records and those containing crucial habitat attributes (i.e. live and dead-hollowing bearing denning trees, feed and large trees and habitat connectivity). The species has an affinity for habitats dominated or co-dominated by <i>Corymbia citriodora</i>, <i>Eucalyptus moluccana</i>, <i>E. tereticornis</i>, <i>E. crebra</i>, <i>C. intermedia</i> and <i>E. portuensis</i> (Eyre, et al., 2022). <i>The Guide to greater glider habitat in Queensland</i> (Eyre, et al., 2022) offers specific thresholds for the size and density of large trees for the REs in which greater gliders are known to occur based on the BioCondition framework. This 'large tree' metric is used as a proxy for estimating abundance and size of hollows. For the Brigalow Belt REs that contain greater glider, the average large tree size and density is 46.5 +/- 7.5 cm dbh at a density of 14.9 +/- 5.1 trees/ha.	Potential denning and breeding habitat for the species have been mapped as areas of contiguous eucalypt woodland or forest with a density of trees > 39 cm dbh at > 9.8/ha. This threshold comes from the lower bounds (mean minus standard deviation) of the large tree benchmarks for REs that are known to be suitable habitat for greater glider in order to take a conservative approach to mapping. Hollow transects (Section 4.5.3.3) were used to identify areas that have the appropriate density of large trees to be mapped as potential denning and breeding habitat. Potential foraging/future denning habitat are areas that may be used for foraging currently and may be used for denning and breeding in the future. In the Project Area, this includes eucalypt woodland or forest with eucalypts > 30 cm dbh that are connected to potential denning and breeding habitat. These areas are not currently suitable for denning and breeding activities as they lack the appropriate density of large trees (as per hollow transects). The BHTs that broadly constitute eucalypt woodland to forest considered into potential habitat mapping for the species include: • Riparian open forests to woodland; • Ironbark open forests to woodland on hilly terrain; • Ironbark and smooth-barked apple open forests to woodland; • Poplar box grassy woodland; and • Gum-topped box open forests to woodland. Isolated patches containing some suitable habitat features (ie. Large trees or preferred foraging species) in of the Project Area are not considered potential habitat due to their lack of connectivity to larger areas of	2,941.4 ha of potential denning/ breeding habitat 1,844.1 ha of potential foraging/ future denning habitat

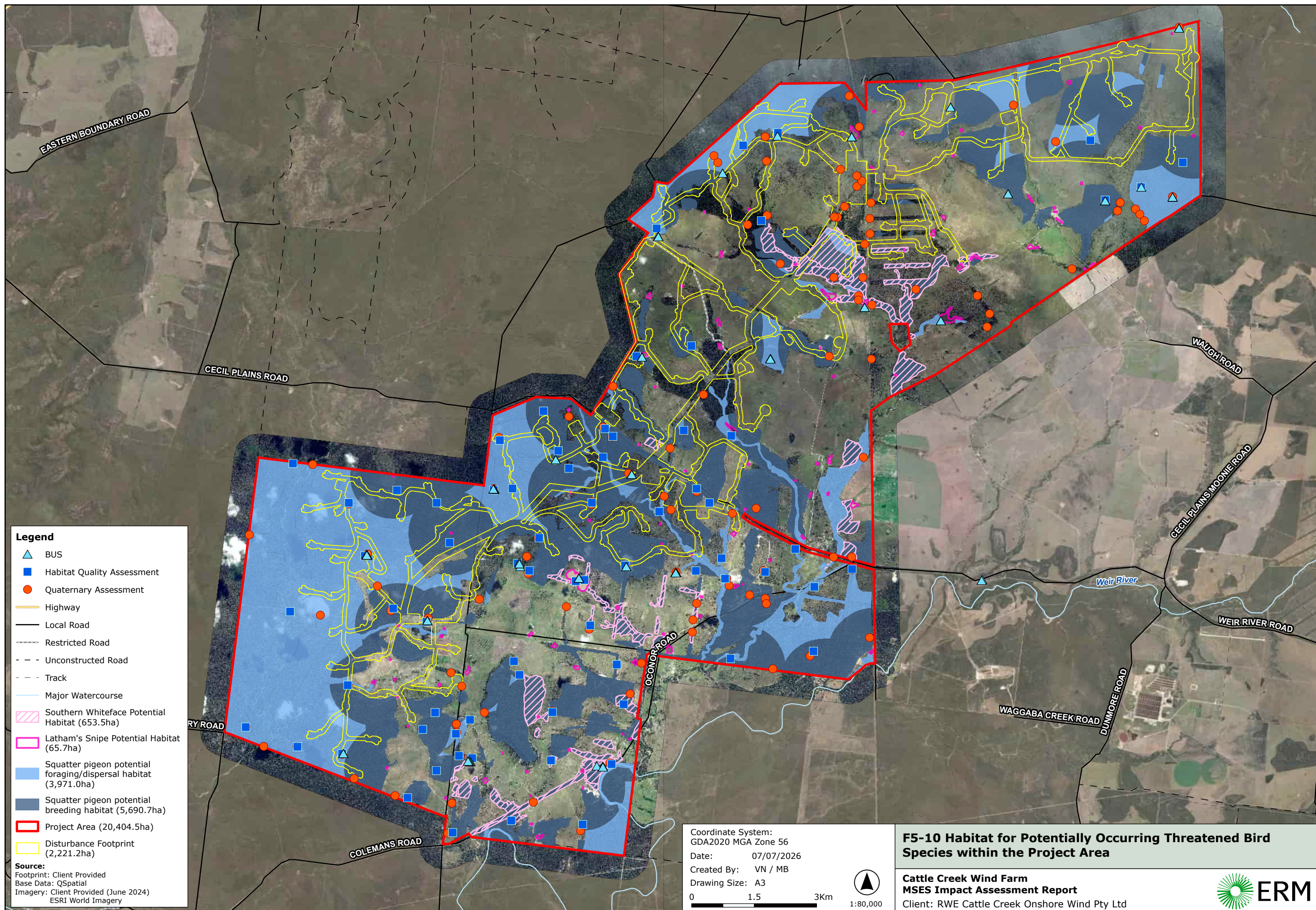
Species	NC Act	Habitat Description	Potential Habitat Mapped within the Project Area	Total Habitat
			suitable habitat, preventing gliding, and the lack of identification of the species. Mapped on Figure 5-9	
Yellow-bellied glider (south-eastern) (<i>Petaurus australis australis</i>)	V	Broadly, habitat for yellow-bellied glider includes wet and dry eucalypt-dominated sclerophyll woodlands and forests. The yellow-bellied glider shows a preference for woodlands and forests that have a high proportion and diversity of winter-flowering and smooth-barked eucalypts, which help provide diversity in food sources year-round. Food sources for the species include insects sheltering in shed bark, manna, eucalypt nectar and pollen and various eucalypts are used for sap-feeding, a process whereby sap is drawn from the tree via V-shaped incisions and vertical furrows created by the species large, lower incisor teeth. The yellow-bellied glider prefers dens in large, old, smooth-barked living eucalypts generally greater than 1 m in diameter. Stags are generally not preferred for yellow-bellied glider denning (DAWE, Conservation Advice for <i>Petaurus australis australis</i> (yellow-bellied glider (south-eastern)), 2022).	As the hollow transects fund that there is an absence of trees > 1 m in diameter, there is not considered to be any potential denning and breeding habitat in the Project Area. Potential foraging/future denning habitat in the Project Area has been mapped to include areas of remnant eucalypt woodland to forest containing smooth-barked eucalypts in proximity to the large patches of remnant vegetation adjacent to the Project Area. The BHTs that broadly constitute eucalypt woodland to forest considered into potential habitat mapping for the species include: • Riparian open forests to woodland; • Ironbark and smooth-barked apple open forests to woodland; and • Gum-topped box open forests to woodland. Mapped on Figure 5-9.	2,036.5 ha of potential foraging/future denning habitat
Birds				
Southern whiteface (<i>Aphelocephala leucopsis</i>)	V	The southern whiteface inhabits open woodlands and scrublands dominated by eucalypts, acacias (particularly mulga), mallee, saltbush and bluebush, usually with low tree densities, a grassy or shrubby understory, and scattered leaf litter or bare ground that support its ground-foraging habits. In Queensland the species is largely confined to the south-west of the Mitchell Grass Downs and along the southern state border, where it persists in habitats with low tree densities and	Potential habitat for the southern whiteface in the Project Area has been mapped to include the following BHT: • Poplar box grassy woodland. The poplar box grassy woodland BHT would not be defined as an 'open woodland' (which the species inhabits) according to the Australian Vegetation Attribute manual Version 6.0 (Executive Steering Committee for Australian Vegetation Information, 2003), as it has a canopy cover that is generally greater than 10%.	726.7 ha

Species	NC Act	Habitat Description	Potential Habitat Mapped within the Project Area	Total Habitat
		an herbaceous understory with scattered litter cover, supporting its ground-foraging behavior. Southern whitefaces forage primarily on insects, spiders, and seeds, which are gleaned from bare ground and leaf litter (DCCEEW, 2023).	However, it is the most open woodland in the Project Area (apart from the agricultural land BHT). Mapped on Figure 5-10.	
Latham's snipe (<i>Gallinago hardwickii</i>)	V	Whilst in Australia, Latham's snipe are dispersive and moves in response to rainfall and availability of food. They typically inhabit open, freshwater wetlands with dense, low vegetation in which they forage and can occur close to human activities (DCCEEW, 2024).	The following BHT is considered potential Latham's snipe foraging habitat: Permanent waterbodies. Mapped on Figure 5-10.	65.7 ha
Squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)	V	The squatter pigeon inhabits open-forests to sparse open-woodlands and scrubs that are mostly dominated by an overstorey of <i>Eucalyptus</i> , <i>Corymbia</i> , <i>Acacia</i> or <i>Callitris</i> species. Patchy tussock grasses are often observed in the ground layer on a substrate of sandy or gravelly soil. Observations of this species are usually made within approximately 3 km of a suitable, permanent, or ephemeral waterbody. Retention of a woodland tree canopy which provides shelter from predatory birds is an important habitat factor for the squatter pigeon (TSSC, 2015). Specifically in Queensland, breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills, and lateritic (duplex) soils on low 'jump-ups' and escarpments within 1 km of watercourses. The land zones which are characterized by these traits are land zone 5 and 7, which are noted as suitable land zones for the species (Squatter Pigeon Workshop, 2011).	Potential breeding habitat are areas with shallow, rocky or sandy soils (land zone 5 and 7) within one km of water with a continuous canopy that provides shelter from predators. This includes the following BHTs when within one km of a permanent water body: - Ironbark open forests to woodland on hilly terrain; - Ironbark and smooth-barked apple open forests; - Poplar box grassy woodland; - Gum-topped box open forests to woodland; and - Buloke open forests to woodland. Potential foraging and dispersal habitat on the other hand are the same BHTs and the riparian open forests to woodlands BHT within one to three km's of permanent waterbodies and ephemeral creeks/rivers. Mapped on Figure 5-10.	3,971.0 ha of potential breeding habitat 5,763.9 ha of potential foraging and dispersal habitat

Species	NC Act	Habitat Description	Potential Habitat Mapped within the Project Area	Total Habitat
Fork-tailed swift (<i>Apus pacificus</i>)	SLC	During the time the fork-tailed swift is within Australia, the species remains almost exclusively aerial, foraging above a variety of habitats across all states of Australia. The species predominantly occurs over inland plains, coastal cliffs, beaches, islands, and offshore waters, often taking advantage of updrafts created by topographical features such as cliffs, escarpments, and dunes. The species also frequents riparian woodlands, saltmarshes, heathlands, grasslands, and open farmland, demonstrating remarkable adaptability to diverse open landscapes. Additionally, it occurs over settled areas like towns and cities, where open spaces and water bodies provide abundant insect prey. The species is largely considered to roost aerially, with it being extremely rare for the species to roost terrestrially in Australia (DCCEEW, 2025).	The entire Project Area may be used for aerial foraging by the species due to their broad habitat requirements.	No mapped habitat.

NC Act Status: CR = Critically Endangered; E = Endangered; V = Vulnerable; SLC = Special Least Concern





5.8.4 WATERCOURSES, WETLANDS AND FISH PASSAGE

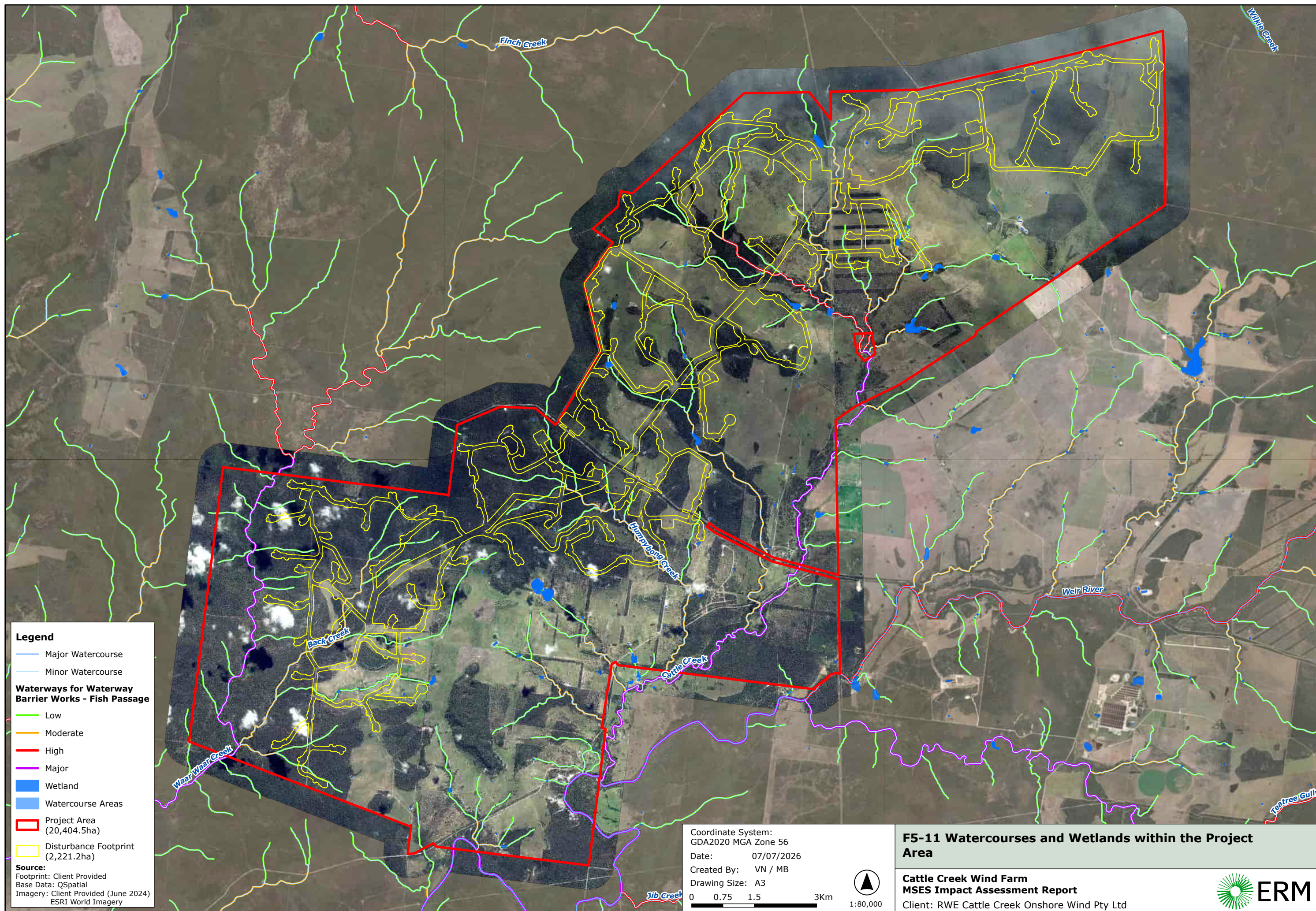
The Project Area is intersected by the following Rivers and creeks, as well as minor tributaries draining into these larger systems:

- Weir River;
- Cattle Creek; and
- Waar Waar Creek.

The predominant stream orders in the Project Area are one, two and three. There is a stream order four watercourse (Waar Waar creek) to the west of the Project Area, and part of the Weir River that occurs in the south of the Project Area is also a stream order five waterway.

There are no wetlands of international importance associated with the Project Area. There are also no HEV waterways present in the Project Area, nor any HES wetlands that occur within the Project Area. Figure 5-11 shows the relevant drainage features mapped throughout the Project Area.

There are low to major risk Queensland waterways for waterway barrier works within the Project Area that may provide fish passage. There are also several other waterways around the Project Area which may be impacted through site access arrangements. There are no high ecological significant watercourses or high ecological significant wetlands within the Project Area.



6. PROPOSED DEVELOPMENT ACTIVITIES AND POTENTIAL IMPACTS

The Proposed Development has the potential to impact on the MSES values within the Project Area during the construction, operation and decommissioning phases. The activities of each phase and their associated impacts are outlined in the following subsections.

6.1 CONSTRUCTION PHASE ACTIVITIES

A detailed construction methodology will be delivered by the Balance of Plant (BoP) contractors, in collaboration with the Proponent. It is anticipated that the construction work (subject to geotechnical conditions) will include, but are not limited to the following:

- Cut and fill earthworks, including but not limited to excavating, hammering, ripping, crushing, material haulage, blasting (if required), compacting, moisture conditioning, and testing;
- Erection of turbines, including but not limited to component delivery, crange, and fitting of ancillary items;
- Construction of BESS and associated component;
- Cabling works, including but not limited to the trenching and laying of cables by various methods;
- Substation construction;
- Vegetation clearing through the use of appropriate methods;
- Construction of site compounds, camps and facilities; and
- Delivery of various Proposed Development components.

The construction phase has the potential to impact on MNES, through habitat disturbance and mortality as a result of:

- Vegetation clearing for new access tracks, temporary construction compounds and laydown areas, borrow pits, batching plants, hardstands, trenches, electrical infrastructure, and associated earthworks;
- Excavating trenches associated with reticulation and instrumentation cables;
- Construction traffic movements; and
- Plant operations (rock crushing and batching plants).

The construction phase is anticipated to have a duration of 24 to 48 months. The predominant impact arising during the construction phase will be habitat loss via vegetation clearing. The construction phase is anticipated to result in a Disturbance Footprint (that is, the maximum to be cleared) of up to 2,221.2 ha across the Project Area, or 10.9% of the Project Area. This value is conservative however, and the 'actual' area of direct impact is likely to be much less than 2,221.2 ha. The 'actual' area of direct impact will be further defined during the detailed design phase. The current Disturbance Footprint overlaps with 813.9 ha of state-mapped remnant RE. The area of overlap between the Disturbance Footprint and state-mapped REs in the Project Area is shown in Table 6-1, overlap between the Disturbance Footprint and MSES is shown in Table 6-2.

It is anticipated that post-construction rehabilitation opportunities will rehabilitate some of the area that was directly impacted during the construction phase, to reduce the permanent impact associated with the Proposed Development. Further detail on rehabilitation is provided in Section 8. Rehabilitation will also reduce the permanent impact that the Proposed Development will have on some listed threatened species (see Section 8 for more detail). Table 6-2 therefore also states the maximum potential permanent impact that the Proposed Development will have on protected species. For species habitat which rehabilitation will not restore functionality to, it is reiterated that the 'actual' area of impact is likely to be far lower than the area of overlap with the Disturbance Footprint as detailed design will continue to refine the Disturbance Footprint.

Other impacts likely to arise during the construction phase include:

- Mortality from vegetation clearing;
- Habitat fragmentation and patch isolation;
- Increased prevalence of invasive flora and fauna;
- Increased vehicle impacts on fauna and habitat;
- Altered fire regimes and bushfire risk;
- Altered hydrology, sedimentation and erosion;
- Noise, dust and light pollution; and
- Hazardous material pollution.

TABLE 6-1 STATE-MAPPED RES WITHIN THE PROJECT AREA AND DISTURBANCE FOOTPRINT

REs	Short Description	VM Act Class	VM Structure Category	Area in Disturbance Footprint (ha)
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of Concern	Sparse	< 0.1
11.3.14	<i>Eucalyptus</i> spp., <i>Angophora</i> spp., <i>Callitris</i> spp. woodland on alluvial plains	Least Concern	Sparse	11.6
11.3.18	<i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium	Least Concern	Sparse	0
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least Concern	Sparse	1.3
11.5.1	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	Least Concern	Sparse	88.4
11.5.1a	<i>Eucalyptus populnea</i> woodland with <i>Allocasuarina luehmannii</i> low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones.	Least Concern	Sparse	17.1
11.5.4	<i>Eucalyptus chloroclada</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains and/or remnant surfaces	Least Concern	Sparse	0.8
11.5.4a	<i>Callitris glaucophylla</i> +/- <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland. Occurs on Cainozoic plains with deep sandy soils.	Least Concern	Sparse	170.3
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> and/or <i>E. woollsiana</i> +/- <i>E. crebra</i> woodland on Cainozoic sand plains	Least Concern	Sparse	60.7
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> woodland on Cainozoic lateritic duricrust	Least Concern	Sparse	108.0
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks	Least Concern	Sparse	0

REs	Short Description	VM Act Class	VM Structure Category	Area in Disturbance Footprint (ha)
11.7.7	<i>Eucalyptus fibrosa subsp. nubilis</i> +/- <i>Corymbia</i> spp. +/- <i>Eucalyptus</i> spp. woodland on Cainozoic lateritic duricrust	Least Concern	Sparse	355.5
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on fine-grained sedimentary rocks	Endangered	Mid-dense	< 0.1
Non-remnant				1,407.5
Total				2,221.4*
*Total area does not equal 2,221.2 ha (Disturbance Footprint) due to rounding of individual RE areas.				

TABLE 6-2 MSES WITHIN THE PROJECT AREA AND DISTURBANCE FOOTPRINT

MSES	Habitat Type	Amount in Project Area (ha)	Amount in Disturbance Footprint (ha)	Rehabilitation Area (ha)	Maximum Permanent Impact (ha)	% Permanently Impacted
Regulated vegetation						
Category B Endangered or Of Concern RE	-	362.2	0.0	NA	0	0
Category B Essential Habitat	-	0.8	0	NA	0	0
Category B RE Intersecting a Watercourse	-	529.5	5.2	NA	2.1	0.4
Protected Species						
Kogan waxflower	Supporting habitat	4.8	1.1	NA	1.1*	22.9
Diamond firetail	Breeding habitat	6,379.2	311.5	34.3	277.1	4.3
	Foraging/ dispersal habitat	1,973.2	185.8	29.1	156.6	8.0
Glossy black cockatoo (south-eastern)	Foraging habitat	809.3	57.5	NA	57.5	7.1
White-throated needletail	No habitat mapped.	Potential impacts will not impede species aerial foraging.				
Koala	Breeding/ foraging/ core dispersal habitat	10,471.0	644.0	NA	644.0	6.1
	Safe intervening ground matrix	5,642.8	484.5	82.5	0.0	0.0

MSES	Habitat Type	Amount in Project Area (ha)	Amount in Disturbance Footprint (ha)	Rehabilitation Area (ha)	Maximum Permanent Impact (ha)	% Permanently Impacted
Greater glider (central and southern)	Potential denning/ breeding habitat	2,941.4	200.1	NA	200.1	6.8
	Potential foraging/ future denning habitat	1,844.1	53.1	NA	53.1	2.9
Yellow-bellied glider (south-eastern)	Potential foraging/ future denning habitat	2,036.5	62.8	NA	62.8	3.1
Squatter pigeon (southern)	Potential breeding habitat	5,690.7	365.8	NA	365.8	6.4
	Potential foraging/ dispersal habitat	3,971.0	220.7	30.1	190.6	4.7
Short-beaked echidna	Suitable habitat	20,404.5	2,221.2	1,050.5	1,170.7	5.7
Latham's snipe	Potential habitat	65.7	0.2	NA	0.1	0.2
Southern whiteface	Potential habitat	653.5	28	2.6	25.4	3.9
Fork-tailed swift	No habitat mapped.	Potential impacts will not impede species aerial foraging.				

NA = not applicable. Rehabilitation will not restore directly impacted habitat to it's former functional state.

* = 'actual' area of direct impact to species habitat which will not be functionally restored through rehabilitation is likely to be substantially less than the Maximum Permanent Impact cited in this Table.

- = impact to koala safe intervening ground matrix is not considered a permanent impact, as dispersal opportunities for this species will be maintained.

6.2 OPERATIONAL AND MAINTENANCE PHASE ACTIVITIES

The operational and maintenance phase activities of the Proposed Development include:

- Operation of the WTGs and BESS; and
- Routine maintenance and servicing of WTGs, BESS, access tracks, electrical installation and infrastructure (as required).

Many of the construction phase impacts to ecological values will also occur as a result of operational activities. There will also be some additional impacts to ecological values unique to the operational phase. Overall, operational phase impacts are expected to include:

- Increased prevalence of invasive flora and fauna;
- Increased vehicle impacts on fauna and habitat;
- Altered fire regimes and bushfire risk;
- Altered hydrology, sedimentation and erosion;
- Noise, dust and light pollution;
- Mortality and injury from turbine collision and barotrauma;
- Changes to bird and bat site utilisation; and
- Hazardous material pollution.

Operational and maintenance phase activities, though longer in duration than those of construction phase activities, are anticipated to result in impacts that are of a more indirect nature, of lower frequency and smaller in intensity. Potential construction phase impacts listed above, such as introduction/spread of invasive species, vehicle collision with fauna, altered fire regimes and hydrology, and environmental (light, noise and dust) pollution, are still relevant in the operational phase but are expected to be far less prevalent, and impacts to MSES are likely to be minimal.

6.3 DECOMMISSIONING PHASE ACTIVITIES

Some of the potential impacts resulting from the construction and operation phases are considered likely to be repeated during the decommissioning phases. Decommissioning phase impacts are similar to those that might occur during the construction phase but likely to be of much lower magnitude. At the end of decommissioning, the Project Area would be rehabilitated to the extent agreed upon with the landholder. Potential impacts from decommissioning include:

- Construction/operation traffic movements and plant operations;
- Vegetation clearing for access tracks, temporary construction compounds and laydown areas, borrow pits, water storages and associated earthworks; and
- Excavating trenches.

If a decision was taken to decommission the Proposed Development, this would involve:

- Dismantling and removal of WTGs;
- Dismantling and removal of BESS infrastructure;
- Removal of electrical reticulation where not part of permanent network infrastructure;
- Responsible disposal/recycling/reuse of infrastructure removed from Project Area according to the waste hierarchy; and

- Rehabilitation of all disturbed land in accordance with good practice at the time and where not required for ongoing grazing or agricultural uses.

Considerable quantities of waste material will be generated during decommissioning of wind turbines and other infrastructure (overhead cabling, met masts) at the end of the Proposed Development's operational life.

The Proponent will commit to finding sustainable and best practice waste management options during the decommissioning process, including implementing the waste reduction hierarchy and prioritising reuse and recycling options over disposal wherever practicable.

7. AVOIDANCE, MITIGATION AND MANAGEMENT

Potential impacts of the Proposed Development will be managed in a manner consistent with the industry standard management approaches for wind farm activities, and, where relevant, additional site-specific measures will be implemented.

The Disturbance Footprint will consist of widely spaced WTGs and associated infrastructure, such as access tracks, underground electrical connections, overhead transmission lines, battery storage and substations. Due to the large size of the Project Area, and the widely spaced nature of the Disturbance Footprint, the ecological surveys were undertaken prior to and concurrently with landholder agreements and a preliminary design process. This approach was intended to guide the proposed design of the Disturbance Footprint to avoid and minimise potential impacts where possible.

To comply with Commonwealth requirements for avoiding and mitigating impact on MNES, the mitigation hierarchy has been developed to limit the amount of damage the Proposed Development has on the environment. Due to this, the mitigation hierarchy has been similarly adopted to limit the impacts the Proposed Development will have on MSES.

The three tiers of the hierarchy, which must be followed preferentially from first to last and explored in full before moving on to the next (DCCEEW, 2024), are avoid, mitigate and offset.

The Proponent has endeavored to follow the mitigation hierarchy, and has proposed avoidance and mitigation measures relevant to each phase of the Proposed Development. Broadly, these measures can be grouped as design and construction phase measures, operational and maintenance phase measures, and decommissioning phase measures.

Site-specific management plans will be developed to manage and mitigate impacts to ecological values of the Project Area and relevant MSES with the potential to be impacted by the Proposed Development. The management plans to be developed for the Proposed Development to fulfill requirements under the EPBC Act, State Code 16, State Code 23 and State Code 27 are:

- Environmental Management Plan (EMP);
- Vegetation and Fauna Management Plan (VFMP) (current version available as Appendix F);
- Cleared Vegetation Management Plan (CVMP);
- Bird and Bat Management Plan (BBMP) (current version available as Appendix E);
- Bushfire Management Plan (BMP);
- Rehabilitation Management Plan (RMP);
- Construction Environmental Management Plan (CEMP);
- Erosion and Sediment Control Plan – Construction (ESCPC); and
- Stormwater Management Plan (SWMP).

At present, the BBMP, VFMP and CEMP are in preliminary stages, with the necessary management plans to be developed and approved prior to commencement of construction works. These management plans will contain mitigation, management measures and monitoring protocols outlined in this MSES IAR. They will also include monitoring protocols to assess the effectiveness of the implemented management measures to identify where corrective actions may need to be implemented.

Together, the avoidance and mitigation measures alongside the management protocol documents in the management plans will minimise impacts on MSES and general ecological values to result in the best environmental outcomes possible.

While vegetation and habitat mapping were considered in site selection, environmental disturbance is not entirely avoidable. The Disturbance Footprint will consist of widely spaced WTGs and associated infrastructure that will occupy a large area (up to 2,221.2 ha across the Project Area), some of which includes remnant vegetation. As a result, ecology surveys have been and will continue to be conducted to guide the design to avoid and minimise unavoidable impacts to the greatest extent possible, across two design phases. The two-stage design process includes:

- First design phase – avoidance of identified important ecological values; and
- Detailed design phase – pre-clearance surveys to inform micro-siting.

For the Proposed Development, it is in the first design phase of avoiding ecological values identified as important on a state level as the field surveys have learnt about the Project Area on a broad scale.

A design refinement process involving initial mapping of ecological constraints has been completed, and pre-clearance micro-siting surveys are still to be undertaken following detailed design and prior to construction commencing. Pre-clearance surveys will be undertaken at the 30% and 80% Disturbance Footprint design to search for key natural habitat features, such as water bodies, escapements, as well as TECs, listed flora species and listed fauna species or their habitat to inform micro-siting of the Proposed Action layout to avoid these values. The investigation will consist of searching all habitat strata and fauna habitat types to be directly impacted (e.g. arboreal, terrestrial, leaf litter), inclusive of a 100 m buffer around infrastructure locations. This two-phase design and avoidance process will allow for all planned areas of disturbance to be adequately assessed in accordance with the State Code 16, State Code 23 and State Code 27 field survey requirements, as well as identification of potential MSES values in accordance with relevant state guidance.

7.1 AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

In addition to the two-stage design process, potential direct and indirect impacts to MSES as a result of the Proposed Development, will be avoided, mitigated and then managed in accordance with the expected procedures for wind farm activities. The avoidance, mitigation and management measures, to be implemented during the construction, operation and decommissioning phases of the Proposed Development are discussed in Table 7-1.

TABLE 7-1 MANAGEMENT AND MITIGATION MEASURES

Impact	Hierarchy	Phase	Measures
Habitat loss, fragmentation and patch isolation	Avoid	Design and construction phase	- The Disturbance Footprint is the result of iterative refinements during the first design phase based on the constraints that the preliminary impact assessments have identified; - Preferably impacting the more disturbed BHTs in the Project Area (cleared land and agricultural land) over the remnant BHTs; - Impacts to areas of habitat for listed threatened species will be further avoided at the detailed design stage (pre-clearance surveys and micrositeing).; and - Clearing of MSES habitat will not exceed approved maximum disturbance limits. Additionally, no MSES or microhabitat features associated with areas to be cleared will not be disturbed without applying relevant mitigation measures.
	Mitigate	Design and construction phase	- Clear demarcation of clearing areas and boundaries to prevent unauthorised overclearing; - A VFMP will be developed and implemented throughout the construction phase to ensure that clearing is undertaken in accordance with legislative standards and requirements; - To prevent unnecessary land and vegetation disturbance, vehicles and equipment will be retained within the approved work zone; - Workers will be made aware of management requirements during inductions and through regular checks during construction. General site inductions will outline potential risks and impacts to the environment, management strategies and methodologies to avoid, minimise and mitigate the potential risks and impacts relevant to the onboarding workers and contractors; - A RMP will be implemented to rehabilitate temporary vegetation clearing in mapped remnant vegetation to pre-construction composition, function and structure (pre-existing BHT); - When linear corridors must be cleared in areas mapped as greater glider or yellow-bellied glider potential habitat, vegetation pinch points will be incorporated as a fauna movement solution; - Installing fauna crossing infrastructure and glider hollow boxes; - Where fencing is required, consideration will be given to maintaining fauna movement to prevent fragmentation impacts; - The Proponent will consider the use of innovative turbine blade transportation, including methods to minimise necessary clearance widths; and - Rehabilitation of temporary use areas.
Mortality from vegetation clearing	Avoid	Construction phase	- Pre-clearance surveys of potential habitat values, where potential risks to fauna may occur, will be undertaken in advance of clearing; - A qualified fauna spotter-catcher will conduct a search for any fauna immediately prior to all clearing; - Where fauna (or important nesting sites for protected fauna) are detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts from clearing;

Impact	Hierarchy	Phase	Measures
	Mitigate	Construction phase	- Injured, sick or dead fauna will be recorded and reported, during all phases of the Proposed Development. This can be carried out by a fauna spotter-catcher during periods where disturbance is expected to occur (primarily, during construction activities); and - Injured or sick fauna will be taken to the nearest wildlife carer or veterinarian if practical.
Increased prevalence of invasive flora and fauna	Avoid	Construction and operational/maintenance phase	- An EMP will be developed and implemented for the Proposed Development which will include biosecurity measures such as vehicle wash downs, weed certification and obligations for traffic to be confined to access tracks throughout the Project Area; - Activities will be planned so that movement of vehicles, plant, machinery and equipment will be in accordance with the requirements of the EMP; - Access to a landholder's property will not occur unless authorised under a land use agreement; and - Staff and contractors will be given information on the location and consequences of biosecurity threats in the Project Area.
	Mitigate	Construction and operational/maintenance phase	- Weeds of National Significance (WoNS) and restrictive invasive species will be identified and monitored in the Project Area. Appropriate weed monitoring will be described in the EMP, and will occur to ensure new weed species are identified, recorded and controlled; - Once weeds are identified, weed management and control methods will depend upon the location, weed species identified, the degree of the infestation, relevant landholder agreement, and local, state and national regulatory requirements; - Imported material able to transport weed and seed will be assessed, and a Weed Hygiene Declaration will be implemented, to ensure material is free of contamination, disease and invasive weeds and no contamination occurs; and - Staff and contractors will be made aware, through general site induction and training, of the potential to exacerbate weed and pest related risks, biosecurity site requirements (e.g., weed certification) and mitigation and management measures
Increased vehicle impacts on fauna and habitat	Avoid	Construction and operational/maintenance phase	No driving will occur in unauthorised areas
	Mitigate	Construction and operational/maintenance phase	- Construction and management of access tracks will be done to ensure safe road designs, both for human and wildlife; - A general site speed limit of 60 km/hr will apply in the Project Area and specific speed limits will also be applied in areas with limited visibility (i.e. remnant vegetation) or areas mapped as MSES habitat where a reduction in speed would reduce the likelihood of fauna collision; - Traffic calming devices such as speed bumps will also be incorporated in sensitive areas; and

Impact	Hierarchy	Phase	Measures
			Night-time safe driving controls will also be applied, including additional speed restrictions, providing additional protection to nocturnal animals.
Altered fire regimes and bushfire risk	Mitigate	Construction and operational/maintenance phase	A BMP will be developed and implemented during construction and operation phase to mitigate the potential impact of fires to ecological values.
Altered hydrology, sedimentation and erosion	Avoid	Design phase	Avoidance of impacts to waterways during the initial design stage.
	Mitigate	Construction and operational/maintenance phase	- An EMP, ESCPC and SWMP will be developed which will outline measures to mitigate potential impacts on hydrology; - A stabilized entry/exit point (rumble pad) will be established and maintained for each area of the Project Area with all-weather access to a sealed road. The stabilized entry and exit points will include a vehicle cleaning area to mitigate the transportation of dust and dirt; - Disturbed areas to be temporarily stabilized during periods of inactivity, and permanently stabilized at the conclusion of the disturbance works; - In areas where the slope is steeper than a ratio of 1 vertical unit for every 10 horizontal units, hydraulically applied blankets, such as bonded fibre matrix or compost blankets to be implemented to promote the establishment of a vegetative cover. Bonded fibre matrix will also assist in reducing the effect of raindrop impact erosion; - Access tracks will be constructed in accordance with Erosion control on property roads and tracks - managing runoff (Queensland Government, 2018b); - Scour protection to be installed along drainage features to disperse and dissipate the energy of surface water flows. Protection may include features such as rock, concrete, or geo-fabric linings, or the establishment of vegetation and/or jute-matting; - Flow diversion banks, diversion channels, catch drains, table drains, chutes and clean water diversions to be installed along the high side of each disturbance area to ensure that during and after storm events, clean water upstream flows entering the Project Area are not contaminated with construction material and/or particulates that might enter the downstream system; - Sediment fences to be placed along the low side of work areas as a means of slowing flows, reducing scour, and capturing some sediment runoff; - As a minimum, channel clearing and stabilization requirements for the work is to be established in line with the best practice channel clearing and stabilization requirements identified in Table I11 of the International Erosion Control Associations Best Practice Erosion and Sediment Control (IECA, 2008), for all watercourse crossings identified; - Channel crossing works to be compliant with the acceptable development outcomes for waterway barrier works (regulated by Queensland Government);

Impact	Hierarchy	Phase	Measures
			- In-stream works to be undertaken during periods when flows are minimal, if not absent; and - Regular inspection and maintenance of erosion and sediment control structures. Following rainfall events sufficient to produce runoff, inspection of erosion control measures and removal of collected material will be undertaken. Replacement of any damaged structures should be performed immediately.
Noise, dust and light pollution	Mitigate	Construction and operational/maintenance phase	- The EMP and CEMP will outline mitigation measures to reduce noise, dust and light pollution; - Dust will be minimised through engineering controls on machinery and other available dust suppression controls (water carts, sprinklers and covering stockpiles etc); - Vehicles will adhere to speed limits within the Project Area to reduce dust generation; - Disturbance from blasting will be minimised through engineering controls and other available blasting suppression, such as barrier walls, to avoid unnecessary ground vibrations, flying rocks, and dust generation; - Lighting will only be installed where it is necessary (e.g., as a safety or accessibility measure) to reduce light pollution impacts; - Light pollution will also be minimised through engineering controls on infrastructure and machinery, such as colour selection to minimise attracting invertebrates, and timing controls to avoid periods of high fauna activity; - Utilising hardware that produces the least amount of noise (while maintaining job suitability and performance); - Idling of machinery, plant and vehicles will occur only when performing tasks necessary for the machinery, plant and vehicles to be idle; - Identifying and avoiding sensitive periods and locations where fauna are reliant on vocal behaviour (e.g., dusk for koalas during breeding season) (e.g., scheduling work during the day, and consideration of placement of machinery, plant and vehicles nearby sensitive receptors (such as water sources)); and - Staff and contractors will be made aware, through general site induction and training, of the potential to generate dust emissions and mitigation and management measures that should be implemented.
Hazardous material pollution	Mitigate	Construction and operational/maintenance phase	- The EMP and CEMP will outline mitigation measures to reduce hazardous material pollution; - All hazardous materials bought on-site will be accompanied by a Material Safety Data Sheet (MSDS), and all relevant personnel will be trained in their proper use; - Areas for plant and construction material storage are to be designated along with associated diversion drains and spillage holding ponds. The BESS and any chemical or waste storage facilities (such as the O&M Facility) are to be bunded to contain any leaks or spills; - Site personnel to be made aware of the correct spill response and management procedures that are to be implemented within the Project Area, with spill response kits to be made available on site and in each vehicle; - Water for earthworks and dust suppression is likely to be locally sourced from groundwater (artesian and sub-artesian), rainwater (sourced from dams or collection ranks), or offsite;

Impact	Hierarchy	Phase	Measures
			- On-site cement/concrete mixing will be carried out behind earth bunds (or other such measures) to capture and contain concrete-laden waste and spills; - All concrete batching and pouring equipment will be rinsed in the designated on-site wash-down areas. Equipment wash-down water will not be diverted into the stormwater system, rather contained on site prior to treatment or disposal; and - The site manager is to ensure that all sediment controls are in place prior any concrete pouring occurs.
Mortality and injury from turbine collision and barotrauma	Avoid	Design phase	Avoid locating WTGs in areas likely to contain MNES bird and bat species.
	Mitigate	Operational/maintenance phase	- Detailed in BBMP (Appendix E); - Designing a WTG with a Rotor Swept Area > 40 m above ground level, to provide a collision-free foraging zone within and > 20 m above the canopy; - Reducing WTG lighting (to reduce invertebrate density) where other factors (e.g., aeronautical safety obligations) are not compromised, and considering the use of red or yellow light (generally less attractive to invertebrates than white light); - Reducing food, water and perching resources for birds around WTGs; - Consideration of the use of innovative blade design, which may include: - Acoustic and visual deterrents (e.g., ultrasound acoustic devices, painted blades); and - Detection systems (e.g., IdentiFlight®, Robin Radar Systems); - Detailed operational monitoring programs, including operational BBUS and mortality monitoring to detect impacts to listed and non-listed bird and bat species; and - Implementation of impact trigger and significant impact threshold framework to identify impacts before they reach a significant impact threshold, so that adaptive management and corrective actions can be implemented to prevent significant impacts occurring (more detail in BBMP).
Changes to bird and bat site utilisation	Avoid	Design phase	Avoid locating WTGs in areas likely to contain MNES bird and bat species.
	Mitigate	Operational/maintenance phase	- Detailed in BBMP (Appendix E); and - As above for 'Mortality and injury from turbine collision and barotrauma'.

8. REHABILITATION

Rehabilitation of some of the vegetation directly impacted by the Proposed Development will occur post-construction. Post-construction rehabilitation will occur in construction laydown areas, widened access tracks and other temporary use areas not required for the operation phase of the Proposed Development. This includes approximately 1,050.5 ha (or 47.2 %) of the Disturbance Footprint. The intention is to progressively stabilise areas of disturbance, making them resilient to erosion and weed infestation, and to re-establish appropriate vegetation cover. Rehabilitation will also focus on restoring and maintaining ecosystem functionality for a range of pre-existing taxa, by rehabilitating directly impacted areas to their originally mapped BHT (unless otherwise agreed with the landowner as well as applicable legal requirements and standards). The key rehabilitation objectives for the Proposed Development are:

- Ensure that rehabilitation of vegetation post-construction not required for operation is properly planned in a manner that promotes self-sustaining ecosystems;
- Ensure rehabilitation of native vegetation can develop into a viable ecological system, comparable to pre-clearing native vegetation and its land uses;
- Ensure rehabilitation continues until ecosystems and all impacted areas are self-sustaining;
- Restore pre-clearance levels of biodiversity and ecosystem functionality;
- Re-planting to be consistent with pre-clearance BHTs as identified within Section 5.2.2;
- Ensure all meaningful efforts to minimise clearing endangered REs;
- Ensure connectivity for native wildlife through species-specific management practices including:
 - Groundcover revegetation will focus on establishing a diverse grassy understory suitable for foraging, to provide for small native mammals and birds;
 - Maintain connectivity for koala habitat;
 - Larger logs that are cleared from the Project Area will be placed within the revegetation area to provide additional habitat features; and
 - Ensuring a fauna spotter catcher is present to re-located fauna within the Disturbance Footprint during clearing activities;
- Reusing topsoil and utilising mulch made from cleared vegetation;
- Preventing erosion from soil, particularly on sloped terrain; and
- Ensuring exotic plant species do not take hold and dominate regrowth vegetation.

The measures that will be used for post-construction rehabilitation to achieve these objectives will include:

- The use of tube-stock containing native species that reflects the surrounding environment will assist in speeding up the rehabilitation process in areas outside of the Disturbance Footprint;
- Matting also helps to conserve soil moisture, improves water infiltration and soil structure, and moderates soil temperatures, thereby improving plant growth;
- Plastic tree guards, held away from a seedling by 3 stakes, to protect against grazing by feral pests, and provide protection from drying winds;
- Approximately 70% understory cover to be successfully established with a successful establishment of native species representative of the pre-existing BHT or neighbouring

vegetation. This serves to protect and cover soils and vegetation, to minimise the risk of erosion and provide homogeneity with the surrounding vegetation;

- Provide areas of newly rehabilitated areas with pre-clearance values and ecological secondary succession through planting and regenerating native species in line with pre-existing BHT values;
- Replacement of native trees along the second order streams within the Project Area to increase the vegetation density along the creek-lines and enhance its value as a linking corridor with remnant vegetation fragments;
- Strong focus and ongoing management of rehabilitation of koala and greater glider eucalypt feed species;
- Topsoil to be replaced before seeding takes place;
- Topsoil to be stockpiled where appropriate (not in areas of high weed seed) and used in the rehabilitation process;
- Topsoil from similar vegetation communities to be respread at similar depths (~5cm) to those originally removed; and
- In some areas of rehabilitation, it might be appropriate to regenerate the track naturally, with weed management processes in place. This weed management may involve the use of mulch formed from vegetation cleared from the Project Area.

Further detail on how post-construction rehabilitation will be carried out and managed will be provided in the Proposed Developments RMP.

As post-construction rehabilitation will restore these areas to their originally mapped BHT, ecological function of some of these areas will be restored for some protected species. That is, directly impacted habitat for some protected species that is rehabilitated post-construction are not considered 'permanent impact' for that species. For example, post-construction rehabilitation of directly impacted squatter pigeon breeding and foraging and dispersal habitat is expected to restore these areas to its former functional state for the species. This is because soil will be stabilised and there will be at least some shrub and tree canopy within five years, to promote safe squatter pigeon breeding, foraging and dispersal. In contrast, post-construction rehabilitation is not expected to restore koala breeding, foraging and core dispersal habitat to its former functional state, as it will take several decades of rehabilitation to be suitable for these koala activities. The protected species habitats' that will have a reduction in permanent impact due to rehabilitation are:

- Diamond firetail breeding and foraging and dispersal habitat;
- Koala safe intervening ground matrix;
- Squatter pigeon potential breeding and potential foraging and dispersal habitat;
- Short-beaked echidna habitat; and
- Southern whiteface potential habitat.

The maximum potential permanent impact of the Proposed Development on protected species considering post-construction rehabilitation is stated in Table 6-2.

9. BIRD AND BAT RISK ASSESSMENT AND MODELLING

Wind farms are known to impact birds and bats through collision with operating turbines. This section provides a summary of the detailed risk assessment and Collision Risk Modelling (CRM) for birds and bats potentially occurring in the Project Area. The detailed risk assessment can be found in the Preliminary BBMP (Appendix E). The Preliminary BBMP has been prepared in accordance with State Code 23 and the Onshore Wind Farm Guidance (DCCEE, 2024). The risk assessment has considered the likelihood of impact, and potential consequences of events including collision with WTGs, as well as the impact of construction and operation on the Proposed Development causing changes in site utilisation by bird and bat species. Where necessary and possible, CRM was then conducted for birds and bats at risk of collision with WTGs.

9.1 BIRD AND BAT RISK ASSESSMENT

The bird and bat risk assessment included all listed species under the EPBC Act and NC Act and non-listed species that can occur in the RSA and therefore may be at risk of collision with WTGs.

As a result of the risk assessment, two listed threatened species, four raptor species and four bat species were assessed as having a low or moderate risk of collision (Table 9-1). All other listed bird and bat species were considered to have negligible risk of impact from collision with WTGs and any indirect impacts associated with the Proposed Development (e.g. barrier effects from WTGs). It is emphasised that this risk assessment assumes a worst-case scenario for each species, based upon literature and realistic observational expectations. Therefore, the final risk ratings assigned to species that have the potential to occur within the Project Area are conservative and enable this worst-case scenario to be considered.

A full detailed risk assessment with conclusions can be found in the Preliminary BBMP.

TABLE 9-1 BIRD AND BAT RISK ASSESSMENT RESULTS

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating
Listed species				
Southern whiteface	V, V	Rare	Low	Negligible
Fork-tailed swift	Mi, SLC	Likely	Low	Low
Latham's snipe	V & Mi, V	Unlikely	Low	Negligible
Glossy black cockatoo (south-eastern)	V, V	Unlikely	Moderate	Low
Squatter pigeon (southern)	V, V	Rare	Moderate	Negligible
White-throated needletail	V & Mi, VU	Likely	Moderate	Moderate
Diamond firetail	V, V	Rare	Low	Negligible
Raptors				
Australian hobby	-, LC	Unlikely	Low	Negligible
Black kite	-	Likely	Low	Low

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating
Black-shouldered kite	-	Likely	Low	Low
Brown falcon	-	Likely	Low	Low
Nankeen kestrel	-	Unlikely	Negligible	Negligible
Spotted harrier	-	Rare	Low	Negligible
Wedge-tailed eagle	-	Almost certain	Low	Low
Whistling kite	-	Unlikely	Negligible	Negligible
Non-listed Birds Observed in RSA				
Fairy martin	-, LC	Likely	Negligible	Negligible
Grey teal	-, LC	Likely	Negligible	Negligible
Hardhead	-, LC	Unlikely	Negligible	Negligible
Sulphur-crested cockatoo	-, LC	Likely	Negligible	Negligible
Torresian crow	-, LC	Rare	Negligible	Negligible
White-faced heron	-, LC	Unlikely	Negligible	Negligible
Bats Known to Occur in Project Area				
Central-eastern broad-nosed bat	-, LC	Rare	Low	Negligible
Chocolate wattled bat	-, LC	Rare	Low	Negligible
Eastern cave bat	-, LC	Rare	Moderate	Negligible
Gould's wattled bat	-, LC	Rare	Negligible	Negligible
Gould's long-eared bat	-, LC	Rare	Negligible	Negligible
Hoary wattled bat	-, LC	Rare	Moderate	Negligible
Inland broad-nosed bat	-, LC	Rare	Low	Negligible
Large bent-wing bat	-, LC	Likely	Moderate	Moderate
Lesser long-eared bat	-, LC	Rare	Negligible	Negligible
Little broad-nosed bat	-, LC	Rare	Negligible	Negligible
Little forest bat	-, LC	Rare	Negligible	Negligible
Little pied bat	-, LC	Rare	Negligible	Negligible
Northern free-tailed bat	-, LC	Likely	Moderate	Moderate
Ride's free-tailed bat	-, LC	Rare	Low	Negligible
White-striped free-tailed bat	-, LC	Likely	Low	Low
Yellow-bellied sheath-tailed bat	-, LC	Likely	Low	Low

Status listing per EPBC Act, NC Act: CE, CR = Critically Endangered; E, EN = Endangered; V, VU = Vulnerable; Mi = Migratory, - = no listing, SLC = Special Least Concern and LC = Least Concern

Historically relevant = records from ALA within 20 years

Broader locality = 150 km buffer applied to the Project Area boundary

RSA used = 75 m - 260 m

9.2 COLLISION RISK MODELLING

The Band CRM (Band, 2024), has been used to predict the total number of bird and bat collisions that may result from the operation of the Proposed Development. The Band CRM is routinely used in wind farm assessment studies across the world. This method of CRM requires the input of parameters that describe species-specific biometrics, flight speeds and characteristics and the expected amount of flight activity in the Project Area. Furthermore, the Band CRM requires the input of wind turbine specific information such as the turbine blade size and pitch, turbine height and rotor rotation period as well as the proportion of time the turbines will be operational. A detailed description of the Band CRM is provided in the BBMP (Appendix E), including the WTG and species parameters incorporated into the model. The Band (2024) approach builds on previous models developed by Band et al. (2007) and Band et al. (2000). The approach is intended to provide collision risk estimates that are comparable across different wind farms.

State Code 23 states that CRM only be undertaken for listed threatened and/or migratory species, or raptors, that occur within the RSA and that are identified as at risk from the Proposed Development. The risk assessment has identified which species are at risk of collision with WTG, and BUS data identified those which occur within the RSA. CRM has been undertaken for the species that were assessed to be at a low or higher risk rating that have been observed within the RSA in the Project Area. This resulted in only four raptors being run through the CRM, as shown in Table 9-2.

For the four species included in the model, collision risk has been calculated as the number of collisions per species per annum as shown in the following table. It is expected that birds in practice show a high level of avoidance of wind turbines (Band, 2024). However, avoidance rates have not been calculated for all species and research is necessary to determine each species-specific avoidance rates. For this CRM, 98% and 99% avoidance rates have been used to calculate collision numbers per annum for the given species. These avoidance rates are what is typically used in CRM exercises (Scottish National Heritage [SNH] (2018) (Smales & Muir, 2005). Indeed, 98% is the recommended default avoidance rate when supporting evidence for other avoidance rates is absent (NatureScot, 2024).

The results of the CRM, based on an RSA of 75 - 260 m, is presented in Table 9-2. In total, CRM indicates < 10 collisions with WTGs per annum due to the Proposed Development, based on a conservative 98% bird avoidance rate. It is important to note that the CRM represents a worst-case scenario and is based on the largest feasible WTG specifications. However, the final project design is expected to use WTGs with smaller dimensions. As a result, actual collision risks are expected to be lower than those predicted by this conservative model.

TABLE 9-2 CRM RESULTS FOR RAPTORS OBSERVED IN RSA IN THE PROJECT AREA

Turbine avoidance rate	98%	99%
Black kite	0.0	0.0
Black-shouldered kite	0.2	0.1
Brown falcon	0.0	0.0
Wedge-tailed eagle	7.1	3.6
Total	7.3	3.7

10. MSES IMPACT ASSESSMENT

The MSES SRIA conducted in this MSES IAR determines the significance of impacts to MSES by referring to the Significant Residual Impact Guideline for MSES and prescribed activities assessable under the *Sustainable Planning Act 2009* (SRIG) (Department of State Development, Infrastructure and Planning (DSDIP, 2014)). The SRIA considers the direct and indirect impacts and disturbances detailed in Section 6 as well as the avoidance, mitigation and management measures outlined in Section 7 to determine if an SRI is triggered.

The SRIG criteria (DSDIP, 2014), applied to the MSES known, likely and potentially impacted by the Proposed Development differ depending on the category of MSES being assessed. The MSES (identified as relevant to the Proposed Development) that must undergo a SRIA include:

- Regulated vegetation;
- Connectivity areas;
- Protected wildlife habitat (Special Least Concern, Vulnerable and Endangered wildlife); and
- Waterways Providing Fish Passage.

The following Sections conduct a SRIA for each of these MSES, with the results being summarised in Table 10-1. As a result of the SIA, the Proposed Development, in its current form is likely to, or has the potential to have a significant impact on the following MSES:

- Regulated vegetation; and
 - Category B regulated vegetation intersecting a VM Act watercourse or drainage.
- Protected wildlife habitat:
 - Diamond firetail;
 - Glossy black cockatoo; and
 - Koala.

Where a significant residual impact (SRI) to these MSES cannot be avoided, the Proponent is committed to preparing an Offset Proposal, as further discussed in Section 11.

TABLE 10-1 MSES SRIA SUMMARY

MSES	SRI?
Regulated Vegetation	
Category B Endangered or Of Concern remnant vegetation	No
Essential habitat	No
RE intersecting a VM Act watercourse or drainage	Yes
Connectivity Areas	
Connectivity	No
Protected wildlife habitat	
Diamond firetail	Yes
Glossy black cockatoo	Yes
Koala	Yes

MSES	SRI?
Short-beaked echidna	No
Kogan waxflower	No
White-throated needletail	No
Greater glider (southern and central)	No
Yellow-bellied glider (south-eastern)	No
Southern whiteface	No
Latham's snipe	No
Squatter pigeon (southern)	No
Fork-tailed swift	NA
Waterways Providing Fish Passage	
Waterways providing fish passage	No
NA = not assessable per SRIG (DEHP, 2014).	

10.1 REGULATED VEGETATION

10.1.1 CATEGORY B ENDANGERED OR OF CONCERN RE

The criteria used to assess a SRI on Category B Endangered or Of Concern REs are prescribed in the SRIG (DSDIP, 2014) as *'an action is likely to have a SRU on an Endangered or Of Concern RE is the action will result in:*

- Clearing of more than 5ha of 'endangered' or 'of concern' RE vegetation;*
- Clearing that results in an overall area (not confined to property boundaries) of 'endangered' or 'of concern' RE vegetation of less than 5ha; or*
- Clearing that results in the physical separation of 'endangered' and 'of concern' RE communities within and on adjoining sites.'*

As no Category B Endangered or Of Concern RE lies within the Disturbance Footprint, the Proposed Development is unlikely to result in a SRI to this MSES. Furthermore, the SRIG (DSDIP, 2014) states that *'an action is unlikely to have a SRI on an Endangered or Of Concern RE if the action will result in:*

- Lineal clearing (that is for a purpose under section 22A of the VM Act) within Endangered or Of Concern RE not exceeding the width and area thresholds specified in Table 10-2 by more than 25%; where an equivalent area which can be mapped as Endangered or Of Concern RE in the future is being rehabilitated on the subject site;*
- Clearing of less than 10% of the total mapped area of Endangered or Of Concern RE intersecting the property boundaries of the project, if total clearing is under 5 ha; and where an equivalent area which can be mapped as endangered or of concern in the future, is rehabilitated through other locations on the subject site;*
- Clearing of Endangered or Of Concern RE not exceeding the width thresholds specified in Table 1, SDAP Module 8 by more than 100% or the area threshold by 50%; where rehabilitated on the subject site;*

- d. *Clearing of Endangered or Of Concern RE within width thresholds specifies in Table 1, SDAP Module 8 and not exceeding the area threshold by more than 50%, to a maximum area of 5 ha;*
- e. *Removal of up to 5% of the total mapped area of Endangered REs intersecting the property boundaries of the project, where not greater than 25 m in width; for the purposes of removing fragments, patches, uneven edges or protruding vegetation;*
- f. *Removal of up to 10% of the total mapped area of Of Concern RE intersecting the property boundaries of the project, where not greater than 50m in width; for the purposes of removing fragments, patches, uneven edges or protruding vegetation;*
- g. *Clearing of Endangered or Of Concern RE vegetation that is equivalent in size/area to existing exempt clearing to be protected via the proposal (i.e. realignment of a boundary which results in a shorter length of exempt clearing through an existing endangered or of concern area than allowed via the existing boundary); or*
- h. *Clearing of REs less than 1.1 ha in size where surrounding land uses are zoned for urban purposes or future urban purposes under a local planning instrument.'*

Therefore, the Proposed Development is unlikely to result in a SRI on Category B Endangered or Of Concern RE.

10.1.2 ESSENTIAL HABITAT

The criteria used to assess a SRI on Essential Habitat are prescribed in the SRIG (DSDIP, 2014) as 'an action is likely to have a SRI on Essential Habitat if the action will result in:

- a. *clearing of Essential habitat exceeding the thresholds specified in Table 10-2, and resulting in a greater than 10% permanent reduction in the extent of EH mapped on site.'*

As no Essential Habitat lies within the Disturbance Footprint, the Proposed Development is unlikely to result in a SRI to this MSES. Furthermore, the SRIG (DSDIP, 2014) states that 'an action is unlikely to have a SRI on Essential habitat if the action will result in:

- a. *Lineal clearing (that is for a purpose under section 22A of the VM Act) within Essential habitat not exceeding the width and area thresholds specified in Table 10-2 by more than 25%, and where an equivalent area which can be mapped as Essential habitat in the future is rehabilitated on the subject site;*
- b. *Clearing of less than 10% of the total mapped areas of Essential habitat on-site; where the remaining 90% is protected through a legally binding agreement (or similar) in order to maintain ecosystem function (e.g. to continue to support the species for which the Essential habitat is derived);*
- c. *Temporary clearing of Essential habitat vegetation not exceeding the width thresholds specified in Table 10-2 by more than 100% or the area threshold by more than 50%; where cleared Essential habitat vegetation is rehabilitated, on the subject site;*
- d. *Clearing of Essential habitat vegetation complying with the width thresholds specified in Table 10-2 and exceeding the area threshold by less than 50%;*
- e. *Removal of Essential habitat vegetation exceeding the width and area thresholds specified in Table 10-2 and where through the remapping of other vegetation the site results in an increase in the extent of mapped Essential habitat vegetation; OR*

- f. Removal of fragmented or isolated areas of Essential habitat where the equivalent area of Essential habitat can be added to a larger retained vegetated area displaying the same Essential habitat factors, by revegetation.'*

Therefore, the Proposed Development is unlikely to result in a SRI on Essential habitat.

10.1.3 CATEGORY B RE INTERSECTING A WATERCOURSE

The criteria used to assess a SRI on Category B RE intersecting a watercourse (remnant vegetation within the defined distance of a watercourse) are prescribed in the SRIG (DSDIP, 2014) as 'an action is likely to have a SRI on remnant vegetation within the defined distance of a watercourse if the action will result in:

- a. Permanent removal of vegetation within the defined distance of a stream order 2 or higher where no rehabilitation is proposed;*
- b. Building of an online detention basin greater than 1 ha in size or other similar works that result in the clearing of vegetation which fragments up and downstream remnant areas on any stream order; OR*
- c. Permanent clearing of more than 0.5 ha of an Endangered or Of Concern RE, within the defined distance of a watercourse.'*

As the Disturbance Footprint overlaps with 14.5 ha of Category B RE intersecting a watercourse, this is likely to result in a SRI to this MSES as not all of this 14.5 ha will be subject to rehabilitation due to the need to maintain cleared corridors for access tracks.

TABLE 10-2 SRIA CRITERIA FOR CLEARING LIMITS

Clearing Limits per RE Structure Category		
Structure Category	Width (metres)	Area (ha)
Dense and mid-dense	10	0.5
Sparse and very sparse	20	2
Grassland	25	5

10.2 CONNECTIVITY AREA

The Landscape Fragmentation and Connectivity (LFC) tool is a GIS tool used as a decision support tool to assess the potential for a SRI on connectivity areas. It compares the extent and arrangement of current regulated vegetation to the extent and arrangement that would remain after a proposed impact (described in the Queensland Environmental Offsets Policy Significant Residual Impact Guideline (DEHP, 2014)). As per DEHP (2014), a development impact on connectivity areas is likely to be significant if either of the following tests are true:

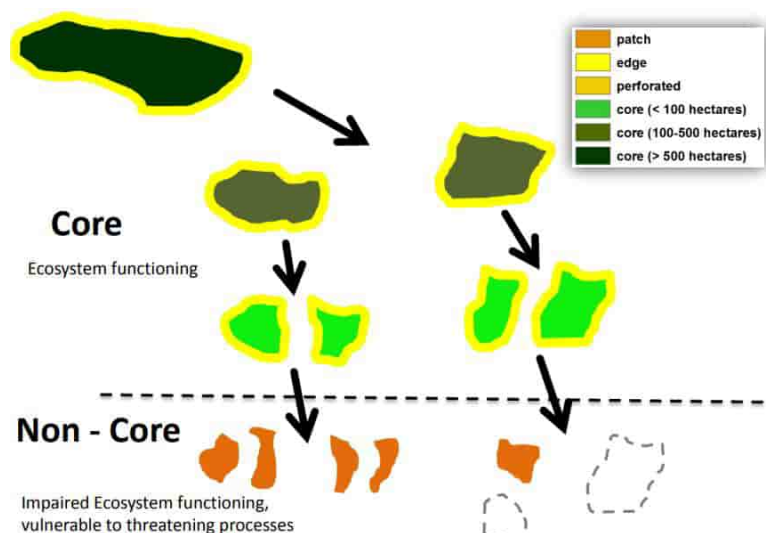
- Test 1 - The change in the core remnant ecosystem extent at the local scale (post impact) is greater than a threshold determined by the level of fragmentation at the regional scale (see table below); or
- Test 2 - Any core area that is greater than or equal to 1 hectare is lost or reduced to patch fragments (core to non-core).

For Test 1, the change threshold is determined by the level of fragmentation at the regional scale as per Table 10-3. For Test 2, Figure 10-1 provides a visual representation of what a loss of core patches is. However, under the SRIG (DSDIP, 2014) by which the Proposed Development is assessed, the LFC tool is merely a decision support tool.

TABLE 10-3 CHANGE THRESHOLD ACCORDING TO REGIONAL SCALE CORE REMNANT EXTENT

RE Scale Extent of Core Remnant Ecosystem (%)	Change Threshold for Local Core Scale Remnant Ecosystem (%)
>90	50
70 – 90	30
50 – 70	20
30 – 50	10
10 – 30	5
<10	2

FIGURE 10-1 VISUALISATION OF LFC TOOL TEST 2



The LFC tool identified that the current Disturbance Footprint has the potential to result in a significant impact to connectivity areas, in the absence of appropriate mitigation to minimise the effects of fragmentation. Despite the output from the LFC tool, the Proposed Development is unlikely to result in an SRI to connectivity areas given required clearing for the Proposed Development consists of narrow, linear strips that are unlikely to reduce ecosystem functioning and fauna connectivity. Mitigation measures for the Proposed Development that are relevant to maintaining connectivity include minimising internal access tracks to no more than 10 m width, rehabilitation of areas required for temporary construction and installation of connectivity structures, such as glider poles.

10.3 PROTECTED WILDLIFE

The SRIG (DSDIP, 2014) outlines criteria used to assess a SRI on Special Least Concern, Vulnerable or Endangered wildlife habitat as per the following sections.

10.3.1 VULNERABLE OR ENDANGERED PLANTS

'An action is unlikely to have a SRI on a plant that is Endangered or Vulnerable wildlife if the action will result in:

- Clearing of plants that are threatened wildlife and not located within a natural setting (i.e. does not meet the definition of 'in the wild' under the Nature Conservation Act 1992) where the proposal includes translocation; or*
- Clearing of up to 10% of the total number of plants that are threatened wildlife occurring on a site where the proposal results in 90% of all plants that are threatened wildlife being retained and protected as a reserve or similar; or*
- Clearing of regenerating plants that are threatened wildlife which have previously been cleared within the last 5 years and that are historically maintained through slashing or grazing; or*
- The proposed relocation of an area of plants that are threatened wildlife less than 1000m² not occurring in a relatively natural ecological situation (e.g. bushland), to a permanent retention area via an approved management plan.'*

Although 1.1 ha of Kogan waxflower habitat lies within the Disturbance Footprint, the detailed design phase (including pre-clearance surveys and micro-siting) will prevent disturbance of this species. This means that the Proposed Development is unlikely to result in SRI on Vulnerable or Endangered plants.

As mentioned, although being protected flora species under the NC Act, Tara wattle, *Prostanthera* sp. Dunmore, *Rutidosia glandulosa*, *Rutidosia lanata* and *Westringia parvifolia* are not MSES as they have not been observed in the Project Area. Due to this, they are not required to go through a SRIA.

10.3.2 SPECIAL LEAST CONCERN, VULNERABLE OR ENDANGERED ANIMALS

The Proposed Developments potential impacts on SLC, Vulnerable or Endangered animals are assessed for a SRI in Appendix G, with Table 10-4 and Table 10-5 providing summaries (bolding indicates where a SRI may occur). The SRIG (DSDIP, 2014) outlines the criteria for a SRI as follows.

'An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to:

- Lead to a long-term decrease in the size of a local population; or*
- Reduce the extent of occurrence of the species; or*
- Fragment an existing population; or*
- Avoid genetically distinct populations forming as a result of habitat isolation; or*
- Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the Endangered or Vulnerable species' habitat; or*
- Introduce disease that may cause the population to decline, or*
- Interfere with the recovery of the species; or*
- Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species'.*

'An action is likely to have a SRI on SLC (non-migratory) animal wildlife habitat if it is likely that it will result in:

- A long-term decrease in the size of a local population; or*
- A reduced extent of occurrence of the species; or*
- Fragmentation of an existing population; or*
- Reduced gene flow among populations; or*
- Disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species.'*

The SRIA found that the Proposed Development is likely to, or has the potential to result in a SRI to diamond firetail, glossy black cockatoo and koala.

TABLE 10-4 SRIA FOR ESSENTIAL HABITAT AND VULNERABLE AND ENDANGERED WILDLIFE

Species	Likelihood of Occurrence	Long-term Decrease	Reduce Extent	Fragment	Habitat Isolation	Invasive Species	Disease	Species Recovery	Disruption	SRI?
Diamond firetail	Known	x	x	x	x	x	x	✓	✓	✓
Glossy black cockatoo	Known	x	x	x	x	x	x	x	✓	✓
Koala	Known	x	x	x	x	x	x	✓	✓	✓
White-throated needletail	Likely	x	x	x	x	x	x	x	x	x
Greater glider	Potential	x	x	x	x	x	x	x	x	x
Yellow-bellied glider	Potential	x	x	x	x	x	x	x	x	x
Southern whiteface	Potential	x	x	x	x	x	x	x	x	x
Latham's snipe	Potential	x	x	x	x	x	x	x	x	x
Squatter pigeon	Potential	x	x	x	x	x	x	x	x	x

TABLE 10-5 SRIA FOR SLC (NON-MIGRATORY) FAUNA

Species	Likelihood Occurrence	Long-Term Decrease	Reduce Extent	Fragment	Reduced Gene Flow	Disruption	SRI?
Short-beaked echidna	Known	No	No	No	No	No	No

10.4 WATERWAYS PROVIDING FOR FISH PASSAGE

The criteria used to assess a SRI on waterways providing for fish passage are prescribed in the SRIG (DSDIP, 2014) as *'an action is likely to have a SRI on a waterway providing for fish passage if the action will result in:*

- a. Permanent modification to the volume, depth, timing, duration or flow frequency of the waterway; or*
- b. Permanent modification or fragmentation of fish habitat including but not limited to in stream vegetation, snags and woody debris, substrate, bank or riffle formation necessary for breeding and/or survival of native fish species; or*
- c. The mortality or injury of fish species; or*
- d. Works that permanently reduce the level of fish passage provided in a tidal waterway or a waterway identified as a major high risk waterway for waterway barrier works, to a level that would increase stress on fish populations.'*

The Proposed Development's potential impacts on watercourses and hydrology are discussed in Section 6, with mitigation measures to reduce the severity of these impacts provided in Section 7. The implementation of this comprehensive list of mitigation measures, as well as the development of an ESCPC and SWMP will reduce the severity of these impacts to an extent that would not trigger any of the above criteria. As such, the Proposed Development is considered unlikely to result in a SRI to waterways providing for fish passage.

11. OFFSETS

11.1 OFFSETS SUMMARY

Where there is a potential for an SRI, as identified in Section 10, these MSES will require an offset in accordance with the Queensland Environmental Offsets Policy 2014 (QEOP 2014) (DETSI, 2025) and *Environmental Offsets Regulation 2014*. Offset for the following MSES is expected to be delivered financially according to the *Financial Settlement Offset Calculation Methodology* in the QEOP 2014:

- Regulated vegetation:
 - Category B regulated vegetation intersecting a *VM Act* watercourse or drainage.

The offset for protected wildlife habitat will be delivered under the EPBC Act as a land-based offset, as these species are also MNES:

- Diamond firetail;
- Glossy black cockatoo; and
- Koala.

11.2 OFFSET MANAGEMENT

The aim of offset management for land-based offsets is to improve the quality of vegetation, so it reaches a higher habitat quality score. A demonstrated increase in habitat quality will be provided against a baseline condition assessment that will be undertaken and presented in the Offset Management Plan (OMP). Part of the offset process will be to undertake a full condition assessment of the offset area, and to implement measurable completion criteria from the MHQA.

Under the EPBC Act Offsets Policy (for land-based offsets), affected threatened species require a like for like replacement of impacted vegetation communities and offsets are required to consider the risk of loss to potential offset areas when considering an appropriate offset area size. MHQA conducted in proposed impact areas and the offset areas will be used to determine the total amount of offset required, based on anticipated direct impact to threatened species habitat. The areas that will be offset will be the 'actual' impacted area (rather than the Maximum Permanent Impact provided in Table 6-2), which will be further defined during the detailed design phase.

At present, land-based offsets will be provided for the following protected wildlife habitats under the EPBC Act:

- Diamond firetail breeding habitat;
- Diamond firetail foraging and dispersal habitat;
- Glossy black cockatoo foraging habitat;
- Greater glider breeding, denning and foraging habitat; and
- Koala breeding, foraging and core dispersal habitat.

Importantly, direct impact to koala safe intervening ground matrix is not anticipated to disrupt the ecological function associated with koala dispersal, so an offset is not proposed to compensate for any residual impacts to koala dispersal.

11.3 POTENTIAL OFFSETS FOR BIRD AND BAT SPECIES

The above Sections discuss offset requirements for diamond firetail and glossy black cockatoo due to an SRI on the species by way of interfering with the species recovery. The SRIAs conducted in Section 10.3 determined that a SRI to any protected bird or bat species in the Project Area was unlikely.

Based on the assessments completed as part of this MSES IAR there is unlikely to be any SRI to bird and bat species from turbine strike. The bird and bat risk assessments and CRM (Section 9) have been conducted and show that there is not anticipated to be any SRI to protected bird and bat species as a result of the Proposed Development.

The Preliminary BBMP (Appendix E) lists the relevant mitigation and management measures to be undertaken during construction and operation to mitigate impact to protected species across the lifetime of the Proposed Development. Of special consideration is the implementation of an adaptive management approach, in which potential impact to protected bird or bat species will be monitored throughout the life of the Proposed Development. This involves the delineation of species-specific impact triggers for protected bird and bat species, which upon being activated, will trigger a decision-making framework and adaptive management to prevent a significant impact threshold being actualized for that species (more detail in Preliminary BBMP). If a SRI is triggered for any listed bird or bat species, financial or other indirect offsets will be adopted by the Proponent. What renders a significant impact is defined in the Preliminary BBMP, but will also be assessed and confirmed by a suitably qualified ecologist.

12. STATE CODE 16 REQUIREMENTS

The Proposed Development is assessable under State Code 16 as 'Material change of use and / or reconfiguring a lot for all other purposes'. Therefore, the performance outcomes (PO) of State Code 16 must be met. Table 12-1 details the performance and acceptable outcomes of the State Code 16 that relate to regulated vegetation, wetlands, watercourses, essential habitat and connectivity in the Project Area, and whether the Proposed Development complies with such outcomes. The Guide to State Development Assessment Provisions *State Code 16: Native Vegetation Clearing* (Department of Resources [DoR], (2023)) has been used to assess compliance of the Proposed Development with State Code 16.

TABLE 12-1 STATE CODE 16 PROVISIONS RELEVANT TO THE PROPOSED DEVELOPMENT

Performance Outcomes	Acceptable Outcomes	Response
Table 16.2 - General		
PO1 Clearing of vegetation is consistent with any notice requiring compliance on the land subject to the development application, unless a better environmental outcome can be achieved.	No acceptable outcome is prescribed.	PO1 complies. Relevant permits associated with obtaining a development application for the proposed change of use will be obtained prior to the clearing of vegetation.
PO2 Clearing of vegetation is consistent with vegetation management requirements for particular regulated areas unless a better environmental outcome can be achieved.	No acceptable outcome is prescribed.	PO2 complies. Particular regulated areas are defined as exchange areas, unlawfully cleared areas, declared areas or offset areas or a Category A area on a PMAV. There are no particular regulated areas in the Disturbance Footprint.
PO3 Clearing of vegetation in a legally secured offset area: 1. Is consistent with the offset delivery plan; or 2. Is consistent with an agreement for the offset area on the land subject to the development application; or 3. Only occurs if an additional offset is provided.	No acceptable outcome is prescribed.	PO3 not applicable. There are no legally secured offset areas within the Project Area.
Table 16.3 Public safety, relevant infrastructure activities and / or consequential development of IPA approval		
Clearing avoids and minimises impacts		
PO4 Clearing of vegetation and adverse impacts of clearing vegetation do not occur unless the application has demonstrated that the clearing and the adverse impacts of clearing have been: 1. Reasonably avoided; or	No acceptable outcome is prescribed.	PO4 complies. Section 7 details the avoidance, management and mitigation measures that have been implemented to avoid, and then minimize clearing of remnant vegetation. In particular the two-stage design process has been adopted to continually refine the Disturbance Footprint to avoid clearing vegetation.

Performance Outcomes	Acceptable Outcomes	Response
2. Reasonably minimised where it cannot be reasonably avoided.		The Disturbance Footprint avoids all areas of endangered and of concern Category B vegetation, and has minimised impacts to vegetation within a defined distance of a watercourse.
Clearing associated with wetlands		
P05 Clearing of vegetation within a natural wetland and/or within 100 metres of the defining bank of a natural wetland maintains the composition, structure and function of any regional ecosystem associated with any natural wetland to protect all of the following: 1. Bank stability by protecting against bank erosion; 2. Water quality by filtering sediments, nutrients and other pollutants; 3. Aquatic habitat; 4. Terrestrial habitat.	A05.1 Clearing does not occur in a natural wetland or within 100 metres of the defining bank of any natural wetland. OR A05.2 Clearing within 100 metres of the defining bank of any natural wetland: 1. Does not occur within 10 metres of the defining bank of any natural wetland; and 2. Does not exceed widths in reference table 1 in this code.	A05.1 complies. There will be no clearing within 100 m of the defining bank of a natural wetland.
P06 Where clearing of vegetation in a regional ecosystem associated with a natural wetland does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, an offset is provided for any acceptable significant residual impact.	No acceptable outcome is prescribed.	P06 not applicable. There will be no clearing of a RE associated with a natural wetland.
Clearing associated with watercourses and drainage features		
P07 Clearing of vegetation within a watercourse and/or drainage feature and/or within the relevant distance (listed in reference table 2) of a watercourse and/or drainage feature, maintains the composition, structure and function of the regional ecosystem associated with the watercourse and/or drainage feature to protect all of the following:	A07.1 Clearing does not occur in any of the following areas: 1. Inside the defining bank of a watercourse or drainage feature; and 2. Within the relevant distance of the defining bank of any watercourse or drainage feature in reference table 2 of this code. OR	AO7.1 or AO7.2 not met. Assessment against performance criteria is made. P07 complies. 1. Identify the location and extent of the Disturbance Footprint: - o All components of the Disturbance Footprint to be cleared are identified in Section 2. 2. Identify the defining bank of any watercourses or drainage features within 50 metres of the Disturbance Footprint:

Performance Outcomes	Acceptable Outcomes	Response
1. Bank stability by protecting against bank erosion; 2. Water quality by filtering sediments, nutrients and other pollutants; 3. Aquatic habitat; 4. Terrestrial habitat.	A07.2 Clearing within any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in reference table 2 of this code: 3. Does not exceed the widths in reference table 1 of this code; and 4. Does not occur within 10 metres of the defining bank, unless clearing is required into or across the watercourse or drainage feature.	○ All watercourses or drainage features within the Project Area have been identified (see Section 5.8.4). 3. Determine the stream order for all identified watercourses and drainage features. ○ Stream orders 1-4 occur within the Disturbance Footprint or within 50 m of it. 4. Identify the assessable clearing areas under the PO for each watercourse and drainage feature based on the relevant distances listed in reference table 2 of the code: ○ Assessable clearing areas of REs within a defined bank of these watercourses have been calculated in Section 5.8.1.3. 5. Identify any of these assessable clearing areas above that are not considered REs associated with a watercourse or drainage feature: ○ The above only includes REs. 6. Demonstrate how clearing in any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature, maintains the composition, structure and function of the RE: ○ There are a range of mitigation measures in place to maintain the composition, structure and function of REs in proximity to watercourses (see Section 7). These include biosecurity measures, clearly demarcating clearing boundaries and extensive bank stability measures. The composition, structure and function of impacted REs will be maintained as a result of the Proposed Development. In particular, the following elements of RE structure, composition and function will be maintained by the proposed measures: a. Bank stability by protecting against bank erosion; – Implementation of the erosion and sediment control measures outlined in Section 7; and – Development and implementation of a ESCPC. b. Water quality by filtering sediments, nutrients and other pollutants; – Implementation of the erosion and sediment control measures outlined in Section 7; and – Development and implementation of a ESCPC.

Performance Outcomes	Acceptable Outcomes	Response
		c. Aquatic habitat; – Implementation of the erosion and sediment control measures outlined in Section 7; – Development and implementation of a ESCPC; and – Water quality and flow control measures outlined in Section 7. d. Terrestrial habitat. – Implementation of the measures outlined in Section 7, such as incorporation of vegetation pinch points to maintain terrestrial fauna habitat connectivity and an EMP and VFMP to reduce the occurrence of threats to terrestrial habitat quality such as invasive weeds.
PO8 Where clearing of vegetation in a regional ecosystem associated with a watercourse and/or drainage feature does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, an offset is provided for any acceptable significant residual impact.	No acceptable outcome is prescribed.	PO8 complies. PO7 complies which means that PO8 automatically complies. See Section 11 for commitment to providing an offset.
Connectivity		
PO9 Regional ecosystems on the subject land and any adjacent land retain sufficient vegetation to: 1. Maintain ecological processes; and 2. Ensure the regional ecosystem remains in the landscape despite threatening processes.	AO9.1 Clearing occurs in accordance with reference table 3 in this code.	AO9.1 cannot be met so assessment against the performance criteria is made. PO9 complies. 1. Identify the location and extent of the development footprint: ○ All components of the Disturbance Footprint to be cleared are identified in Section 2. 2. Details of the location and extent of remnant vegetation to be retained within the development footprint and adjacent land: ○ The location of remnant vegetation to be retained is depicted on Figure 5-2, and the extent is outlined in Section 10. 3. Identify all of the REs within the development footprint and adjacent land:

Performance Outcomes	Acceptable Outcomes	Response
		○ All REs within the Project Area are listed in Section 5.2.1. 4. Identify and provide desktop and field data on all ecological processes occurring within remnant vegetation within the development footprint and on adjacent land: ○ Rigorous field data has been collected through the methodology described in Section 4.5, and the findings of these surveys is described in Section 5. Rigorous field data has been collected in both general habitat areas and special landscape features (ie. escarpments and riparian corridors). 5. Provide an analysis of how the remnant vegetation with its altered extent and configuration will maintain ecological processes: ○ Ecological processes within retained remnant vegetation will be maintained via the avoidance and mitigation measures detailed in Section 7, such as clearly demarcating clearing boundaries and using vegetation pinch points in clearing corridors in areas with remnant vegetation. Section 10 discusses how ecological processes will be maintained. The development of an EMP and VFMP will further ensure that ecological processes will be maintained. 6. Identify and provide desktop and field data on any known and likely threatening processes: ○ Current and historical threatening processes in the Project Area are described in Section 0. Expected impacts and threatening processes that may arise as a result of the Proposed Development are discussed in Section 6. 7. Provide an analysis of how the remnant vegetation with its altered extent and configuration will remain in the landscape despite threatening processes ○ Section 7 and 10 detail how remnant vegetation will persist in the landscape despite threatening processes. Importantly, remnant vegetation has been avoided as much as practicable, with only 10.3 % of total remnant RE in the Project Area subject to direct impact. The avoidance and mitigation measures detailed in Section

Performance Outcomes	Acceptable Outcomes	Response
		7 will include a focus on minimising the exacerbation of current impacts (ie. edge effects). 8. Demonstrate how regional ecosystems on the subject land and any adjacent land retain sufficient vegetation to a) maintain ecological processes; and b) ensure the RE remains in the landscape despite threatening processes: - Section 12.1 explains how ecological processes in the Project Area will be maintained despite the existing and expected threatening processes, with specific reference to the 'ecological processes' listed in the Guide to SDAP <i>State Code 16</i> (DoR, 2023). - As shown in Table 6-1, no RE will be completely removed from the Project Area because of the Proposed Development. The largest proportion of an RE that will be removed is 16.7 % of Least Concern RE 11.7.4.
Soil erosion if the local government is not the assessment manager for the development application		
PO10 Clearing of vegetation does not result in accelerated soil erosion within or outside the land the subject of the development application.	AO10.1 Clearing only occurs if an erosion and sediment control plan is developed and implemented to prevent increased soil erosion and instability resulting from the clearing.	AO10.1 complies. Clearing will only occur after the ESCPC is developed and implemented. The ESCPC will include rigorous mitigation measures to prevent increased soil erosion and instability.
Salinity		
PO11 Clearing of vegetation within 100 metres of a salinity expression area does not contribute to or accelerate land degradation through either of the following: 1. Waterlogging; 2. The salinisation of groundwater, surface water or soil.	AO11.1 Clearing does not occur within 100 metres of a salinity expression area.	PO11 not applicable. Salinity expression areas do not exist within the proposed clearing areas or within 100 m of any proposed clearing as identified in Section 5.6.
Conserving Least Concern regional ecosystems - Minimising clearing of areas temporarily required to enable construction of the infrastructure		
PO12 Clearing of vegetation in areas to construct necessary infrastructure, such as temporary use roads or access tracks,	AO12.1 Clearing for temporary use areas to construct necessary	Neither AO 12.1, 12.2 or 12.3 is met. Assessment is made against the performance criteria. PO12 complies.

Performance Outcomes	Acceptable Outcomes	Response
maintains the composition, structure and function of least concern regional ecosystems.	infrastructure does not occur in a least concern regional ecosystem. OR AO12.2 Total clearing for temporary use areas to construct necessary infrastructure in any regional ecosystem combined does not exceed the widths prescribed in table reference table 1 of this code. OR AO12.3 Total clearing for temporary use areas to construct necessary infrastructure in any regional ecosystem combined does not exceed areas prescribed in table reference table 1 of this code.	1. Identify the location and extent of the Disturbance Footprint: - o All components of the Disturbance Footprint to be cleared are identified in Section 2. 2. Identify any proposed clearing in Least Concern RE: - o The areas of proposed clearing in Least Concern RE are identified in Table 6-1. 3. Identify all temporary use areas required to enable construction of necessary infrastructure: - o Temporary use areas that will be cleared to facilitate construction of necessary infrastructure are identified in Section 8. These temporary use areas will be rehabilitated after the construction phase is completed. 4. Demonstrate how clearing for temporary use areas to enable construction of necessary infrastructure in any Least Concern RE maintains the composition, structure and function of the RE: - o The mitigation measures outlined in Section 7 will ensure that overall composition, structure and function of Least Concern RE in the Project Area is maintained despite impact to a small proportion. For example, clearly demarcating clearing boundaries and implementing biosecurity measures will maintain the structure and composition of Least Concern REs. Measures such as vegetation pinch points, timing construction activities to avoid ecologically sensitive periods and minimizing noise and light disturbance will maintain function of Least Concern REs. - o Rehabilitation of temporary use areas will also after the construction phase is completed, as described in Section 8. This will involve targeted rehabilitation to the pre-existing BHT, which in areas of least concern RE, will reflect the native, remnant vegetation community that was cleared due to the Proposed Development.
PO13 Where clearing of vegetation in a regional ecosystem for temporary use areas to construct necessary infrastructure does	No acceptable outcome is prescribed.	PO13 complies.

Performance Outcomes	Acceptable Outcomes	Response
not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, the cleared area is rehabilitated.		PO12 complies which means that PO13 automatically complies.
Conserving Endangered and Of Concern regional ecosystems		
PO14 Clearing of vegetation maintains the composition, structure and function of endangered regional ecosystems and/or of concern regional ecosystems.	AO14.1 Clearing does not occur in an endangered regional ecosystem or an of concern regional ecosystem. OR AO14.2 Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed the widths prescribed in table reference table 1 of this code. OR AO14.3 Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed areas prescribed in table reference table 1 of this code.	AO14.3 complies. Less than 0.1 ha of Endangered or Of Concern RE will be cleared in the Project Area, which does not exceed the thresholds listed in table 1 of the code.
PO15 Where clearing of vegetation in an endangered regional ecosystem or an of concern regional ecosystems does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, the cleared area: 1. Is rehabilitated; or 2. Where the cleared area cannot reasonably be rehabilitated, an offset is provided for any acceptable significant residual impact.	No acceptable outcome is prescribed.	PO15 complies. PO14 complies which means that PO15 automatically complies.
Essential habitat excluding essential habitat for Phascolarctos cinereus (koalas) if development is assessable under Schedule 10, Part 10 of the Planning Regulation 2017		

Performance Outcomes	Acceptable Outcomes	Response
PO16 Clearing of vegetation in a regional ecosystem that is an area of essential habitat maintains the composition, structure and function of the regional ecosystem for each protected wildlife species individually.	AO16.1 Clearing does not occur in essential habitat. OR AO16.2 Clearing in essential habitat does not exceed the widths prescribed in reference table 1 of this code. OR AO16.3 Clearing in essential habitat does not exceed the areas prescribed in table reference table 1 of this code.	AO16.1 complies. All areas of essential habitat in the Project Area have been avoided by the Disturbance Footprint.
PO17 Where clearing of vegetation in a regional ecosystem that is an area of essential habitat does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, an offset is provided for any acceptable significant residual impact for each protected wildlife species individually.	No acceptable outcome is prescribed.	PO17 complies. PO16 complies which means that PO17 automatically complies.
Acid sulfate soils if the local government is not the assessment manager for the development application		
PO18 Clearing of vegetation does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either of the following: 1. Aeration of horizons containing iron sulphides; 2. Mobilisation of acid or metals.	AO18.1 Clearing does not occur in land zone 1, land zone 2 or land zone 3. OR AO18.2 Clearing in land zone 1, land zone 2 or land zone 3 in areas below the five metre Australian Height Datum only occurs where: 1. Mechanical clearing does not disturb the soil to a depth greater than 30 centimetres; and 2. Acid sulfate soils are managed consistent with the soil management guidelines in the	AO18.1 complies. The entire Project Area is well above 5 m Australian Height Datum (AHD) (see Section 5.6), so no clearing is proposed in land zone 1, 2 or 3 below 5 m AHD.

Performance Outcomes	Acceptable Outcomes	Response
	Queensland Acid Sulfate Soil Technical Manual.	
Table 16.8 – Material Change of Use and/or Reconfiguring a Lot for All Other Purposes		
Clearing avoids and minimises		
P080 Clearing of vegetation and adverse impacts of clearing vegetation do not occur unless the application has demonstrated that the clearing and the adverse impacts of clearing have been: 1. Reasonably avoided; or 2. Reasonably minimised where it cannot be reasonably avoided.	No acceptable outcome is prescribed.	P080 complies. Section 7 details the avoidance, management and mitigation measures that have been implemented to avoid, and then minimize clearing of remnant vegetation. In particular the two-stage design process has been adopted to continually refine the Disturbance Footprint to avoid clearing vegetation.
Clearing associated with Wetlands		
P081 Clearing of vegetation within a natural wetland and/or within 100 metres of the defining bank of a natural wetland maintains the composition, structure and function of any regional ecosystem associated with any natural wetland to protect all of the following: 1. Bank stability by protecting against bank erosion; 2. Water quality by filtering sediments, nutrients and other pollutants; 3. Aquatic habitat; 4. Terrestrial habitat.	A081.1 Clearing does not occur in a natural wetland or within 100 metres of the defining bank of any natural wetland. OR A081.2 Clearing within 100 metres of the defining bank of any natural wetland: 1. Does not occur within 10 metres of the defining bank of any natural wetland; and 2. Does not exceed widths in reference table 1 in this code.	A081.1 complies. There will be no clearing within 100 m of the defining bank of a natural wetland.
P082 Where clearing of vegetation in a regional ecosystem associated with a natural wetland does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, an offset is provided for any acceptable significant residual impact.	No acceptable outcome is prescribed.	P082 not applicable. There will be no clearing of a RE associated with a natural wetland.

Performance Outcomes	Acceptable Outcomes	Response
Clearing associated with watercourses and drainage features		
P083 Clearing of vegetation within a watercourse and /or drainage feature and/or within the relevant distance (listed in reference table 2) of a watercourse and/or drainage feature, maintains the composition, structure and function of the regional ecosystem associated with the watercourse and/or drainage feature to protect all of the following: 1. Bank stability by protecting against bank erosion; 2. Water quality by filtering sediments, nutrients and other pollutants; 3. Aquatic habitat; 4. Terrestrial habitat.	A083.1 Clearing does not occur in any of the following areas: 1. Inside the defining bank of a watercourse or drainage feature; and 2. Within the relevant distance of the defining bank of any watercourse or drainage feature in reference table 2 of this code. OR A083.2 Clearing within any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in reference table 2 of this code: 1. Does not exceed the widths in table reference table 1 of this code; and 2. Does not occur within 10 metres of the defining bank, unless clearing is required into or across the watercourse or drainage feature.	AO83.1 or AO83.2 not met. Assessment against performance criteria is made. P083 complies. 1. Identify the location and extent of the Disturbance Footprint: - o All components of the Disturbance Footprint to be cleared are identified in Section 2. 2. Identify the defining bank of any watercourses or drainage features within 50 metres of the Disturbance Footprint: - o All watercourses or drainage features within the Project Area have been identified (see Section 5.8.4). 3. Determine the stream order for all identified watercourses and drainage features. - o Stream orders 1-4 occur within the Disturbance Footprint or within 50 m of it. 4. Identify the assessable clearing areas under the PO for each watercourse and drainage feature based on the relevant distances listed in reference table 2 of the code: - o Assessable clearing areas of REs within a defined bank of these watercourses have been calculated in Section 5.8.1.3. 5. Identify any of these assessable clearing areas above that are not considered REs associated with a watercourse or drainage feature: - o The above only includes REs. 6. Demonstrate how clearing in any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature, maintains the composition, structure and function of the RE: - o There are a range of mitigation measures in place to maintain the composition, structure and function of REs in proximity to watercourses (see Section 7). These include biosecurity measures, clearly demarcating clearing boundaries and extensive bank stability measures. The composition, structure and function of impacted REs will be maintained as a result of the Proposed Development. In particular, the

Performance Outcomes	Acceptable Outcomes	Response
		following elements of RE structure, composition and function will be maintained by the proposed measures: a. Bank stability by protecting against bank erosion; – Implementation of the erosion and sediment control measures outlined in Section 7; and – Development and implementation of an ESCPC. b. Water quality by filtering sediments, nutrients and other pollutants; – Implementation of the erosion and sediment control measures outlined in Section 7; and – Development and implementation of an ESCPC. c. Aquatic habitat; – Implementation of the erosion and sediment control measures outlined in Section 7; – Development and implementation of an ESCPC; and – Water quality and flow control measures outlined in Section 7. d. Terrestrial habitat. – Implementation of the measures outlined in Section 7, such as incorporation of vegetation pinch points to maintain terrestrial fauna habitat connectivity and an EMP and VFMP to reduce the occurrence of threats to terrestrial habitat quality such as invasive weeds.
PO84 Where clearing of vegetation in a regional ecosystem associated with a watercourse and/or drainage feature does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, an offset is provided for any acceptable significant residual impact.	No acceptable outcome is prescribed.	PO84 complies. PO83 complies which means that PO84 automatically complies. See Section 11 for commitment to providing an offset.
Connectivity		
PO85 Regional ecosystems on the subject land and any adjacent land, retain sufficient vegetation to maintain: 1. Ecological processes; and	A085.1 Clearing occurs in accordance with reference table 3 in this code.	A085.1 cannot be met so assessment against the performance criteria is made. PO85 complies. 1. Identify the location and extent of the development footprint:

Performance Outcomes	Acceptable Outcomes	Response
2. Ensure the regional ecosystem remains in the landscape despite threatening processes.		○ All components of the Disturbance Footprint to be cleared are identified in Section 2. 2. Details of the location and extent of remnant vegetation to be retained within the development footprint and adjacent land: ○ The location of remnant vegetation to be retained is depicted on Figure 5-2, and the extent is outlined in Section 10. 3. Identify all of the REs within the development footprint and adjacent land: ○ All REs within the Project Area are listed in Section 5.2.1. 4. Identify and provide desktop and field data on all ecological processes occurring within remnant vegetation within the development footprint and on adjacent land: ○ Rigorous field data has been collected through the methodology described in Section 4.5, and the findings of these surveys is described in Section 5. 5. Provide an analysis of how the remnant vegetation with its altered extent and configuration will maintain ecological processes: ○ Ecological processes within retained remnant vegetation will be maintained via the avoidance and mitigation measures detailed in Section 7, such as clearly demarcating clearing boundaries and using vegetation pinch points in clearing corridors in areas with remnant vegetation. Section 10 discusses how ecological processes will be maintained. The development of an EMP and VFMP will further ensure that ecological processes will be maintained. 6. Identify and provide desktop and field data on any known and likely threatening processes: ○ Current and historical threatening processes in the Project Area are described in Section 0. Expected impacts and threatening processes that may arise as a result of the Proposed Development are discussed in Section 6.

Performance Outcomes	Acceptable Outcomes	Response
		7. Provide an analysis of how the remnant vegetation with its altered extent and configuration will remain in the landscape despite threatening processes - Section 7 and 10 detail how remnant vegetation will persist in the landscape despite threatening processes. Importantly, remnant vegetation has been avoided as much as practicable, with only 10.3 % of total remnant RE in the Project Area subject to clearing. 8. Demonstrate how regional ecosystems on the subject land and any adjacent land retain sufficient vegetation to a) maintain ecological processes; and b) ensure the RE remains in the landscape despite threatening processes: - Section 12.1 explains how ecological processes in the Project Area will be maintained despite the existing and expected threatening processes, with specific reference to the 'ecological processes' listed in the Guide to SDAP <i>State Code 16</i> (DoR, 2023). - As shown in Table 6-1, no RE will be completely removed from the Project Area because of the Proposed Development. The largest proportion of an RE that will be removed is 16.7 % of Least Concern RE 11.7.4.
Soil erosion if the local government is not the assessment manager for the development application		
P086 Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application.	A086.1 Clearing only occurs if an erosion and sediment control plan is developed and implemented to prevent soil erosion and instability resulting from the clearing.	A086.1 complies. Clearing will only occur after the ESCPC is developed and implemented.
Salinity		
P087 Clearing within 100 metres of a salinity expression area does not contribute to or accelerate land degradation through either of the following: 1. Waterlogging;	A087.1 Clearing does not occur within 100 metres of a salinity expression area.	P087 not applicable. Salinity expression areas do not exist within the proposed clearing areas or within 100 m of any proposed clearing as identified in Section 5.6.

Performance Outcomes	Acceptable Outcomes	Response
2. The salinisation of groundwater, surface water or soil.		
Conserving endangered and of concern regional ecosystems		
P088 Clearing of vegetation maintains the composition, structure and function of endangered regional ecosystems and/or of concern regional ecosystems.	A088.1 Clearing does not occur in an endangered regional ecosystem or an of concern regional ecosystem. OR A088.2 Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed the widths prescribed in reference table 1 of this code. OR A088.3 Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed areas prescribed in reference table 1 of this code.	A088.3 complies. Less than 0.1 ha of Endangered or Of Concern RE will be cleared in the Project Area, which does not exceed the thresholds listed in table 1 of the code.
P089 Where clearing of vegetation in an endangered regional ecosystem or an of concern regional ecosystems does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, the cleared area: 1. Is rehabilitated; or 2. Where the cleared area cannot be rehabilitated, an offset is provided for any acceptable significant residual impact.	No acceptable outcome is prescribed.	P089 complies. P088 complies which means that P089 automatically complies.
Essential habitat excluding essential habitat for Phascolarctos cinereus (koalas) if development is assessable under Schedule 10, Part 10 of the Planning Regulation 2017		
P090 Clearing of vegetation in a regional ecosystem that is an area of essential habitat	A090.1 Clearing does not occur in essential habitat.	A090.1 complies.

Performance Outcomes	Acceptable Outcomes	Response
maintains the composition, structure and function of the regional ecosystem for each protected wildlife species individually.	OR A090.2 Clearing in essential habitat does not exceed the widths prescribed in reference table 1 of this code. OR A090.3 Clearing in essential habitat does not exceed the areas prescribed in reference table 1 of this code.	All areas of essential habitat in the Project Area has been avoided by the Disturbance Footprint.
P091 Where clearing of vegetation in a regional ecosystem that is an area of essential habitat does not maintain the composition, structure and function of the regional ecosystem, and cannot be avoided and has been mitigated, an offset is provided for any acceptable significant residual impact for each protected wildlife species individually.	No acceptable outcome is prescribed.	P091 complies. PO90 complies which means that P091 automatically complies.
Acid sulfate soils if the local government is not the assessment manager for the development application		
P092 Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either of the following: 1. Aeration of horizons containing iron sulphides; 2. Mobilisation of acid or metals.	A092.1 Clearing does not occur in land zone 1, land zone 2 or land zone 3. OR A092.2 Clearing in land zone 1, land zone 2 or land zone 3 in areas below the five metre Australian Height Datum only occurs where: 1. Mechanical clearing does not disturb the soil to a depth greater than 30 centimetres; and 2. Acid sulfate soils are managed consistent with the Queensland Acid Sulfate Soil Technical Manual.	A092.2 complies. The entire Project Area is well above 5 m Australian Height Datum (AHD) (see Section 5.6), so no clearing is proposed in land zone 1, 2 or 3 below 5 m AHD.

12.1 RESPONSE TO PO9 AND PO85

In order to achieve compliance with Performance Outcome PO85 of State Code 16, REs on the subject land and any adjacent land must:

'Retain sufficient vegetation to:

- 1. Maintain ecological processes; and*
- 2. Ensure the RE remains in the landscape despite threatening processes.'*

As demonstrated in Table 6-1, no RE will be entirely removed from the Project Area, with the highest percentage of clearance being 16.7% of RE 11.7.4.

Ecological processes are defined under State Code 16 to mean processes including, but not limited to, the following:

1. Hydrological processes;
2. Soil development;
3. Nutrient cycling;
4. Chemical processes including storage of nutrients;
5. Decomposition and cycling of organic matter;
6. Pollination and seed production;
7. Seed dispersal;
8. Predator-prey relationships;
9. Germination and recruitment of species;
10. The carbon cycle and stability of atmospheric carbon; or
11. Habitats for flora and fauna (such as particular regional ecosystems, logs, rocks, debris, leaf litter, nectar, hollow bearing trees, food and shelter).

Table 12-2 provides justification for how all eleven ecological processes, listed above, will be maintained within the Project Area and adjacent land.

TABLE 12-2 RESPONSE TO PO9 AND PO85

Ecological Function	Relevance to Proposed Development
Hydrological processes	A review of the proposed layout of the Proposed Development identified the following post-development areas considered to be impervious to water: • WTG foundations and hardstands; • Collector substations; • Electrical switching station; • BESS; • Meteorological masts; • Construction compounds; • Operational and maintenance facilities; and • Accommodation facility. The proportion of the total 20,404.5 ha Project Area that will be comprised by these impervious structures is considered to be negligible. Given such a negligible increase in the proportion of impervious land throughout the post-development landscape, it is anticipated that no significant changes to post-development peak flow rates will occur, and thus no specific mitigation measures will be required. To further ensure potential impacts to hydrology, stream flow, and natural drainage patterns are minimised, the Disturbance Footprint will be further refined in the micro-siting phase. Where access tracks and roadways are anticipated to intersect with natural drainage lines, vegetated table drains, and diversion drains will be fitted to maintain natural drainage flow paths. Areas around turbines are proposed to be graded to maintain sheet flow, as a means of ensuring natural drainage flow paths are maintained. The greatest extent of impact to hydrological processes is expected to be confined to the construction phase of the development, notably throughout the disturbance of watercourses for the construction of linear infrastructure. However, all assessments completed indicate that impacts to hydrology and natural drainage flows throughout the operational phase of the development are anticipated to be negligible, and hydrological processes are expected to be maintained.
Soil development	Soil development is the ecological process through which soil forms and evolves over time. This process relies on geological, biological, climatic and topographic interactions. Within the Project Area, there are four identified land zones, as defined by REs. These include: • Recent Quaternary alluvial systems - alluvial river and creek flats (land zone 3); • Tertiary-early Quaternary loamy and sandy plains and plateau (land zone 5) • Cainozoic duricrusts – ironstone jump ups (land zone 7); and • Fine grained sedimentary rocks (land zone 9). An ESCPC will be developed, in accordance with the Queensland Erosion and Sediment Control Plan, as part of the CEMP prior to construction. Sediment and erosion control within the Project Area will be managed in accordance with this plan, as well as contractor's erosion and sediment control procedures. In addition, where access tracks and roadways are anticipated to intersect with natural drainage lines, vegetated table drains, and diversion drains will be fitted to maintain natural drainage flow paths. As a result, the ecological process of soil development is unlikely to be significantly impacted by erosion as a result of the Proposed Development, and will therefore be maintained.

Ecological Function	Relevance to Proposed Development
	Additionally, as described below, the nutrient cycling and decomposition of organic matter will be maintained after the construction the Proposed Development, and therefore these factors are also unlikely to disrupt soil development within the Project Area.
Nutrient cycling	Nutrient cycling is the process in which essential elements (such as nitrogen, phosphorus, potassium, calcium, magnesium and sulfur) are transferred between soil, water, plants and animals within an ecosystem. This process ensures the availability of nutrients that are essential for the growth and metabolism of organism. The cycle is completed through producers (plants) absorbing available nutrients from soils, consumers (animals) gaining nutrients through consumption of producers and other consumers and, decomposers (fungi and bacteria) breaking down the producers and consumers and releasing nutrients back into soils. When the nutrient cycle is not maintained within an ecosystem, concentrations of nutrients become either too high or too low, which can impact the ecosystem in a variety of ways (e.g. decreased soil fertility and plant growth (low amounts of nutrients in soils), and cause eutrophication of waterways (high amounts of nutrients in water)). As discussed below, the Proposed Development is unlikely to impact decomposition, predator-prey relationships or flora and fauna habitat to the point where these ecological processes are not maintained within the Project Area or adjacent land. The Proposed Development will result a maximum impact to 813.9 ha of mapped RE, that will impact the nutrient cycling within these localised areas, however this area is only 10.3 % of RE in the Project Area and is unlikely to result in detrimental effects of a disrupted nutrient cycle.
Chemical processes including storage of nutrients	Chemical process within the Project Area that have the potential to be impacted by the Proposed Development include photosynthesis, decomposition, nutrient cycling and weathering. Decomposition, nutrient cycling and the weathering of rock and soil development have been discussed elsewhere in this table. There is the potential for photosynthesis of vegetation adjacent to construction areas to be impacted by dust as a layer of dust over plants decreases access to sunlight. However, with proper dust mitigation measures (Table 7-1), this impact is expected to be negligible. Clearing of vegetation is known to disrupt nutrient cycles and increase the vulnerability of soils to acidification. However, as the Project Area does not contain acid sulphate soils and is not within a trigger area under the State Planning Policy Acid Sulphate Soils Trigger Areas, it is unlikely that the clearing of vegetation associated with the Proposed Development will lead to acid acidification within the Project Area or surrounding environments. Additionally, there is the potential for the Proposed Development to impact waterways and aquatic habitats through eutrophication and pollution from chemicals, such as fertilisers, herbicides and pesticides. Although fertilisers are unlikely to be utilised, there is the potential that herbicides and pesticides may be utilised for weed and pest management during the construction and operation of the Proposed Development. However, weed and pest management will involve multiple management measures outside of chemical treatment (integrated weed and pest management), and will also be highly targeted with species specific management plans opposed to generalised treatments. It is therefore unlikely that these chemicals will be applied to the extent where they result in pollution to waterways.
Decomposition and cycling of organic matter	The construction of the Proposed Development is expected to have minimal direct impact on decomposition and cycling of organic matter within the Project Area. To assess this, three main factors have been considered as necessary to maintain this ecological process: • Soil structure;

Ecological Function	Relevance to Proposed Development
	• Microbial communities; and • Organic inputs. During construction soil structure is likely to be subject to compaction from heavy machinery and potential erosion. However, an ESCPC will be adopted and followed and where these impacts cannot be avoided or mitigated, they will be limited to the immediate area surrounding the turbine bases and access roads. With the health and composition of microbial communities within the Project Area being currently unknown, we are assuming that these communities are healthy and functioning to a level adequate for the vegetation and habitat types present within the Project Area. As concrete footings will be developed at the base of the turbines, microbial activity will not be able to occur on these footings, however, it is unlikely that the Proposed Development will impact the composition or abundance of microbial communities surrounding these footings and thus decomposition is likely to be maintained. Decomposition and cycling of organic matter can only occur when there is a constant input of organic matter into a system. After construction, the Proposed Development is unlikely to negatively impact input of organic matter, with potential to increase accessible vegetation for microbial communities through vegetation management practices (which will be outlined in the VFMP). Ultimately, it is not expected that the Proposed Development will directly impact microbial communities responsible for decomposition in the soil within the Project Area, and this ecological process will be maintained as long as soil disturbance is minimal and organic inputs remain consistent.
Pollination and seed production	Flora species in Australia utilise a combination of wind, birds, flying and non-flying mammals and insects for pollination and ultimately seed production of native flora species (Armstrong, 1979). Although the Proposed Development is unlikely to alter the wind patterns within the Project Area, the Proposed Development has the potential to impact pollination and seed production indirectly through altering the abundance and/or behaviour of bird, mammals (particularly bats) and insects within the Project Area. Firstly, bird and bat species within the Project Area have the potential to be impacted by collision risk and barotrauma by WTGs within the Project Area. This has the potential to result in the reduction in the abundance of pollinator species/ avoidance of the area by these species. However, common pollinating species within the Project Area (such as honeyeaters and lorikeets (most persistent flower-feeders) (Ford, 1979), and mega-bats) are unlikely to be flying at heights where collision and barotrauma are considered to be a high risk, with most of these species occupying habitat below the RSA. Additionally, mitigation and management measures will be put in place to reduce the risk of these impacts (Table 7-1). Secondly, evidence is accumulating that insects are frequently killed by operating wind turbines. For example, the annual loss of insect by onshore wind turbines in Germany was recently estimated at about 1.2 trillion killed insects per year (Voigt, 2021). This potential decline of insect populations may also diminish their ecosystem function, including services like pollination. Currently, there is a lack of data on how the siting of wind turbines affect insect fatalities, and thus, how turbine siting may impact local insect diversity and associated ecosystem functions (Voigt, 2021). Although there is the potential for the Proposed Development to reduce the abundance of insects within the Project Area, and the associated pollination function that they provide, it is unlikely that the Proposed Development will impact this ecological process to an extent that it is unable to be maintained within the Project Area and the surrounding environments. In terms of pollinator behaviour, it has been shown, for example, that the visitation rates to eucalyptus flowers (pollination) by birds, bats and insects is correlated with canopy structure, flowering effort, tree height and the number of trees simultaneously flowering (Bacles, et al., 2009). Other than directly removing vegetation through clearing, these factors will not be directly impacted as a result of the Proposed Development and the pollination and seed production ecological process will be maintained.

Ecological Function	Relevance to Proposed Development
Seed dispersal	Seed dispersal is important for the genetic diversity and population maintenance/recovery of native species, as well as colonization of and habitat expansion into of disturbed areas. Additionally, seed dispersal contributes to the food source of certain animal species, including birds, mammals and insects. In general, the construction of wind turbines often results in the fragmentation of habitats and the creation of barriers that can impede seed dispersal. Certain species of animals that disperse seeds may avoid crossing open areas that leave the animal more susceptible to predation, leading to reduced seed dispersal across cleared areas. However, specifically for the Proposed Development, these cleared areas will be narrow and linear in nature, and will be additionally reduced through natural regeneration during the operation of the Proposed Development. This distanced between habitat patches is considered unlikely to create a barrier to dispersal to the species considered known to occur within the Project Area, and therefore seed dispersal through animal movement. Additionally, the Proposed Development is unlikely to impact wind patterns and hydrological processes (discussed above) which would also contribute to seed dispersal within the Project Area and the wider locality.
Predator-prey relationships	A full list of species identified within the Project Area are provided in Appendix D. There are multiple examples of predator-prey relationships between these species, including both native and introduced species. Two main impacts from the Proposed Development have been identified as having the potential to disrupt the predator-prey relationships within the Project Area. These include: • Bird and bat mortality from collision risk; and • Habitat loss and fragmentation and the indirect impacts to animal behaviours. A study focusing on native bird populations did not find any evidence suggesting that mortality due to collision risk disrupt the predator-prey relationships of these species within the broader ecosystem. Specifically, they found that there was no evidence of significant population level impacts on bird species that are preyed on by raptors (Marques et al., 2014). Secondly, habitat loss and fragmentation has the potential to impact predator prey relationships through increasing predator behaviour and success due to increased areas with low canopy cover and greater edge effects (see Table 5 1 for further description) (Marcques, et al., 2014). However, these changes are localised so the Project Area and are not considered drastic enough to disrupt predator-prey relationships. Additionally, mitigation measures, such as avoidance of important ecological values, habitat restoration and monitoring, that will be implemented through the planning of the Proposed Development and/ or management plans (BBMP, VFMP, BMP etc.) will minimise potential impacts and help maintain ecological processes associated with wildlife, including predator-prey relationships. Therefore, while there can be localised effects on wildlife due to the construction and operation of the Proposed Development, with proper design and management, these impacts should not significantly disrupt predator-prey relations and this ecological process should be maintain within the broader community.
Germination and recruitment of species	While the construction of the Proposed Development will initial disturb vegetation through clearing for turbine foundations, access roads, and other infrastructure, and potentially impact soil structure, and the germination and recruitment of species, the area to be impacted is small relative to the wider Project Area (10.9 %) and these impacts are likely to be localised to the Disturbance Footprint.

Ecological Function	Relevance to Proposed Development
	Additionally, a reduction in vegetation management of the Disturbance Footprint has been proposed and will result in the natural regeneration of native species within areas not required for the operation of the Proposed Development. This process will allow for the germination and recruitment of species in cleared, non-permanent areas within the Project Area. Germination and recruitment of species is likely to be unimpacted and maintained in areas outside the disturbance footprint and throughout the wider landscape during all phases of the Proposed Development.
The carbon cycle and stability of atmospheric carbon	The construction and operation of the Proposed Development is anticipated to maintain or even have a positive implication for carbon cycle and atmospheric stability due to its ability to generate renewable energy and reduce reliance on fossil fuels. Although vegetation clearing associated with the Proposed Development will contribute to an increase in atmospheric carbon and impact to carbon sequestration ability, the area required to be cleared for the Proposed Development (2,221.2 ha) is a much smaller area compared to other forms of energy production, such as coal. Additionally, these carbon emissions are expected to be offset during operation of the Proposed Development due to the emissions saved from displacing fossil fuel use.
Habitats for flora and fauna (such as particular regional ecosystems, logs, rocks, debris, leaf litter, nectar, hollow bearing trees, food and shelter).	BHTs within the Project Area have been identified and avoided where possible during the Proposed Development's design. The area of each BHT within the permanent footprint of the Proposed Development to be impacted are: • Cleared land – 208.2 ha; • Agricultural land – 357.3 ha; • Buloke and poplar box open forests to woodland – 50.3 ha; • Ironbark and smooth-barked apple woodland – 139.5 ha; • Ironbark open forests to woodland on hilly terrain – 186.0 ha; • Gum-topped box open forests to woodland – 28.6 ha; • Poplar box grassy woodland – 24.1 ha; • Riparian open forests to woodland – 10.8 ha; • Belah with or without brigalow open forests to woodlands – 45.6 ha; and • Permanent waterbodies – < 0.1 ha. As these impacts are narrow and linear in nature, entire habitat patches will not be removed and the habitat functions that these habitat types provide (foraging, dispersal and breeding) are likely to be maintained. Additionally, although the Proposed Development's development footprint will bisect certain patches of identified habitat, and a certain level of fragmentation will occur, this clearing will be reduced in width through natural regeneration during the operation of the Proposed Development. This distance between habitat patches is considered unlikely to create a barrier to dispersal to the species identified as known to occur within the Project Area. Finally, the second stage of impact mitigation will entail on the ground micro-siting at each location proposed for infrastructure to determine if any ecological values (i.e. species microhabitat features such as hollow-bearing trees and rocky outcrops) occur in that area to influence the re-siting of infrastructure. Habitat features such as logs, leaf litter and nectar are unlikely to result in the re-siting of infrastructure, however these habitat features are common throughout the Project Area and will not be impacted in areas outside of the disturbance footprint. It is important to note that although the overall ecosystem process of habitat for flora and fauna is likely to be maintained, the area of habitat and impacts to habitat function may be significant for species. An impact assessment has been completed for species listed under the NC Act and EPBC Act, summarized within Section 10.3.

13. STATE CODE 23 REQUIREMENTS

13.1 RESPONSE TO PERFORMANCE OUTCOMES

The Proposed Development is assessable under State Code 23 as 'Material change of use'. Therefore, the environmental PO's of Table 23.1 of State Code 23 need to be assessed. Table 13-1 details how the Proposed Development complies with the PO relevant to environmental values. All other POs are assessed within the relevant Development Application documentation for the Proposed Development.

TABLE 13-1 STATE CODE 23 PROVISIONS RELEVANT TO ECOLOGICAL COMPONENTS OF THE PROPOSED DEVELOPMENT

Performance Outcome	Response
Protected wildlife and associated habitats and areas of high ecological value	
PO1 Development is located and designed to ensure that: - Protected wildlife and associated habitats; and - Areas of high ecological value are protected from adverse impacts.	PO1 complies. This MSES IAR has detailed the flora and fauna values of the Project Area (Section 5.4 and 5.5) and identified areas of high ecological value (Section 5.2.2). Impacts to these areas have been avoided, then minimized (Section 7). Protected wildlife habitat has also been identified (Section 5.8.3) and impact to these areas has been avoided then minimized (Section 7).
PO2 Development is constructed to ensure that: - Protected wildlife and associated habitats; and - Areas of high ecological value are protected from adverse impacts.	PO2 complies. Compliance with PO2 will be demonstrated during the construction phase of the Proposed Development. The following plans will be developed prior to construction to ensure compliance with PO2: - VFMP; and - CVMP.
PO3 Development operations ensure that protected wildlife and birds and bats are protected from adverse impacts.	PO3 complies. A BBMP has been drafted and will be iteratively improved throughout the assessment phase. The Proposed Development will not commence until the BBMP is approved. A Bird Utilisation Survey Report (BUSR) will also be developed based on the two years of operational BUS that will be conducted.
PO4 Areas cleared for the construction of a wind farm are progressively rehabilitated to the maximum extent practicable following construction without impeding the safe and efficient operations and maintenance of the wind farm.	PO4 complies. A RMP will be developed for the Proposed Development, to ensure that rehabilitation will occur in areas that are not required to be retained as cleared throughout the operation phase.
Natural drainage patterns	
PO6 The wind farm, including ancillary infrastructure, is designed and sited to minimise crossings of and interference with natural	PO6 complies. Impacts to waterways are detailed in Section 10.4. Impacts to watercourses and wetlands have been avoided, then

Performance Outcome	Response
drainage lines, waterways and wetlands.	minimised throughout the design phase of the Proposed Development (see Section 7). The Proposed Development will also develop a SWMP prior to commencement of operation of the Proposed Development.
Natural drainage patterns	
P07 Development is designed to avoid areas of high erosion risk, where failure of erosion management devices would result in permanent and/or adverse impacts on receiving waterways or wetlands.	P07 complies. An Erosion Risk Assessment has been submitted as part of the DA to identify areas of risk and hazard management techniques to mitigate risk in these areas.
P08 Development is constructed to maintain or improve the water quality of receiving waters, waterways and wetlands by: • Minimising erosion and run off; • Managing drainage control; and • Preserving the bank stability of affected waterways and drainage lines.	P08 complies. An ESCPC will be developed and adopted prior to any clearing associated with the Proposed Development to avoid, mitigate and manage risks to water quality.
P09 Areas cleared for construction are progressively stabilised during construction to ensure that erosion and run off to the surrounding landscape and waterways is minimised to the greatest extent possible.	P09 complies. The following plans will be developed and adopted for the Proposed Development to ensure cleared areas are progressively stabilized and do not have downstream effects into watercourses: • RMP; • ESCPC; • SWMP; and • SSPO.

14. STATE CODE 27 REQUIREMENTS

14.1 RESPONSE TO PERFORMANCE OUTCOMES

The Proposed Development is assessable under State Code 27 as 'Material change of use'. Therefore, the environmental PO's of Table 27.1 of State Code 27 need to be assessed. Table 14-1 details how the Proposed Development complies with the PO relevant to environmental values. All other POs are assessed within the relevant Development Application documentation for the Proposed Development.

TABLE 14-1 STATE CODE 27 PROVISIONS RELEVANT TO ECOLOGICAL COMPONENTS OF THE PROPOSED DEVELOPMENT

Performance Outcome	Response
Areas of high ecological value and associated wildlife habitats	
PO1 Development is located, sited and designed to ensure that the following are protected from adverse impacts: - Protected wildlife and associated habitats; and - Areas of high ecological value.	PO1 complies. This MSES IAR has detailed the flora and fauna values of the Project Area (Section 5.4 and 5.5) and identified areas of high ecological value (Section 5.2.2). Impacts to these areas have been avoided, then minimized (Section 7). Protected wildlife habitat has also been identified (Section 5.8.3) and impact to these areas has been avoided then minimized (Section 7).

15. CONCLUSION

This MSES IAR describes the ecological values of the Project Area and assesses the potential impacts of the Proposed Development on MSES defined in the Environmental Offsets Regulation 2014. The SRIAs are underpinned by a comprehensive desktop review of publicly available databases, mapping and aerial imagery and nine ecological field survey events undertaken from December 2023 to October 2025.

These ecological assessments concluded that several classes of regulated vegetation, including Category B Endangered and Of Concern REs, Category B essential habitat and Category B RE intersecting watercourses occur within the Project Area. Additionally, six species protected under the NC Act are known to occur, or are considered likely to occur:

- Koala (*Phascolarctos cinereus*);
- Glossy black cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*);
- Diamond firetail (*Stagonopleura guttata*);
- White-throated needletail (*Hirundapus caudacutus*);
- Short-beaked echidna (*Tachyglossus aculeatus*); and
- Kogan waxflower (*Philothea sporadica*).

A further 11 protected flora and fauna species were assessed as having the potential to occur.

The proposed impacts associated with the Proposed Development include:

- Habitat loss;
- Mortality from vegetation clearing;
- Habitat fragmentation and patch isolation;
- Increased prevalence of invasive flora and fauna;
- Increased vehicle impacts on fauna and habitat;
- Altered fire regimes and bushfire risk;
- Altered hydrology, sedimentation and erosion;
- Noise, dust and light pollution;
- Hazardous material pollution;
- Mortality and injury from turbine collision and barotrauma; and
- Changes to bird and bat site utilisation.

A bird and bat risk assessment and collision risk modelling found that the fork-tailed swift and white-throated needletail are considered to be at low and moderate risk, respectively.

Avoidance and mitigation measures have been proposed to minimise the severity of the potential impacts associated with the Proposed Development. Several management plans will also be developed prior to the Proposed Development commencing, and will be implemented throughout the life of the Proposed Development as required. The attached Preliminary BBMP describes measures and an adaptive management framework to reduce the likelihood of bird and bat collision with WTGs.

The potential impacts to MSES associated with the Proposed Development have been assessed against the NC Act Significant Residual Impact Guidelines considering both the potential impacts and proposed avoidance mitigation and management measures. The SRIA determined that the Proposed Development is likely, or has the potential to result on a SRI on the following MSES:

- Regulated vegetation:
 - Category B RE intersecting a watercourse;
- Protected wildlife habitat:
 - Diamond firetail;
 - Glossy black cockatoo; and
 - Koala.

Offsets for these SRIs will be provided in line with the Environmental Offsets Policy and Environmental Offsets Regulation 2014.

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APPENDIX A WILDNET SEARCH RESULTS



WildNet Records Species List

For the selected area of interest 74240.51 Custom input
Current as at 05/12/2025 SpeciesListPt1

Summary Information

The following table provides an overview of the area of interest: Custom input

Table 1. Area of interest details

Size (ha)	
74,240.51	
Local Government(s)	
Toowoomba Regional	
Western Downs Regional	
Catchment(s)	
Border Rivers	
Balonne-Condamine	
Bioregion(s)	Subregion(s)
Brigalow Belt	Eastern Darling Downs
Brigalow Belt	Inglewood Sandstones

Protected Area(s) The following estates and/or reserves are located in the area of interest:

Dunmore State Forest
Kumbarilla State Forest

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Introduction

This WildNet report is derived from a spatial layer that is generated from the [WildNet database](#), managed by the Department of the Environment, Tourism, Science and Innovation. The layer, which is generated weekly, contains a subset of WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero. It does not include aspatial data such as some baseline species lists created for some protected areas.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest.

The [WildNet Application](#) may provide additional information on species occurrence within your area of interest.

Species data

Contextual location information is presented in Map 1.

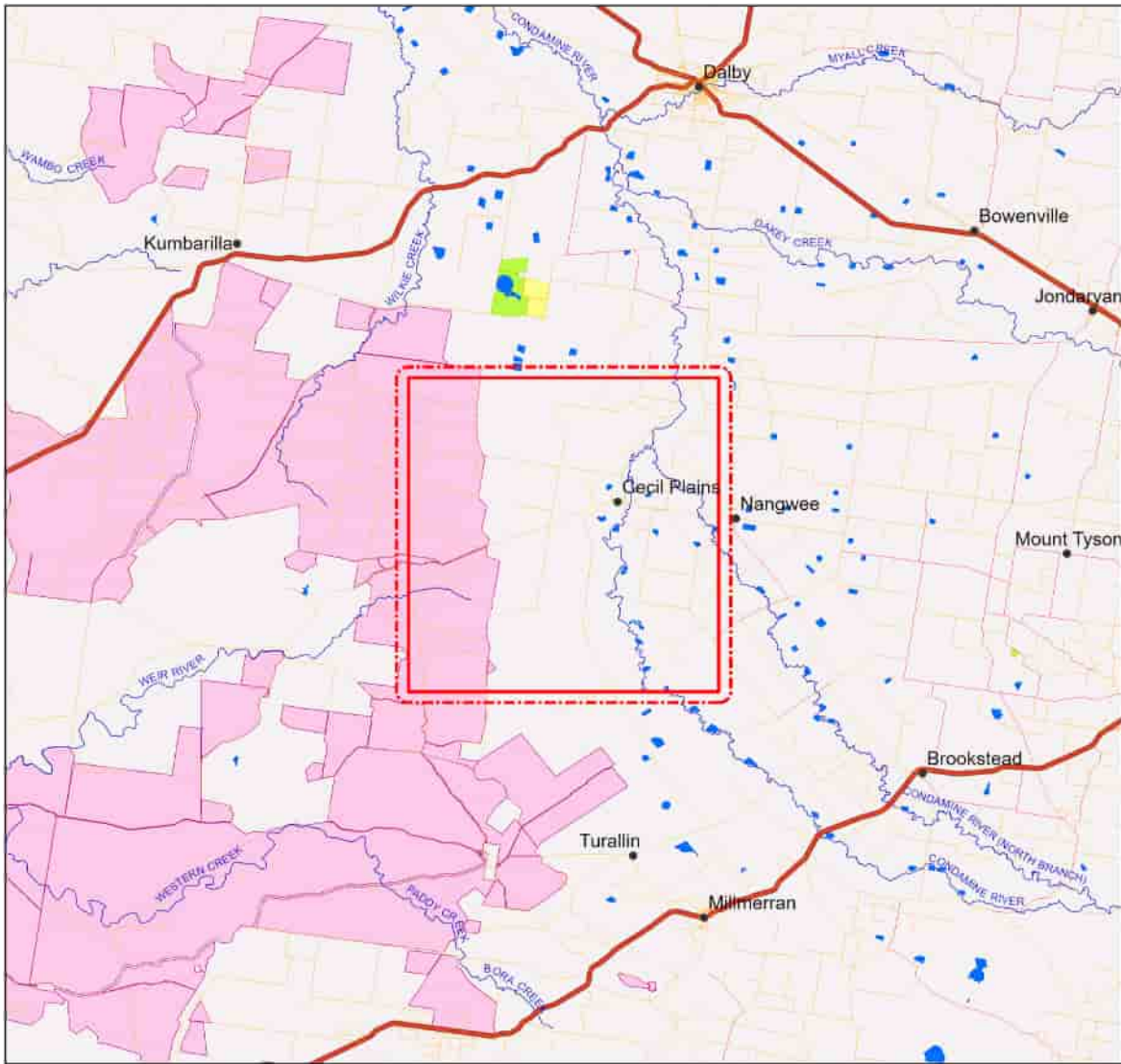
Table 2 lists the animals recorded within the area of interest and its one kilometre buffer.

Table 3 lists the plants recorded within the area of interest and its one kilometre buffer.

Table 4 lists the fungi recorded within the area of interest and its one kilometre buffer.

Table 5 lists the other species recorded within the area of interest and its one kilometre buffer.

Map 1. Locality Map



Locality Map

Legend

- Towns
- Freeways/Highways
- Connector
- Street/Local Road
- Lakes and reservoirs
- National Park
- National Park (Scientific)
- National Park (CYPAL)
- National Park (Aboriginal Land)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland
- Custom area
- 1 kilometre buffer



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Table 2. Animals recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
26896	Actinopterygii	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish			0	3	18/03/2013
26920	Actinopterygii	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead			0	1	31/08/1995
26941	Actinopterygii	Clupeidae	<i>Nematalosa erebi</i>	bony bream			0	9	22/03/2013
19545	Actinopterygii	Cyprinidae	<i>Carassius auratus</i>	goldfish			0	1	31/08/1995
26943	Actinopterygii	Cyprinidae	<i>Cyprinus carpio</i>	European carp			0	7	22/03/2013
26956	Actinopterygii	Eleotridae	<i>Hypseleotris klunzingeri</i>	western carp gudgeon			0	2	31/08/1995
33897	Actinopterygii	Eleotridae	<i>Hypseleotris sp.</i>				0	5	22/03/2013
26958	Actinopterygii	Eleotridae	<i>Hypseleotris species 2</i>	Lake's carp gudgeon			0	1	31/08/1995
26968	Actinopterygii	Eleotridae	<i>Philypnodon grandiceps</i>	flathead gudgeon			0	1	31/08/1995
27025	Actinopterygii	Melanotaeniidae	<i>Melanotaenia fluviatilis</i>	Murray River rainbowfish			0	3	19/03/2013
27041	Actinopterygii	Percichthyidae	<i>Maccullochella peelii</i>	Murray cod		V	0	1	18/03/2013
27042	Actinopterygii	Percichthyidae	<i>Macquaria ambigua</i>	golden perch			0	7	22/03/2013
27048	Actinopterygii	Plotosidae	<i>Neosilurus hyrtl</i>	Hyrtl's catfish			0	2	22/03/2013
27054	Actinopterygii	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish			0	4	18/03/2013
27055	Actinopterygii	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish			0	5	22/03/2013
27061	Actinopterygii	Retropinnidae	<i>Retropinna semoni</i>	Australian smelt			0	3	18/03/2013
27089	Actinopterygii	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch			0	3	22/03/2013
716	Amphibia	Bufonidae	<i>Rhinella marina</i>	cane toad			0	4	6/02/2021
624	Amphibia	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog	C		0	3	28/02/2013
643	Amphibia	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog	C		0	1	27/02/2013
620	Amphibia	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog	C		1	4	9/04/2021
623	Amphibia	Hylidae	<i>Cyclorana verrucosa</i>	rough collared frog	C		0	31	30/07/2023
627	Amphibia	Hylidae	<i>Litoria caerulea</i>	common green treefrog	C		1	5	28/02/2013

608	Amphibia	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog	C		0	4	28/02/2013
614	Amphibia	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog	C		1	12	5/11/2023
596	Amphibia	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog	C		1	4	19/09/2022
600	Amphibia	Hylidae	<i>Litoria rubella</i>	ruddy treefrog	C		1	7	27/02/2013
679	Amphibia	Limnodynastidae	<i>Limnodynastes fletcheri</i>	barking frog	C		2	4	19/09/2022
684	Amphibia	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog	C		1	6	22/10/2022
673	Amphibia	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk	C		0	5	28/02/2013
667	Amphibia	Limnodynastidae	<i>Neobatrachus sudellae</i>	meeowing frog	C		0	3	28/02/2013
680	Amphibia	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog	C		0	12	10/01/2014
696	Amphibia	Myobatrachidae	<i>Crinia parinsignifera</i>	beeping froglet	C		0	5	28/02/2013
659	Amphibia	Myobatrachidae	<i>Pseudophryne major</i>	great brown broodfrog	C		0	1	28/02/2013
635	Amphibia	Myobatrachidae	<i>Uperoleia laevigata</i>	eastern gungan	C		0	5	28/02/2013
639	Amphibia	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan	C		1	10	28/02/2013
1418	Aves	Acanthizidae	<i>Acanthiza apicalis</i>	inland thornbill	C		0	22	27/02/2013
1419	Aves	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	C		0	12	15/03/2014
1421	Aves	Acanthizidae	<i>Acanthiza lineata</i>	striated thornbill	C		0	1	15/03/2014
1422	Aves	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill	C		0	47	15/03/2014
1423	Aves	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill	C		0	13	15/03/2014
1425	Aves	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill	C		0	16	15/03/2014
1412	Aves	Acanthizidae	<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill	C		0	1	28/10/2009
1407	Aves	Acanthizidae	<i>Gerygone fusca</i>	western gerygone	C		0	8	13/08/2003
1396	Aves	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone	C		0	15	27/02/2013
1403	Aves	Acanthizidae	<i>Pyrrholaemus sagittatus</i>	speckled warbler	C		0	30	15/03/2014
1371	Aves	Acanthizidae	<i>Smicromis brevirostris</i>	weebill	C		0	80	5/11/2023

1742	Aves	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk	C		0	1	21/12/2002
1729	Aves	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk	C		0	1	8/04/2021
1732	Aves	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle	C		0	4	8/04/2021
1723	Aves	Accipitridae	<i>Circus assimilis</i>	spotted harrier	C		0	1	11/08/2018
1725	Aves	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite	C		0	6	16/08/2023
1718	Aves	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	C		0	1	13/05/2007
1707	Aves	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite	C		0	7	15/03/2014
1714	Aves	Accipitridae	<i>Milvus migrans</i>	black kite	C		0	2	5/09/2023
1305	Aves	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler	C		0	1	4/12/1994
1973	Aves	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar	C		0	6	19/12/1999
1776	Aves	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher	C		0	1	4/12/1994
1767	Aves	Alcedinidae	<i>Dacelo novaeguineae</i>	laughing kookaburra	C		0	41	5/11/2023
1762	Aves	Alcedinidae	<i>Todiramphus sanctus</i>	sacred kingfisher	C		0	14	28/02/2013
1993	Aves	Anatidae	<i>Anas gracilis</i>	grey teal	C		0	10	15/03/2014
1998	Aves	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C		0	15	15/03/2014
1999	Aves	Anatidae	<i>Aythya australis</i>	hardhead	C		0	4	9/01/2000
2003	Aves	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C		0	9	16/08/2023
2005	Aves	Anatidae	<i>Cygnus atratus</i>	black swan	C		0	5	15/03/2014
1978	Aves	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck	C		0	3	26/02/2013
1980	Aves	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck	C		0	1	9/01/2000
1995	Aves	Anatidae	<i>Spatula querquedula</i>	garganey	SL		0	1	26/09/1976
1996	Aves	Anatidae	<i>Spatula rhynchotis</i>	Australasian shoveler	C		0	4	9/01/2000
1987	Aves	Anatidae	<i>Stictonetta naevosa</i>	freckled duck	C		0	1	28/02/1983
1279	Aves	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter	C		0	9	15/03/2014

1965	Aves	Apodidae	<i>Apus pacificus</i>	fork-tailed swift	SL		0	1	17/03/2003
1971	Aves	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail	V	V	0	3	4/01/2001
1829	Aves	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret	C		0	4	7/08/2000
1831	Aves	Ardeidae	<i>Ardea intermedia</i>	intermediate egret	C		0	1	21/12/2002
1832	Aves	Ardeidae	<i>Ardea pacifica</i>	white-necked heron	C		0	6	27/02/2013
1840	Aves	Ardeidae	<i>Egretta garzetta</i>	little egret	C		0	1	7/12/1999
1826	Aves	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron	C		0	11	5/11/2023
1818	Aves	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron	C		0	2	9/01/2000
1646	Aves	Artamidae	<i>Artamus minor</i>	little woodswallow	C		0	2	19/12/1999
1649	Aves	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow	C		0	1	27/02/2013
1654	Aves	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird	C		0	35	5/09/2023
1656	Aves	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird	C		0	56	5/11/2023
1644	Aves	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	C		0	42	5/09/2023
1645	Aves	Artamidae	<i>Strepera graculina</i>	piebald currawong	C		0	40	5/11/2023
1956	Aves	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew	C		0	1	1/04/1993
1191	Aves	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo	C		0	39	5/09/2023
1194	Aves	Cacatuidae	<i>Cacatua sanguinea</i>	little corella	C		0	11	5/09/2023
1196	Aves	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo	C		0	1	18/05/2020
22494	Aves	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)	V	V	0	3	10/05/2010
1193	Aves	Cacatuidae	<i>Eolophus roseicapilla</i>	galah	C		0	39	16/08/2023
1173	Aves	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel	C		0	13	27/02/2013
1185	Aves	Cacatuidae	<i>Zanda funerea</i>	yellow-tailed black-cockatoo	C		0	2	30/05/2000
1635	Aves	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike	C		0	1	28/10/2009
1636	Aves	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike	C		0	18	27/02/2013

1637	Aves	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike	C		0	2	19/12/1999
1639	Aves	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird	C		0	7	24/07/2001
1642	Aves	Campephagidae	<i>Lalage tricolor</i>	white-winged triller	C		0	2	25/11/2011
1089	Aves	Casuariidae	<i>Dromaius novaehollandiae</i>	emu	C		0	7	8/04/2021
1940	Aves	Charadriidae	<i>Elseyornis melanops</i>	black-fronted dotterel	C		0	2	15/03/2014
1942	Aves	Charadriidae	<i>Erythronyx cinctus</i>	red-kneed dotterel	C		0	1	26/02/2013
27774	Aves	Charadriidae	<i>Vanellus miles</i>	masked lapwing	C		0	4	28/02/2013
1933	Aves	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)	C		0	6	16/08/2023
18143	Aves	Charadriidae	<i>Vanellus tricolor</i>	banded lapwing	C		0	2	17/08/1975
1820	Aves	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork	C		0	2	15/03/2014
1628	Aves	Climacteridae	<i>Climacteris picumnus</i>	brown treecreeper	C		0	1	30/11/2011
1617	Aves	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper	C		0	3	9/12/2011
18293	Aves	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)	C		0	28	27/02/2013
1804	Aves	Columbidae	<i>Columba livia</i>	rock dove			0	10	5/09/2023
1809	Aves	Columbidae	<i>Geopelia cuneata</i>	diamond dove	C		0	3	1/09/1994
1810	Aves	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove	C		0	8	5/11/2023
18323	Aves	Columbidae	<i>Geopelia placida</i>	peaceful dove	C		0	9	15/03/2014
1793	Aves	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon	C		0	27	5/09/2023
1795	Aves	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing	C		0	6	5/11/2023
1774	Aves	Columbidae	<i>Spilopelia chinensis</i>	spotted dove			0	2	25/11/2011
1779	Aves	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird	C		0	12	28/02/2013
1603	Aves	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough	C		0	10	19/03/2021
1605	Aves	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird	C		0	17	19/03/2021
1608	Aves	Corvidae	<i>Corvus coronoides</i>	Australian raven	C		0	22	16/08/2023

1609	Aves	Corvidae	<i>Corvus orru</i>	Torresian crow	C		0	60	5/09/2023
1610	Aves	Corvidae	<i>Corvus sp.</i>		C		0	2	5/05/2002
1754	Aves	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo	C		0	4	15/03/2014
1751	Aves	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal	C		0	2	19/12/1999
1745	Aves	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo	C		0	2	19/12/1999
1747	Aves	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo	C		0	1	19/12/1999
1738	Aves	Cuculidae	<i>Eudynamis orientalis</i>	eastern koel	C		0	1	25/11/2011
1740	Aves	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo	C		0	1	19/12/1999
1611	Aves	Dicaeidae	<i>Dicaeum hirundinaceum</i>	mistletoebird	C		0	38	15/03/2014
1601	Aves	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo	C		0	2	15/03/2014
1359	Aves	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch	C		0	2	7/03/2000
1355	Aves	Estrildidae	<i>Stagonopleura guttata</i>	diamond firetail	V	V	0	1	1/12/2019
1342	Aves	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch	C		0	18	8/04/2021
1343	Aves	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch	C		0	4	8/04/2021
1949	Aves	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar	C		0	3	28/02/2013
1716	Aves	Falconidae	<i>Falco berigora</i>	brown falcon	C		0	3	5/09/2023
1704	Aves	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel	C		0	15	5/09/2023
1691	Aves	Falconidae	<i>Falco longipennis</i>	Australian hobby	C		0	1	26/02/2013
1692	Aves	Falconidae	<i>Falco peregrinus macropus</i>	Australian peregrine falcon	C		0	1	28/05/1979
1693	Aves	Falconidae	<i>Falco subniger</i>	black falcon	C		0	2	7/08/1998
1572	Aves	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow	C		0	5	15/03/2014
1573	Aves	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin	C		0	9	27/12/2017
1570	Aves	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren	C		0	28	15/03/2014
1556	Aves	Maluridae	<i>Malurus lamberti sensu lato</i>	variegated fairy-wren			0	6	27/02/2013

1558	Aves	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren	C		0	1	21/04/2002
1694	Aves	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey	C		0	1	9/08/2009
1552	Aves	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater	C		0	8	15/03/2014
1523	Aves	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater	C		0	113	15/03/2014
1539	Aves	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater	C		0	14	15/03/2014
1497	Aves	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater	C		0	27	26/08/2018
1499	Aves	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner	C		0	4	9/01/2000
1500	Aves	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner	C		0	55	5/09/2023
1504	Aves	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater	C		0	3	28/05/2017
1508	Aves	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater	C		0	16	15/03/2014
1489	Aves	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater	C		0	3	15/03/2014
1516	Aves	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater	C		0	38	15/03/2014
1493	Aves	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird	C		0	11	25/11/2011
1494	Aves	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird	C		0	37	28/05/2017
1471	Aves	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater	C		0	35	5/11/2023
1518	Aves	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater	C		0	9	5/05/2010
1764	Aves	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater	C		0	14	8/04/2021
1589	Aves	Monarchidae	<i>Grallina cyanoleuca</i>	maggie-lark	C		0	38	5/11/2023
1600	Aves	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher	C		0	4	10/10/2004
1586	Aves	Monarchidae	<i>Myiagra rubecula</i>	lead flycatcher	C		0	23	15/03/2014
1455	Aves	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit	C		0	5	16/08/2023
1453	Aves	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella	C		0	13	15/03/2014
1442	Aves	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole	C		0	7	5/11/2023
1680	Aves	Otididae	<i>Ardeotis australis</i>	Australian bustard	C		0	1	21/11/2019

1449	Aves	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush	C		0	24	5/11/2023
1436	Aves	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler	C		0	5	10/05/2010
1437	Aves	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler	C		0	57	5/11/2023
1389	Aves	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote	C		0	14	15/03/2014
1392	Aves	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote	C		0	29	15/03/2014
1360	Aves	Passeridae	<i>Passer domesticus</i>	house sparrow			0	2	25/11/2011
1284	Aves	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	C		0	2	15/03/2014
1347	Aves	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin	C		0	35	19/03/2021
1337	Aves	Petroicidae	<i>Melanodryas cucullata</i>	hooded robin	C		0	1	5/05/2002
1339	Aves	Petroicidae	<i>Microeca fascinans</i>	jacky winter	C		0	15	15/03/2014
1329	Aves	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin	C		0	4	15/03/2014
1332	Aves	Petroicidae	<i>Petroica rosea</i>	rose robin	C		0	2	9/06/2002
1261	Aves	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant	C		0	4	15/03/2014
1263	Aves	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant	C		0	4	15/03/2014
1264	Aves	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant	C		0	1	7/08/2000
1699	Aves	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail	C		0	1	27/02/2013
1687	Aves	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail	C		0	4	1/12/2011
1955	Aves	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth	C		0	7	28/02/2013
1249	Aves	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe	C		0	6	15/03/2014
1318	Aves	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler	C		0	38	19/03/2021
1180	Aves	Psittaculidae	<i>Alisterus scapularis</i>	Australian king-parrot	C		0	2	26/02/2013
1182	Aves	Psittaculidae	<i>Aprosmictus erythropterus</i>	red-winged parrot	C		0	19	16/08/2023
1145	Aves	Psittaculidae	<i>Glossopsitta concinna</i>	musk lorikeet	C		0	1	9/06/2002
1151	Aves	Psittaculidae	<i>Melopsittacus undulatus</i>	budgerigar	C		0	1	17/02/1948

1147	Aves	Psittaculidae	<i>Parvipsitta pusilla</i>	little lorikeet	C		0	3	27/02/2013
1136	Aves	Psittaculidae	<i>Platycercus adscitus</i>	pale-headed rosella	C		0	18	28/05/2017
21976	Aves	Psittaculidae	<i>Platycercus adscitus palliceps</i>	pale-headed rosella (southern form)	C		0	1	16/08/2023
1118	Aves	Psittaculidae	<i>Psephotus haematonotus</i>	red-rumped parrot	C		0	11	16/08/2023
1124	Aves	Psittaculidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet	C		0	27	5/09/2023
1125	Aves	Psittaculidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet	C		0	6	28/05/2017
1623	Aves	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird	C		0	1	28/05/2017
1686	Aves	Rallidae	<i>Fulica atra</i>	Eurasian coot	C		0	3	15/03/2014
1673	Aves	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen	C		0	5	23/01/2011
1893	Aves	Recurvirostridae	<i>Himantopus leucocephalus</i>	pied stilt	C		0	4	15/03/2014
1575	Aves	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail	C		0	39	15/03/2014
1576	Aves	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail	C		0	41	5/11/2023
22467	Aves	Rhipiduridae	<i>Rhipidura leucophrys leucophrys</i>	willie wagtail (southern)	C		0	2	16/08/2023
1578	Aves	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail	C		0	2	28/10/2009
1874	Aves	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper	V	V	0	1	9/01/2000
1857	Aves	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe	V	V	0	2	15/03/2014
1841	Aves	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper	SL		0	1	9/01/2000
1102	Aves	Strigidae	<i>Ninox boobook</i>	southern boobook	C		0	4	30/07/2023
1101	Aves	Strigidae	<i>Ninox connivens</i>	barking owl	C		0	1	16/12/1999
1314	Aves	Sturnidae	<i>Acridotheres tristis</i>	common myna			0	8	5/09/2023
1303	Aves	Sturnidae	<i>Sturnus vulgaris</i>	common starling			0	3	17/09/2001
1822	Aves	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill	C		0	5	15/03/2014
1823	Aves	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill	C		0	2	9/01/2000
1812	Aves	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis	C		0	4	15/03/2014

1800	Aves	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis	C		0	6	16/08/2023
1091	Aves	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail	C		0	3	19/03/2021
1081	Aves	Turnicidae	<i>Turnix varius</i>	painted button-quail	C		0	1	13/12/1999
1108	Aves	Tytonidae	<i>Tyto javanica</i>	eastern barn owl	C		0	1	27/04/2019
1276	Aves	Zosteropidae	<i>Zosterops lateralis</i>	silveryeye	C		0	11	10/05/2010
35081	Insecta	Aeshnidae	<i>Anax papuensis</i>	Australian Emperor			0	1	8/04/2021
35199	Insecta	Libellulidae	<i>Diplacodes bipunctata</i>	wandering percher			0	1	5/11/2023
35219	Insecta	Libellulidae	<i>Orthetrum caledonicum</i>	blue skimmer			0	1	5/11/2023
19315	Insecta	Lycaenidae	<i>Zizeeria karsandra</i>	spotted grass-blue			0	1	5/05/2010
19316	Insecta	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)			0	2	28/05/2017
19179	Insecta	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer			0	2	8/04/2021
19177	Insecta	Nymphalidae	<i>Danaus plexippus</i>	monarch			0	2	28/05/2017
19185	Insecta	Nymphalidae	<i>Euploea corinna</i>	common crow			0	1	4/12/1994
19163	Insecta	Nymphalidae	<i>Hypolimnys bolina nerina</i>	varied eggfly			0	2	5/05/2010
19172	Insecta	Nymphalidae	<i>Junonia villida villida</i>	meadow argus			0	4	28/05/2017
19176	Insecta	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger			0	1	4/12/1994
19170	Insecta	Nymphalidae	<i>Vanessa itea</i>	yellow admiral			0	2	28/05/2017
19075	Insecta	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail			0	1	5/11/2023
19068	Insecta	Papilionidae	<i>Papilio aegaeus aegaeus</i>	orchard swallowtail (Australian subspecies)			0	1	8/04/2021
19067	Insecta	Papilionidae	<i>Papilio anactus</i>	dainty swallowtail			0	1	4/09/2023
19074	Insecta	Papilionidae	<i>Papilio demoleus sthenelus</i>	chequered swallowtail			0	1	5/05/2010
19110	Insecta	Pieridae	<i>Belenois java teutonia</i>	caper white			0	1	5/11/2023
19098	Insecta	Pieridae	<i>Delias argenthona argenthona</i>	scarlet jezebel			0	2	28/05/2017
19084	Insecta	Pieridae	<i>Eurema smilax</i>	small grass-yellow			0	3	5/05/2010

19118	Insecta	Pieridae	<i>Pieris rapae</i>	cabbage white			0	2	5/09/2023
1084	Mammalia	Bovidae	<i>Bos taurus</i>	European cattle			0	12	19/03/2021
1067	Mammalia	Canidae	<i>Canis familiaris</i>	dog			0	4	19/03/2021
1069	Mammalia	Canidae	<i>Canis sp.</i>				0	1	27/02/2013
1071	Mammalia	Canidae	<i>Vulpes vulpes</i>	red fox			0	3	5/09/2023
22485	Mammalia	Dasyuridae	<i>Antechinus flavipes flavipes</i>	yellow-footed antechinus (south-east Queensland)	C		0	1	10/03/2017
803	Mammalia	Dasyuridae	<i>Dasyurus maculatus maculatus</i>	spotted-tailed quoll (southern subspecies)	E	E	0	1	31/12/1988
793	Mammalia	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart	C		0	3	27/02/2013
1006	Mammalia	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat	C		0	2	7/10/2010
814	Mammalia	Equidae	<i>Equus caballus</i>	horse			0	1	29/11/2011
1056	Mammalia	Felidae	<i>Felis catus</i>	cat			0	8	19/03/2021
832	Mammalia	Leporidae	<i>Lepus europaeus</i>	European brown hare			0	5	8/04/2021
834	Mammalia	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit			0	2	8/04/2021
901	Mammalia	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo	C		0	11	16/08/2023
902	Mammalia	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby	C		0	1	26/02/2013
904	Mammalia	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby	C		0	6	8/04/2021
885	Mammalia	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby	C		0	8	8/04/2021
988	Mammalia	Molossidae	<i>Mormopterus sp.</i>		C		0	1	15/12/1999
764	Mammalia	Muridae	<i>Mus musculus</i>	house mouse			0	7	8/04/2021
731	Mammalia	Muridae	<i>Rattus rattus</i>	black rat			0	1	5/09/2023
784	Mammalia	Peramelidae	<i>Isodon macrourus</i>	northern brown bandicoot	C		0	1	1/12/2011
786	Mammalia	Peramelidae	<i>Isodon sp.</i>		C		0	1	19/12/1999
879	Mammalia	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider	C		0	3	28/02/2013
36762	Mammalia	Petauridae	<i>Petaurus notatus</i>	Kreff's glider	C		0	1	16/12/1999

859	Mammalia	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum	C		0	7	19/03/2021
860	Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala	E	E	0	15	28/02/2013
862	Mammalia	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong	C		0	2	28/02/2013
963	Mammalia	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox	C		0	2	17/01/2003
1080	Mammalia	Suidae	<i>Sus scrofa</i>	pig			0	3	1/12/2011
838	Mammalia	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna	SL		0	8	19/03/2021
972	Mammalia	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat	C		0	2	19/12/1999
936	Mammalia	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat	C		0	9	19/12/1999
933	Mammalia	Vespertilionidae	<i>Scotorepens sp.</i>		C		0	1	19/12/1999
22059	Mammalia	Vespertilionidae	<i>Scotorepens sp. (Parnaby)</i>	central-eastern broad-nosed bat	C		0	45	19/12/1999
927	Mammalia	Vespertilionidae	<i>Vespadelus sp.</i>		C		0	11	19/12/1999
18847	Reptilia	Agamidae	<i>Amphibolurus burnsi</i>	Burns's dragon	C		0	1	5/05/2010
561	Reptilia	Agamidae	<i>Diporiphora nobbi</i>	nobbi	C		2	8	19/03/2021
554	Reptilia	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon	C		0	2	28/02/2013
556	Reptilia	Agamidae	<i>Pogona barbata</i>	bearded dragon	C		0	5	9/04/2021
18390	Reptilia	Agamidae	<i>Tympanocryptis condaminensis</i>	Condamine earless dragon	E	E	0	2	5/09/2023
519	Reptilia	Boidae	<i>Morelia spilota</i>	carpet python	C		0	2	19/03/2021
62	Reptilia	Chelidae	<i>Chelodina expansa</i>	broad-shelled river turtle	C		0	1	12/03/1990
43	Reptilia	Chelidae	<i>Emydura macquarii macquarii</i>	Murray turtle	C		0	2	5/05/2010
512	Reptilia	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake	C		0	2	9/12/2011
508	Reptilia	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake	C		0	5	7/11/1991
391	Reptilia	Diplodactylidae	<i>Amalosia robusta</i>	robust velvet gecko	C		0	1	23/01/2011
429	Reptilia	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko	C		0	4	28/02/2013
457	Reptilia	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake	C		0	2	15/05/2022

493	Reptilia	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake	C		0	2	5/11/2023
486	Reptilia	Elapidae	<i>Furina diadema</i>	red-naped snake	C		0	2	28/10/2009
474	Reptilia	Elapidae	<i>Pseudechis guttatus</i>	spotted black snake	C		1	4	11/01/2014
462	Reptilia	Elapidae	<i>Pseudechis porphyriacus</i>	red-bellied black snake	C		0	2	19/03/2021
454	Reptilia	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake	C		0	4	11/08/2018
438	Reptilia	Elapidae	<i>Suta dwyeri</i>	Dwyer's snake	C		0	5	28/02/2013
444	Reptilia	Elapidae	<i>Vermicella annulata</i>	bandy-bandy	C		0	1	27/02/2013
420	Reptilia	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella	C		1	26	9/04/2021
409	Reptilia	Gekkonidae	<i>Gehyra sp.</i>		C		1	1	9/04/1984
413	Reptilia	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko	C		2	35	8/04/2021
325	Reptilia	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard	C		0	2	9/01/2014
297	Reptilia	Scincidae	<i>Carlia pectoralis sensu lato</i>				0	1	19/12/1999
289	Reptilia	Scincidae	<i>Carlia sp.</i>		C		0	1	15/03/2014
31898	Reptilia	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink	C		1	10	8/04/2021
239	Reptilia	Scincidae	<i>Ctenotus sp.</i>		C		0	1	27/02/2013
240	Reptilia	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus	C		2	2	9/04/1984
201	Reptilia	Scincidae	<i>Egernia striolata</i>	tree skink	C		0	1	19/12/1999
192	Reptilia	Scincidae	<i>Eulamprus sp.</i>		C		0	2	19/12/1999
167	Reptilia	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider	C		1	1	9/04/2021
157	Reptilia	Scincidae	<i>Lerista punctatovittata</i>	eastern robust slider	C		6	12	9/04/2021
155	Reptilia	Scincidae	<i>Lerista timida</i>	timid slider	C		2	10	9/04/2021
226	Reptilia	Scincidae	<i>Liopholis modesta</i>	eastern ranges rock-skink	C		0	1	22/05/1990
150	Reptilia	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink	C		0	17	15/03/2014
134	Reptilia	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink	C		8	15	15/03/2014

120	Reptilia	Scincidae	<i>Saiphos equalis</i>	three-toed skink	C		0	1	30/07/2023
103	Reptilia	Scincidae	<i>Tiliqua rugosa</i>	shingle-back	C		0	2	29/08/2022
107	Reptilia	Scincidae	<i>Tiliqua scincoides scincoides</i>	eastern bluetongue	C		0	9	6/02/2021
91	Reptilia	Typhlopidae	<i>Anilius ligatus</i>	robust blind snake	C		0	1	14/12/2009
83	Reptilia	Typhlopidae	<i>Anilius wiedii</i>	brown-snouted blind snake	C		0	1	15/03/2021
78	Reptilia	Varanidae	<i>Varanus gouldii</i>	sand monitor	C		0	7	19/03/2021
74	Reptilia	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor	C		0	1	28/10/2009
71	Reptilia	Varanidae	<i>Varanus sp.</i>	goanna	C		0	1	11/01/2014
60	Reptilia	Varanidae	<i>Varanus tristis</i>	black-tailed monitor	C		0	2	11/04/2021
61	Reptilia	Varanidae	<i>Varanus varius</i>	lace monitor	C		0	28	19/03/2021

Table 3. Plants recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
8089	Chlorophyceae	Chaetophoraceae	<i>Stigeoclonium tenue</i>		C		0	1	6/04/2001
7641	Compsopogonophyceae	Compsopogonaceae	<i>Compsopogon coeruleus</i>		C		0	1	6/04/2001
16375	Equisetopsida	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower	C		0	2	21/05/1998
13379	Equisetopsida	Alismataceae	<i>Damasonium minus</i>	starfruit	SL		1	1	5/09/2012
32728	Equisetopsida	Amaranthaceae	<i>Alternanthera denticulata</i> var. <i>denticulata</i>		C		0	1	17/03/2011
32727	Equisetopsida	Amaranthaceae	<i>Alternanthera denticulata</i> var. <i>micrantha</i>		C		1	1	6/04/2010
17978	Equisetopsida	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed	C		1	2	7/12/2018
14846	Equisetopsida	Amaranthaceae	<i>Amaranthus macrocarpus</i>	dwarf amaranth	C		1	2	15/02/2022
17051	Equisetopsida	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed			0	2	17/03/2011
11782	Equisetopsida	Amaranthaceae	<i>Guilleminea densa</i>	small matweed			1	1	20/04/2017
16587	Equisetopsida	Amaranthaceae	<i>Nyssanthus erecta</i>		C		1	1	28/11/2003
11753	Equisetopsida	Amaryllidaceae	<i>Calostemma luteum</i>		SL		1	2	4/12/2013
12416	Equisetopsida	Amaryllidaceae	<i>Crinum flaccidum</i>	Murray lily	SL		0	2	1/01/2021

11769	Equisetopsida	Anacardiaceae	<i>Schinus terebinthifolius</i>				1	1	24/09/2021
12167	Equisetopsida	Apiaceae	<i>Actinotus gibbonsii</i>	dwarf flannel flower	C		1	1	2/01/2008
15150	Equisetopsida	Apiaceae	<i>Platysace ericoides</i>	heath platysace	C		1	1	10/05/2017
15277	Equisetopsida	Araliaceae	<i>Hydrocotyle acutiloba</i>		C		1	1	2/01/2008
42223	Equisetopsida	Araliaceae	<i>Hydrocotyle elegans</i>		C		1	1	8/04/2024
13587	Equisetopsida	Asparagaceae	<i>Lomandra confertifolia</i>		C		0	1	19/05/1998
14415	Equisetopsida	Asparagaceae	<i>Lomandra confertifolia</i> subsp. <i>pallida</i>		C		0	1	15/03/2000
16770	Equisetopsida	Asparagaceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		C		1	1	31/08/2006
12407	Equisetopsida	Asparagaceae	<i>Lomandra leucocephala</i>		C		0	2	16/03/2000
16774	Equisetopsida	Asparagaceae	<i>Lomandra leucocephala</i> subsp. <i>leucocephala</i>		C		0	1	15/12/2010
16776	Equisetopsida	Asparagaceae	<i>Lomandra longifolia</i>		C		1	4	7/11/2023
16777	Equisetopsida	Asparagaceae	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>		C		0	1	12/09/1997
17778	Equisetopsida	Asphodelaceae	<i>Bulbine alata</i>	native leek	C		0	1	5/12/2007
14014	Equisetopsida	Asphodelaceae	<i>Bulbine bulbosa</i>	golden lily	C		0	1	5/12/2007
41655	Equisetopsida	Asphodelaceae	<i>Bulbine fraseri</i>		C		1	1	23/07/2021
15644	Equisetopsida	Asteraceae	<i>Arctotheca calendula</i>	Cape weed			1	2	20/04/2023
7691	Equisetopsida	Asteraceae	<i>Bidens pilosa</i>				0	1	17/03/2011
9570	Equisetopsida	Asteraceae	<i>Brachyscome multifida</i>		C		2	2	20/04/2023
15598	Equisetopsida	Asteraceae	<i>Brachyscome whitei</i>		C		1	1	2/07/2024
15565	Equisetopsida	Asteraceae	<i>Calotis cuneifolia</i>	burr daisy	C		1	2	15/12/2010
15566	Equisetopsida	Asteraceae	<i>Calotis dentex</i>	white burr daisy	C		0	1	14/03/1999
15568	Equisetopsida	Asteraceae	<i>Calotis lappulacea</i>	yellow burr daisy	C		0	2	9/04/2021
10063	Equisetopsida	Asteraceae	<i>Calotis scapigera</i>	tufted burr daisy	C		1	1	19/04/2023
15572	Equisetopsida	Asteraceae	<i>Camptacra barbata</i>		C		1	1	28/11/2003

8398	Equisetopsida	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons	C		2	6	20/04/2023
10564	Equisetopsida	Asteraceae	<i>Cotula australis</i>	common cotula	C		1	1	20/04/2023
31386	Equisetopsida	Asteraceae	<i>Cymbonotus maidenii</i>		E		2	2	25/11/2022
34823	Equisetopsida	Asteraceae	<i>Eclipta platyglossa</i> subsp. <i>platyglossa</i>		C		0	1	5/12/2007
35905	Equisetopsida	Asteraceae	<i>Erigeron sumatrensis</i>				0	1	16/03/2000
31935	Equisetopsida	Asteraceae	<i>Hypochaeris albiflora</i>				1	1	26/03/2008
15245	Equisetopsida	Asteraceae	<i>Minuria integerrima</i>	smooth minuria	C		1	1	28/11/2003
41334	Equisetopsida	Asteraceae	<i>Olearia fulgens</i>		C		1	1	6/05/2020
8366	Equisetopsida	Asteraceae	<i>Ozothamnus diosmifolius</i>	white dogwood	C		1	1	7/12/2018
15107	Equisetopsida	Asteraceae	<i>Podolepis arachnoidea</i>	clustered copper-wire daisy	C		2	2	23/11/2022
8202	Equisetopsida	Asteraceae	<i>Pycnosorus globosus</i>		C		1	1	28/11/2003
22335	Equisetopsida	Asteraceae	<i>Rutidosia glandulosa</i>		NT		1	1	8/12/2022
30179	Equisetopsida	Asteraceae	<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>		C		1	2	20/04/2023
22236	Equisetopsida	Asteraceae	<i>Soliva sessilis</i>				1	1	20/04/2023
15039	Equisetopsida	Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle			0	1	17/03/2011
34624	Equisetopsida	Asteraceae	<i>Sphaeromorphaea australis</i>		C		0	1	15/12/2010
10456	Equisetopsida	Asteraceae	<i>Vittadinia cuneata</i> var. <i>hirsuta</i>		C		1	1	3/12/2018
12899	Equisetopsida	Asteraceae	<i>Vittadinia pterochaeta</i>	rough fuzzweed	C		1	1	23/07/2021
14958	Equisetopsida	Asteraceae	<i>Vittadinia pustulata</i>		C		2	2	3/12/2018
22235	Equisetopsida	Asteraceae	<i>Xanthium occidentale</i>				0	1	17/03/2011
10411	Equisetopsida	Asteraceae	<i>Zinnia peruviana</i>	wild zinnia			1	1	23/11/2022
8594	Equisetopsida	Boraginaceae	<i>Cynoglossum australe</i>		C		0	1	17/03/2011
36286	Equisetopsida	Boraginaceae	<i>Hackelia suaveolens</i>		C		1	1	18/09/2017
12221	Equisetopsida	Brassicaceae	<i>Lepidium bonariense</i>	Argentine peppergrass			1	1	19/04/2023

11630	Equisetopsida	Brassicaceae	<i>Rapistrum rugosum</i>				1	2	2/03/2020
29616	Equisetopsida	Byttneriaceae	<i>Seringia corollata</i>		C		1	1	18/05/2023
19352	Equisetopsida	Cactaceae	<i>Opuntia stricta</i>				0	2	15/10/2015
9535	Equisetopsida	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear			0	6	1/03/2016
36488	Equisetopsida	Campanulaceae	<i>Wahlenbergia capillaris</i>		SL		1	1	11/05/2018
15918	Equisetopsida	Campanulaceae	<i>Wahlenbergia gracilis</i>	spreading bluebell	SL		1	2	15/12/2010
13728	Equisetopsida	Campanulaceae	<i>Wahlenbergia graniticola</i>	granite bluebell	SL		1	2	19/04/2023
17668	Equisetopsida	Caryophyllaceae	<i>Cerastium glomeratum</i>	mouse ear chickweed			1	1	20/04/2023
16385	Equisetopsida	Caryophyllaceae	<i>Polycarpha corymbosa</i> var. <i>corymbosa</i>		C		1	1	24/09/2014
32458	Equisetopsida	Caryophyllaceae	<i>Spergularia brevifolia</i>		C		1	1	21/03/2014
18011	Equisetopsida	Casuarinaceae	<i>Allocasuarina inophloia</i>		C		1	22	10/07/2018
18012	Equisetopsida	Casuarinaceae	<i>Allocasuarina littoralis</i>		C		2	2	10/07/2018
18013	Equisetopsida	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak	C		1	78	10/07/2018
14748	Equisetopsida	Centrolepidaceae	<i>Centrolepis strigosa</i>		C		1	1	20/04/2023
32391	Equisetopsida	Chenopodiaceae	<i>Dysphania melanocarpa</i> forma <i>melanocarpa</i>		C		1	1	20/04/2017
34474	Equisetopsida	Chenopodiaceae	<i>Dysphania pumilio</i>		C		0	1	17/03/2011
9501	Equisetopsida	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>nutans</i>		C		0	1	16/03/2000
11390	Equisetopsida	Chenopodiaceae	<i>Sclerolaena birchii</i>	galvanised burr	C		0	1	15/12/2010
9607	Equisetopsida	Chenopodiaceae	<i>Sclerolaena muricata</i> var. <i>muricata</i>		C		1	1	25/07/2019
10032	Equisetopsida	Commelinaceae	<i>Commelina ciliata</i>		C		1	1	11/09/2023
16599	Equisetopsida	Commelinaceae	<i>Murdannia graminea</i>	murdannia	C		1	1	24/09/2014
40468	Equisetopsida	Cucurbitaceae	<i>Citrullus amarus</i>				0	1	17/03/2011
33901	Equisetopsida	Cucurbitaceae	<i>Cucumis picocarpus</i>		C		1	1	11/11/2024
8221	Equisetopsida	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine	C		1	145	24/09/2014

14785	Equisetopsida	Cyperaceae	<i>Bolboschoenus fluviatilis</i>		C		1	1	26/07/2019
9750	Equisetopsida	Cyperaceae	<i>Cyperus betchei</i> subsp. <i>betchei</i>		C		1	1	27/08/2019
17512	Equisetopsida	Cyperaceae	<i>Cyperus brevifolius</i>	Mullumbimby couch			0	1	15/12/2010
11060	Equisetopsida	Cyperaceae	<i>Cyperus concinnus</i>		C		1	1	27/08/2019
11451	Equisetopsida	Cyperaceae	<i>Cyperus dactyloides</i>		C		1	1	28/02/2023
17515	Equisetopsida	Cyperaceae	<i>Cyperus difformis</i>	rice sedge	C		1	1	28/08/2019
17519	Equisetopsida	Cyperaceae	<i>Cyperus fulvus</i>		C		1	1	30/08/2019
17521	Equisetopsida	Cyperaceae	<i>Cyperus gracilis</i>		C		0	1	17/03/2011
9366	Equisetopsida	Cyperaceae	<i>Cyperus gunnii</i> subsp. <i>gunnii</i>		C		1	1	21/09/2019
14669	Equisetopsida	Cyperaceae	<i>Cyperus victoriensis</i>		C		0	1	17/03/2011
17340	Equisetopsida	Cyperaceae	<i>Eleocharis cylindrostachys</i>		C		1	1	11/09/2019
11467	Equisetopsida	Cyperaceae	<i>Eleocharis pusilla</i>	small spikerush	C		1	1	27/09/2019
17107	Equisetopsida	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush	C		0	3	15/12/2010
17078	Equisetopsida	Cyperaceae	<i>Gahnia aspera</i>		C		0	3	14/03/1999
16941	Equisetopsida	Dilleniaceae	<i>Hibbertia linearis</i>		C		0	1	15/12/2010
34473	Equisetopsida	Droseraceae	<i>Drosera hookeri</i>		SL		1	1	19/01/2024
30299	Equisetopsida	Ericaceae	<i>Agiortia pleiosperma</i>		C		1	1	11/05/2020
17804	Equisetopsida	Ericaceae	<i>Brachyloma daphnoides</i>		C		2	3	2/01/2008
13593	Equisetopsida	Ericaceae	<i>Melichrus adpressus</i>		C		0	3	16/03/2000
16662	Equisetopsida	Ericaceae	<i>Melichrus urceolatus</i>	honey gorse	C		1	3	20/04/2023
41530	Equisetopsida	Ericaceae	<i>Styphelia mutica</i>		C		2	4	21/06/2021
42342	Equisetopsida	Ericaceae	<i>Styphelia sparsa</i>		C		1	5	27/11/2024
29696	Equisetopsida	Frullaniaceae	<i>Frullania probosciphora</i>		C		1	1	17/03/2022
14008	Equisetopsida	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion	SL		2	2	16/07/2009

17058	Equisetopsida	Goodeniaceae	<i>Goodenia bellidifolia</i> subsp. <i>argentea</i>		C		1	1	19/08/2021
11018	Equisetopsida	Goodeniaceae	<i>Goodenia delicata</i>		C		1	1	19/08/2021
17059	Equisetopsida	Goodeniaceae	<i>Goodenia fascicularis</i>		C		1	1	28/11/2003
17060	Equisetopsida	Goodeniaceae	<i>Goodenia glabra</i>		C		0	1	15/12/2010
9906	Equisetopsida	Goodeniaceae	<i>Goodenia glauca</i>		C		0	1	21/05/1998
11010	Equisetopsida	Goodeniaceae	<i>Goodenia gracilis</i>		C		1	1	21/05/2025
17062	Equisetopsida	Goodeniaceae	<i>Goodenia hederacea</i> subsp. <i>hederacea</i>		C		0	1	15/03/2000
10696	Equisetopsida	Haloragaceae	<i>Gonocarpus urceolatus</i>		C		8	16	31/07/2012
17017	Equisetopsida	Haloragaceae	<i>Haloragis heterophylla</i>	rough raspweed	C		1	1	20/04/2023
13020	Equisetopsida	Hemerocallidaceae	<i>Caesia parviflora</i> var. <i>vittata</i>		C		1	1	15/05/2008
10281	Equisetopsida	Hemerocallidaceae	<i>Dianella longifolia</i>		C		0	3	15/12/2010
15974	Equisetopsida	Hemerocallidaceae	<i>Tricoryne elatior</i>	yellow autumn lily	C		1	1	15/05/2008
15283	Equisetopsida	Hypericaceae	<i>Hypericum gramineum</i>		C		1	1	20/04/2023
8127	Equisetopsida	Juncaceae	<i>Juncus ochrocoleus</i>		C		2	2	21/01/2022
12132	Equisetopsida	Juncaceae	<i>Juncus subsecundus</i>		C		1	1	11/07/2018
16846	Equisetopsida	Juncaceae	<i>Juncus usitatus</i>		C		0	1	17/03/2011
41035	Equisetopsida	Lamiaceae	<i>Coleus australis</i>		C		1	1	11/08/2021
36562	Equisetopsida	Lamiaceae	<i>Teucrium daucoides</i>		C		1	1	30/06/2023
14963	Equisetopsida	Lamiaceae	<i>Westringia cheelii</i>		C		1	1	12/08/2021
14436	Equisetopsida	Laxmanniaceae	<i>Laxmannia compacta</i>		C		1	1	16/04/2019
15784	Equisetopsida	Leguminosae	<i>Acacia caroleae</i>		C		1	1	27/02/2020
14903	Equisetopsida	Leguminosae	<i>Acacia chinchillensis</i>		C		2	2	6/03/2020
14932	Equisetopsida	Leguminosae	<i>Acacia conferta</i>		C		1	5	27/02/2020
9654	Equisetopsida	Leguminosae	<i>Acacia crassa</i>		C		0	2	15/03/2000

15792	Equisetopsida	Leguminosae	<i>Acacia crassa</i> <i>subsp. crassa</i>		C		1	1	27/02/2020
14936	Equisetopsida	Leguminosae	<i>Acacia excelsa</i> <i>subsp. angusta</i>		C		1	1	9/03/2020
6372	Equisetopsida	Leguminosae	<i>Acacia juncifolia</i>		C		1	1	18/04/2020
14066	Equisetopsida	Leguminosae	<i>Acacia leiocalyx</i> <i>subsp. leiocalyx</i>		C		1	1	18/04/2020
15724	Equisetopsida	Leguminosae	<i>Acacia muelleriana</i>		C		0	1	16/03/2000
15727	Equisetopsida	Leguminosae	<i>Acacia neriifolia</i>	pechey wattle	C		2	11	5/05/2020
14872	Equisetopsida	Leguminosae	<i>Acacia polybotrya</i>	western silver wattle	C		1	1	5/05/2020
14891	Equisetopsida	Leguminosae	<i>Acacia spectabilis</i>	pilliga wattle	C		1	1	20/04/2023
15700	Equisetopsida	Leguminosae	<i>Acacia stenophylla</i>	belalie	C		0	1	17/03/2011
34542	Equisetopsida	Leguminosae	<i>Bossiaea concolor</i>		C		1	1	14/11/2012
5838	Equisetopsida	Leguminosae	<i>Cullen patens</i>	bullamon lucerne	C		1	1	28/11/2003
15444	Equisetopsida	Leguminosae	<i>Daviesia genistifolia</i>	broom bitter pea	C		1	1	20/04/2023
2105	Equisetopsida	Leguminosae	<i>Daviesia ulicifolia</i> <i>subsp. stenophylla</i>		C		2	2	20/04/2023
15460	Equisetopsida	Leguminosae	<i>Desmodium</i> <i>rhytidophyllum</i>		C		0	1	16/03/2000
13935	Equisetopsida	Leguminosae	<i>Desmodium varians</i>	slender tick trefoil	C		0	1	15/12/2010
11004	Equisetopsida	Leguminosae	<i>Glycine latifolia</i>		C		0	1	17/03/2011
15356	Equisetopsida	Leguminosae	<i>Glycine tabacina</i>	glycine pea	C		1	1	16/08/2004
15357	Equisetopsida	Leguminosae	<i>Glycine tomentella</i>	woolly glycine	C		0	1	15/12/2010
15260	Equisetopsida	Leguminosae	<i>Jacksonia scoparia</i>		C		0	4	16/03/2000
15204	Equisetopsida	Leguminosae	<i>Neptunia gracilis</i>		C		1	2	28/11/2022
15068	Equisetopsida	Leguminosae	<i>Senna aciphylla</i>	Australian senna	C		2	2	31/08/2006
15069	Equisetopsida	Leguminosae	<i>Senna barclayana</i>		C		0	1	17/03/2011
18750	Equisetopsida	Leguminosae	<i>Sesbania cannabina</i>		C		0	1	17/03/2011
34114	Equisetopsida	Leguminosae	<i>Vachellia farnesiana</i>				0	11	15/10/2015

33172	Equisetopsida	Leguminosae	<i>Vigna suberecta</i>		C		1	1	10/03/2010
14847	Equisetopsida	Loranthaceae	<i>Amyema cambagei</i>		C		1	1	30/07/2021
14057	Equisetopsida	Loranthaceae	<i>Amyema linophylla</i> subsp. <i>orientalis</i>		C		1	1	10/08/2021
16727	Equisetopsida	Macarthuriaceae	<i>Macarthuria neocambrica</i>		C		1	1	18/01/2022
16960	Equisetopsida	Malvaceae	<i>Hibiscus sturtii</i>		C		1	1	28/11/2003
16146	Equisetopsida	Malvaceae	<i>Sida rhombifolia</i>				0	1	17/03/2011
22199	Equisetopsida	Malvaceae	<i>Sida</i> sp. (Musselbrook M.B.Thomas+ MRS437)		C		1	2	16/09/2010
11689	Equisetopsida	Marsileaceae	<i>Marsilea drummondii</i>	common nardoo	C		1	2	24/11/2019
12433	Equisetopsida	Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed	C		0	1	17/03/2011
33123	Equisetopsida	Myrsinaceae	<i>Lysimachia arvensis</i>				1	1	27/06/2022
17998	Equisetopsida	Myrtaceae	<i>Angophora floribunda</i>	rough-barked apple	C		0	18	16/03/2000
17999	Equisetopsida	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum	C		0	12	16/03/2000
42283	Equisetopsida	Myrtaceae	<i>Blakella tessellaris</i>		C		0	1	15/12/2010
17764	Equisetopsida	Myrtaceae	<i>Calytrix longiflora</i>	pink fringe myrtle	C		1	1	17/07/2021
17766	Equisetopsida	Myrtaceae	<i>Calytrix tetragona</i>	fringe myrtle	C		0	1	21/05/1998
6534	Equisetopsida	Myrtaceae	<i>Corymbia clarksoniana</i>		C		0	2	14/03/1999
6443	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>trachyphloia</i>		C		2	19	13/06/2020
17247	Equisetopsida	Myrtaceae	<i>Eucalyptus camaldulensis</i>		C		0	1	17/03/2011
17249	Equisetopsida	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum	C		0	19	16/03/2000
12506	Equisetopsida	Myrtaceae	<i>Eucalyptus conica</i>	fuzzy box	C		2	2	9/07/2020
17252	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark	C		1	9	13/06/2020
17256	Equisetopsida	Myrtaceae	<i>Eucalyptus curtisii</i>	Plunkett mallee	NT		1	1	15/12/2022
30502	Equisetopsida	Myrtaceae	<i>Eucalyptus elegans</i>		C		1	1	24/06/2020
17262	Equisetopsida	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint	C		0	11	16/03/2000

12500	Equisetopsida	Myrtaceae	<i>Eucalyptus fibrosa</i> <i>subsp. fibrosa</i>		C		0	5	15/03/2000
17188	Equisetopsida	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box	C		1	2	8/05/2020
8906	Equisetopsida	Myrtaceae	<i>Eucalyptus rhombica</i>		C		1	2	23/09/2022
17204	Equisetopsida	Myrtaceae	<i>Eucalyptus tereticornis</i>		C		0	1	15/12/2010
42159	Equisetopsida	Myrtaceae	<i>Gaudium lamellatum</i>		C		1	1	14/08/2023
14480	Equisetopsida	Myrtaceae	<i>Kunzea opposita</i>		C		0	2	16/03/2000
18863	Equisetopsida	Myrtaceae	<i>Kunzea opposita</i> <i>var. opposita</i>		C		2	3	25/10/2023
16744	Equisetopsida	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo	C		2	9	17/07/2021
13592	Equisetopsida	Myrtaceae	<i>Melaleuca decora</i>		C		2	5	12/09/2024
12869	Equisetopsida	Nyctaginaceae	<i>Boerhavia dominii</i>		C		1	1	28/11/2003
6877	Equisetopsida	Nyctaginaceae	<i>Boerhavia</i> sp. (St George A.Hill AQ399299)		C		0	1	17/03/2011
33129	Equisetopsida	Oleaceae	<i>Jasminum dianthifolium</i>		C		0	1	17/03/2011
13420	Equisetopsida	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose	C		0	1	17/03/2011
9457	Equisetopsida	Oxalidaceae	<i>Oxalis corniculata</i>				0	1	15/12/2010
12740	Equisetopsida	Oxalidaceae	<i>Oxalis perennans</i>		C		1	2	8/06/2022
16409	Equisetopsida	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera	C		1	1	20/04/2023
16479	Equisetopsida	Phytolaccaceae	<i>Phytolacca octandra</i>	inkweed			1	1	8/07/2022
16505	Equisetopsida	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree	C		0	4	15/12/2010
22227	Equisetopsida	Pittosporaceae	<i>Bursaria spinosa</i> <i>subsp. spinosa</i>		C		1	2	23/09/2021
15670	Equisetopsida	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass	C		0	1	16/03/2000
11117	Equisetopsida	Poaceae	<i>Aristida acuta</i>		C		0	1	16/03/2000
15649	Equisetopsida	Poaceae	<i>Aristida calycina</i> <i>var. calycina</i>		C		0	2	15/03/2000
15650	Equisetopsida	Poaceae	<i>Aristida caput-medusae</i>		C		1	3	14/03/2022
15652	Equisetopsida	Poaceae	<i>Aristida holathera</i> <i>var. holathera</i>		C		0	1	16/03/2000

9349	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i>		C		0	1	15/12/2010
15655	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>		C		0	4	15/03/2000
8934	Equisetopsida	Poaceae	<i>Aristida personata</i>		C		1	1	28/08/2019
11124	Equisetopsida	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>		C		1	1	29/08/2019
9661	Equisetopsida	Poaceae	<i>Aristida ramosa</i>	purple wiregrass	C		1	1	29/08/2019
15658	Equisetopsida	Poaceae	<i>Aristida vagans</i>		C		0	3	16/03/2000
9979	Equisetopsida	Poaceae	<i>Bothriochloa biloba</i>		C		2	2	9/03/2020
15606	Equisetopsida	Poaceae	<i>Bothriochloa pertusa</i>				0	1	24/06/2021
33785	Equisetopsida	Poaceae	<i>Cenchrus spinifex</i>				1	1	24/01/2020
15551	Equisetopsida	Poaceae	<i>Chloris gayana</i>	rhodes grass			0	1	17/03/2011
15526	Equisetopsida	Poaceae	<i>Chloris ventricosa</i>	tall chloris	C		1	1	24/10/2019
15531	Equisetopsida	Poaceae	<i>Chrysopogon fallax</i>		C		0	1	12/09/1997
22332	Equisetopsida	Poaceae	<i>Chrysopogon filipes</i>		C		1	1	14/02/2022
15498	Equisetopsida	Poaceae	<i>Cleistochloa subjuncea</i>		C		1	2	27/07/2021
15485	Equisetopsida	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass	C		0	4	16/03/2000
15486	Equisetopsida	Poaceae	<i>Cynodon dactylon</i>				0	1	17/03/2011
15467	Equisetopsida	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>		C		1	3	6/03/2020
10403	Equisetopsida	Poaceae	<i>Dichelachne crinita</i>	longhair plumegrass	C		0	1	16/03/2000
15424	Equisetopsida	Poaceae	<i>Digitaria divaricatissima</i>	spreading umbrella grass	C		1	1	15/01/2020
14599	Equisetopsida	Poaceae	<i>Digitaria porrecta</i>		NT		1	1	20/01/2022
14567	Equisetopsida	Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass			1	1	24/11/2019
33788	Equisetopsida	Poaceae	<i>Entolasia minutifolia</i>		C		1	1	14/03/2022
15411	Equisetopsida	Poaceae	<i>Entolasia stricta</i>	wiry panic	C		0	1	16/03/2000
15390	Equisetopsida	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass	C		0	5	16/03/2000

15391	Equisetopsida	Poaceae	<i>Eragrostis ciliaris</i>				1	1	10/09/2019
15359	Equisetopsida	Poaceae	<i>Eragrostis curvula</i>				0	1	15/12/2010
15361	Equisetopsida	Poaceae	<i>Eragrostis elongata</i>		C		1	4	21/09/2019
15364	Equisetopsida	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass	C		1	1	25/01/2021
15371	Equisetopsida	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass	C		1	1	5/01/2022
15330	Equisetopsida	Poaceae	<i>Eriochloa crebra</i>	spring grass	C		0	1	17/03/2011
15336	Equisetopsida	Poaceae	<i>Eulalia aurea</i>	silky browntop	C		0	1	21/05/1998
15320	Equisetopsida	Poaceae	<i>Heteropogon contortus</i>	black speargrass	C		0	1	15/12/2010
15802	Equisetopsida	Poaceae	<i>Hyparrhenia hirta</i>	coolati grass			1	1	18/04/2020
29093	Equisetopsida	Poaceae	<i>Megathyrsus maximus</i>				0	1	15/12/2010
13607	Equisetopsida	Poaceae	<i>Panicum effusum</i>		C		0	1	19/05/1998
15176	Equisetopsida	Poaceae	<i>Panicum larcomianum</i>		C		1	1	14/02/2022
10870	Equisetopsida	Poaceae	<i>Panicum queenslandicum</i> var. <i>queenslandicum</i>		C		1	1	15/11/2019
10256	Equisetopsida	Poaceae	<i>Paspalidium aversum</i>		C		1	1	15/12/2019
14345	Equisetopsida	Poaceae	<i>Paspalidium distans</i>	shotgrass	C		0	1	17/03/2011
11418	Equisetopsida	Poaceae	<i>Paspalidium jubiflorum</i>	warrego grass	C		0	1	17/03/2011
15056	Equisetopsida	Poaceae	<i>Schizachyrium fragile</i>	firegrass	C		0	1	16/03/2000
15042	Equisetopsida	Poaceae	<i>Sorghum bicolor</i>	forage sorghum			1	1	6/08/2015
22166	Equisetopsida	Poaceae	<i>Sporobolus sessilis</i>		C		0	1	16/03/2000
27672	Equisetopsida	Poaceae	<i>Walwhalleya subxerophila</i>		C		1	1	10/01/2020
14351	Equisetopsida	Polygonaceae	<i>Persicaria orientalis</i>	princes feathers	C		1	1	11/11/2004
16271	Equisetopsida	Polygonaceae	<i>Rumex brownii</i>	swamp dock	C		1	2	7/12/2018
13066	Equisetopsida	Polygonaceae	<i>Rumex dumosus</i>	wiry dock	C		1	1	28/11/2003
16359	Equisetopsida	Portulacaceae	<i>Portulaca oleracea</i>	pigweed			0	1	17/03/2011

6485	Equisetopsida	Proteaceae	<i>Banksia integrifolia</i> <i>subsp. compar</i>		C		3	3	30/06/2023
22354	Equisetopsida	Proteaceae	<i>Hakea lorea</i> <i>subsp. lorea</i>		C		1	1	19/05/2025
16500	Equisetopsida	Proteaceae	<i>Persoonia sericea</i>	silky geebung	C		1	1	6/08/2015
15892	Equisetopsida	Proteaceae	<i>Xylomelum cunninghamianum</i>		C		2	3	25/10/2023
17679	Equisetopsida	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern	C		0	1	16/03/2000
17682	Equisetopsida	Pteridaceae	<i>Cheilanthes sieberi</i> <i>subsp. sieberi</i>		C		0	4	15/12/2010
41591	Equisetopsida	Pteridaceae	<i>Pteris platyzomopsis</i>		SL		4	4	25/10/2023
27648	Equisetopsida	Ranunculaceae	<i>Ranunculus meristus</i>		C		1	1	19/04/2023
9659	Equisetopsida	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree	C		2	4	18/07/2022
13231	Equisetopsida	Rhamnaceae	<i>Cryptandra amara</i>		C		0	1	8/07/2009
33970	Equisetopsida	Rhamnaceae	<i>Cryptandra propinqua</i> <i>subsp. maranoa</i>		C		1	1	19/05/2011
17936	Equisetopsida	Rubiaceae	<i>Asperula conferta</i>		C		1	2	19/04/2023
16543	Equisetopsida	Rubiaceae	<i>Opercularia diphylla</i>		C		1	1	20/04/2023
16407	Equisetopsida	Rubiaceae	<i>Pomax umbellata</i>		C		1	7	20/04/2023
29838	Equisetopsida	Rubiaceae	<i>Psydrax odorata</i> <i>forma subnitida</i>		C		2	2	10/05/2017
17834	Equisetopsida	Rutaceae	<i>Boronia glabra</i>		C		1	1	5/12/2022
41636	Equisetopsida	Rutaceae	<i>Cyanothamnus occidentalis</i>		C		1	1	4/06/2021
17180	Equisetopsida	Santalaceae	<i>Exocarpos cupressiformis</i>	native cherry	C		1	1	28/11/2003
13244	Equisetopsida	Sapindaceae	<i>Dodonaea biloba</i>		C		1	1	27/07/2021
14610	Equisetopsida	Sapindaceae	<i>Dodonaea heteromorpha</i>		C		2	2	27/07/2021
13655	Equisetopsida	Sapindaceae	<i>Dodonaea macrossanii</i>		C		1	1	27/07/2021
16736	Equisetopsida	Solanaceae	<i>Lycium ferocissimum</i>	African boxthorn			0	3	15/10/2015
16476	Equisetopsida	Solanaceae	<i>Physalis lanceifolia</i>				0	1	17/03/2011
16165	Equisetopsida	Solanaceae	<i>Solanum ellipticum</i>	potato bush	C		1	1	5/12/2022

16166	Equisetopsida	Solanaceae	<i>Solanum esuriale</i>	quena	C		0	1	19/05/1998
13788	Equisetopsida	Solanaceae	<i>Solanum nigrum</i>				0	1	15/12/2010
29794	Equisetopsida	Solanaceae	<i>Solanum stenopterum</i>		E		3	4	9/01/2023
34284	Equisetopsida	Verbenaceae	<i>Glandularia aristigera</i>				1	2	30/06/2023
7796	Equisetopsida	Verbenaceae	<i>Phyla canescens</i>				1	2	30/06/2023
14159	Equisetopsida	Zygophyllaceae	<i>Tribulus micrococcus</i>	yellow vine	C		0	1	17/03/2011

Table 4. Fungi recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
40897	Agaricomycetes	Botryobasidiaceae	<i>Botryobasidium</i>		C		3	3	13/07/2023
25903	Agaricomycetes	Geastraceae	<i>Geastrum</i>		C		1	1	30/07/2018
28065	Agaricomycetes	Gloeophyllaceae	<i>Gloeophyllum abietinum</i>		C		1	1	30/07/2018
33547	Agaricomycetes	Hymenochaetaeaceae	<i>Fomitiporia robusta</i>		C		1	1	30/07/2018
26699	Agaricomycetes	Hymenochaetaeaceae	<i>Hymenochaetaeaceae</i>		C		2	2	14/07/2023
28618	Agaricomycetes	Lycoperdaceae	<i>Mycenastrum corium</i>		C		1	1	30/07/2018
27416	Agaricomycetes	Meripilaceae	<i>Rigidoporus lineatus</i>		C		1	1	30/07/2018
23098	Lecanoromycetes	Caliciaceae	<i>Dirinaria confluens</i>		C		1	1	14/12/2009
23536	Lecanoromycetes	Caliciaceae	<i>Pyxine petricola</i>		C		2	2	7/12/2018
23016	Lecanoromycetes	Cladoniaceae	<i>Cladia aggregata</i>		C		1	1	1/09/2022
23239	Lecanoromycetes	Lecideaceae	<i>Lecidea ochroleuca</i>		C		1	1	16/03/2022
23117	Lecanoromycetes	Parmeliaceae	<i>Flavoparmelia rutidota</i>		C		1	1	25/01/2012
24288	Lecanoromycetes	Parmeliaceae	<i>Parmotrema judithae</i>		C		1	1	2/09/2022
27119	Lecanoromycetes	Parmeliaceae	<i>Punctelia pseudocoralloidea</i>		C		1	1	2/09/2022
23507	Lecanoromycetes	Parmeliaceae	<i>Punctelia subflava</i>		C		1	1	2/09/2022
28306	Lecanoromycetes	Parmeliaceae	<i>Usnea scabrida</i>		C		1	1	23/08/2018
23799	Lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia barbatica</i>		C		1	1	14/10/2005
23808	Lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia flavescentireagens</i>		C		1	1	14/10/2005
23823	Lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia scabrosa</i>		C		1	1	14/10/2005
29993	Lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia semiviridis</i>		C		1	1	28/07/2009
23828	Lecanoromycetes	Parmeliaceae	<i>Xanthoparmelia tasmanica</i>		C		1	1	14/10/2005
30994	Lecanoromycetes	Stereocaulaceae	<i>Hertelidea wankaensis</i>		C		2	2	23/05/2007
22989	Lecanoromycetes	Teloschistaceae	<i>Caloplaca cerina</i>		C		1	1	1/09/2022

Table 5. Other species recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
30343	Bacillariophyceae	Achnanthidiaceae	<i>Achnanthidium minutissimum</i>		C		0	1	23/11/2001
30443	Bacillariophyceae	Bacillariaceae	<i>Hantzschia amphioxys</i>		C		0	1	23/11/2001
30464	Bacillariophyceae	Bacillariaceae	<i>Nitzschia amphibia</i>		C		0	1	23/11/2001
30650	Bacillariophyceae	Bacillariaceae	<i>Nitzschia filiformis</i>		C		0	1	6/04/2001
30594	Bacillariophyceae	Bacillariaceae	<i>Nitzschia fonticola</i>		C		0	2	6/04/2001
30668	Bacillariophyceae	Bacillariaceae	<i>Nitzschia frustulum</i>		C		0	3	23/11/2001
30508	Bacillariophyceae	Bacillariaceae	<i>Nitzschia gracilis</i>		C		0	2	23/11/2001
30550	Bacillariophyceae	Bacillariaceae	<i>Nitzschia inconspicua</i>		C		0	1	23/11/2001
30651	Bacillariophyceae	Bacillariaceae	<i>Nitzschia intermedia</i>		C		0	1	6/04/2001
30741	Bacillariophyceae	Bacillariaceae	<i>Nitzschia palea</i>		C		0	4	23/11/2001
30684	Bacillariophyceae	Bacillariaceae	<i>Nitzschia paleacea</i>		C		0	1	23/11/2001
30558	Bacillariophyceae	Bacillariaceae	<i>Tryblionella calida</i>		C		0	1	6/04/2001
30563	Bacillariophyceae	Bacillariaceae	<i>Tryblionella hungarica</i>		C		0	1	23/11/2001
30387	Bacillariophyceae	Catenulaceae	<i>Amphora coffeaeformis</i>		C		0	3	23/11/2001
30578	Bacillariophyceae	Fragilariaceae	<i>Synedra ulna</i>		C		0	2	23/11/2001
30403	Bacillariophyceae	Gomphonemataceae	<i>Encyonema mesiana</i>		C		0	1	6/04/2001
30467	Bacillariophyceae	Gomphonemataceae	<i>Gomphonema lagenula</i>		C		0	3	23/11/2001
30353	Bacillariophyceae	Gomphonemataceae	<i>Gomphonema parvulum</i>		C		0	2	23/11/2001
30381	Bacillariophyceae	Naviculaceae	<i>Caloneis bacillum</i>		C		0	1	23/11/2001
30334	Bacillariophyceae	Naviculaceae	<i>Hippodonta capitata</i>		C		0	1	23/11/2001
30375	Bacillariophyceae	Naviculaceae	<i>Navicula cryptocephala</i>		C		0	1	23/11/2001
30411	Bacillariophyceae	Naviculaceae	<i>Navicula elginensis</i>		C		0	1	23/11/2001
30428	Bacillariophyceae	Naviculaceae	<i>Navicula libonensis</i>		C		0	2	6/04/2001
30426	Bacillariophyceae	Naviculaceae	<i>Navicula menisculus</i>		C		0	1	6/04/2001

30420	Bacillariophyceae	Naviculaceae	<i>Navicula schroeterii</i>		C		0	3	23/11/2001
30368	Bacillariophyceae	Naviculaceae	<i>Navicula veneta</i>		C		0	1	23/11/2001
30439	Bacillariophyceae	Naviculaceae	<i>Navicula viridula</i>		C		0	5	23/11/2001
30363	Bacillariophyceae	Rhopalodiaceae	<i>Epithemia adnata</i>		C		0	2	23/11/2001
30534	Bacillariophyceae	Rhopalodiaceae	<i>Rhopalodia gibba</i>		C		0	2	23/11/2001
30707	Bacillariophyceae	Rhopalodiaceae	<i>Rhopalodia musculus</i>		C		0	1	23/11/2001
30474	Bacillariophyceae	Sellaphoraceae	<i>Fallacia tenera</i>		C		0	2	23/11/2001
30708	Bacillariophyceae	Sellaphoraceae	<i>Sellaphora seminulum</i>		C		0	2	23/11/2001
30364	Bacillariophyceae	Stauroneidaceae	<i>Craticula halophila</i>		C		0	2	6/04/2001
30503	Bacillariophyceae	Ulnariaceae	<i>Tabularia fasciculata</i>		C		0	1	23/11/2001
30456	Coscinodiscophyceae	Aulacoseiraceae	<i>Aulacoseira ambigua</i>		C		0	1	23/11/2001
30355	Coscinodiscophyceae	Aulacoseiraceae	<i>Aulacoseira granulata</i>		C		0	1	23/11/2001
30383	Coscinodiscophyceae	Aulacoseiraceae	<i>Aulacoseira subarctica forma subborealis</i>		C		0	1	6/04/2001
30440	Coscinodiscophyceae	Melosiraceae	<i>Melosira varians</i>		C		0	4	23/11/2001
30695	Cyanophyceae	Nostocaceae	<i>Anabaena ambigua</i>		C		0	1	23/11/2001
30659	Cyanophyceae	Oscillatoriaceae	<i>Phormidium retzii</i>		C		0	1	23/11/2001
30477	Mediophyceae	Stephanodiscaceae	<i>Cyclotellina tholiformis</i>		C		0	2	23/11/2001
30478	Mediophyceae	Stephanodiscaceae	<i>Cyclotella meneghiniana</i>		C		0	1	6/04/2001
30471	Mediophyceae	Stephanodiscaceae	<i>Cyclotella stelligera</i>		C		0	1	23/11/2001

Species table headings and codes

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Least Concern (C), Critically Endangered (CR), Endangered (E), Extinct (EX), Near Threatened (NT), Extinct in the Wild (PE), Special Least Concern (SL), and Vulnerable (V)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Vulnerable (V), and Extinct in the Wild (XW)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [WildNet Application](#) - public interface to find species information and species lists generated from the WildNet database.
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld WildNet Data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [Wetland Maps](#) - view species records, survey locations etc. approved for publication
- [Wetland Summary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
- [WildNet wildlife records - published - Queensland](#) - spatial layer of WildNet records approved for publication generated weekly
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the WildNet Team WildNet@detsi.qld.gov.au.

Other useful sites for accessing Queensland biodiversity data include:

- [Useful wildlife resources](#)
- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australasian Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

Disclaimer

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WildNet Records Species List

For the selected area of interest 88727.34 Custom input
Current as at 05/12/2025 SpeciesListPt2

Summary Information

The following table provides an overview of the area of interest: Custom input

Table 1. Area of interest details

Size (ha)	
88,727.34	
Local Government(s)	
Toowoomba Regional	
Western Downs Regional	
Catchment(s)	
Border Rivers	
Balonne-Condamine	
Moonie	
Bioregion(s)	Subregion(s)
Brigalow Belt	Inglewood Sandstones

Protected Area(s) The following estates and/or reserves are located in the area of interest:

Dunmore State Forest
Kumbarilla State Forest
Western Creek State Forest

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Introduction

This WildNet report is derived from a spatial layer that is generated from the [WildNet database](#), managed by the Department of the Environment, Tourism, Science and Innovation. The layer, which is generated weekly, contains a subset of WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero. It does not include aspatial data such as some baseline species lists created for some protected areas.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest.

The [WildNet Application](#) may provide additional information on species occurrence within your area of interest.

Species data

Contextual location information is presented in Map 1.

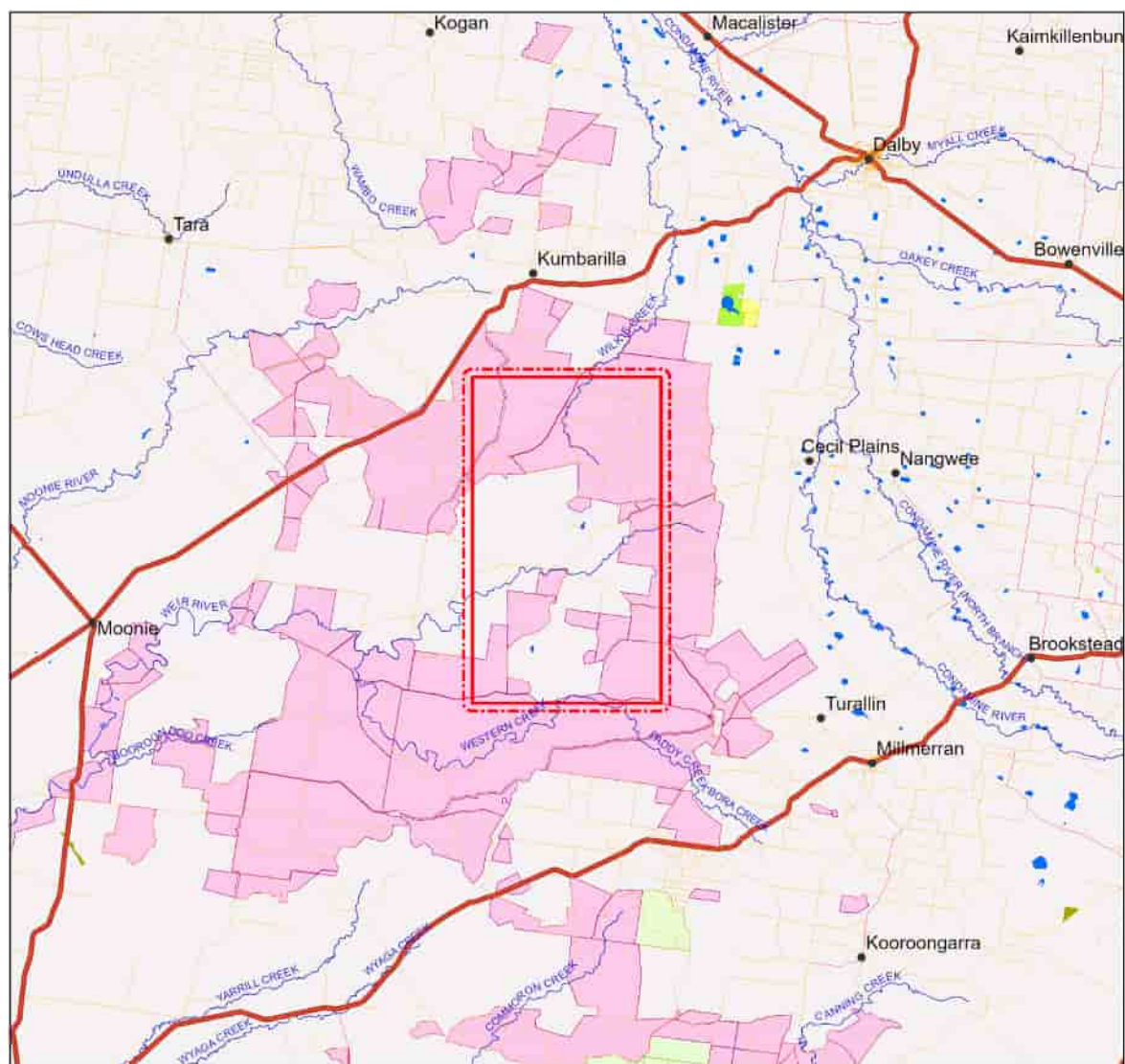
Table 2 lists the animals recorded within the area of interest and its one kilometre buffer.

Table 3 lists the plants recorded within the area of interest and its one kilometre buffer.

Table 4 lists the fungi recorded within the area of interest and its one kilometre buffer.

Table 5 lists the other species recorded within the area of interest and its one kilometre buffer.

Map 1. Locality Map



Locality Map

Legend

- Towns
 Freeways/Highways
 Connector
 Street/Local Road
 Lakes and reservoirs
 National Park
 National Park (Scientific)
 National Park (CYPAL)
 National Park (Aboriginal Land)
 Conservation Park
 Resources Reserve
 Forest Reserve
 State Forest
 Timber Reserve
 Nature Refuges
 Coordinated Conservation Areas
 Major rivers/creeks
 Queensland
 Custom area
 1 kilometre buffer



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This product is displayed in GDA2020

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Table 2. Animals recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
27055	Actinopterygii	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish			0	1	12/07/2017
716	Amphibia	Bufonidae	<i>Rhinella marina</i>	cane toad			0	1	23/01/2011
624	Amphibia	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog	C		0	2	20/11/2008
643	Amphibia	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog	C		0	3	20/11/2008
620	Amphibia	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog	C		0	4	28/02/2015
623	Amphibia	Hylidae	<i>Cyclorana verrucosa</i>	rough collared frog	C		0	1	20/11/2008
627	Amphibia	Hylidae	<i>Litoria caerulea</i>	common green treefrog	C		0	2	19/12/1999
614	Amphibia	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog	C		2	12	5/11/2023
604	Amphibia	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog	C		0	1	28/02/2015
600	Amphibia	Hylidae	<i>Litoria rubella</i>	ruddy treefrog	C		0	8	6/11/2023
681	Amphibia	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog	C		1	1	28/12/2021
682	Amphibia	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog	C		0	1	20/11/2008
684	Amphibia	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog	C		2	9	8/04/2021
673	Amphibia	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk	C		0	6	20/11/2008
667	Amphibia	Limnodynastidae	<i>Neobatrachus sudellae</i>	meeowing frog	C		0	1	20/11/2008
680	Amphibia	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog	C		0	7	6/05/2010
696	Amphibia	Myobatrachidae	<i>Crinia parinsignifera</i>	beeping froglet	C		1	6	28/12/2021
698	Amphibia	Myobatrachidae	<i>Crinia signifera</i>	clicking froglet	C		0	1	1/12/1997
639	Amphibia	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan	C		0	3	20/11/2008
1418	Aves	Acanthizidae	<i>Acanthiza apicalis</i>	inland thornbill	C		0	8	30/11/2009
1419	Aves	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	C		0	3	31/05/2005
1422	Aves	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill	C		0	25	6/11/2023
1423	Aves	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill	C		0	1	25/08/1994

1425	Aves	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill	C		0	17	20/11/2008
1412	Aves	Acanthizidae	<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill	C		0	3	20/11/2008
1407	Aves	Acanthizidae	<i>Gerygone fusca</i>	western gerygone	C		0	2	25/08/2001
1396	Aves	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone	C		0	12	6/11/2023
1403	Aves	Acanthizidae	<i>Pyrrholaemus sagittatus</i>	speckled warbler	C		0	18	6/02/2021
1371	Aves	Acanthizidae	<i>Smicromis brevirostris</i>	weebill	C		0	32	5/11/2023
1729	Aves	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk	C		0	1	25/08/1994
1732	Aves	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle	C		0	2	25/08/1994
1725	Aves	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite	C		0	2	12/05/2001
1726	Aves	Accipitridae	<i>Elanus scriptus</i>	letter-winged kite	C		0	1	1/12/1997
1707	Aves	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite	C		0	1	12/05/2001
1973	Aves	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar	C		0	9	23/04/2011
1776	Aves	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher	C		0	1	1/12/1997
1767	Aves	Alcedinidae	<i>Dacelo novaeguineae</i>	laughing kookaburra	C		0	17	5/11/2023
1762	Aves	Alcedinidae	<i>Todiramphus sanctus</i>	sacred kingfisher	C		0	4	18/12/1999
1993	Aves	Anatidae	<i>Anas gracilis</i>	grey teal	C		0	4	31/05/2005
1998	Aves	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C		0	4	31/05/2005
2003	Aves	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C		0	3	18/12/1999
1978	Aves	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck	C		0	1	18/12/1999
1279	Aves	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter	C		0	2	31/05/2005
1965	Aves	Apodidae	<i>Apus pacificus</i>	fork-tailed swift	SL		0	1	1/12/1997
1971	Aves	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail	V	V	0	5	19/12/1999
1831	Aves	Ardeidae	<i>Ardea intermedia</i>	intermediate egret	C		0	1	20/12/2013
1832	Aves	Ardeidae	<i>Ardea pacifica</i>	white-necked heron	C		0	4	12/07/2017

1826	Aves	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron	C		0	3	5/11/2023
1658	Aves	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow	C		0	2	22/08/1994
1659	Aves	Artamidae	<i>Artamus cyanopterus</i>	dusky woodswallow	C		0	1	22/08/1994
1660	Aves	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow	C		0	1	12/07/2017
1646	Aves	Artamidae	<i>Artamus minor</i>	little woodswallow	C		0	1	19/12/1999
1649	Aves	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow	C		0	1	20/12/2013
1654	Aves	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird	C		0	6	20/11/2008
1656	Aves	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird	C		0	28	5/11/2023
1644	Aves	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	C		0	11	19/03/2021
1645	Aves	Artamidae	<i>Strepera graculina</i>	piebald currawong	C		0	25	6/11/2023
1956	Aves	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew	C		0	3	19/12/1999
1191	Aves	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo	C		0	15	6/11/2023
22494	Aves	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)	V	V	0	2	28/03/2000
1193	Aves	Cacatuidae	<i>Eolophus roseicapilla</i>	galah	C		0	8	20/11/2008
1173	Aves	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel	C		0	4	18/12/1999
1636	Aves	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike	C		0	6	20/11/2008
1637	Aves	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike	C		0	4	20/12/2013
1639	Aves	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird	C		0	7	24/07/2001
1089	Aves	Casuariidae	<i>Dromaius novaehollandiae</i>	emu	C		0	2	18/12/1999
1933	Aves	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)	C		0	1	1/12/1997
1617	Aves	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper	C		0	2	27/05/2003
18293	Aves	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)	C		0	27	24/07/2001
1809	Aves	Columbidae	<i>Geopelia cuneata</i>	diamond dove	C		0	1	20/12/2013
1810	Aves	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove	C		0	10	5/11/2023

18323	Aves	Columbidae	<i>Geopelia placida</i>	peaceful dove	C		0	12	6/11/2023
1796	Aves	Columbidae	<i>Geopelia sp.</i>		C		0	1	6/02/2021
1793	Aves	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon	C		0	3	12/05/2001
1795	Aves	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing	C		0	9	5/11/2023
1779	Aves	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird	C		0	1	20/12/2013
1603	Aves	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough	C		0	7	19/03/2021
1605	Aves	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird	C		0	4	19/03/2021
1608	Aves	Corvidae	<i>Corvus coronoides</i>	Australian raven	C		0	11	6/11/2023
1609	Aves	Corvidae	<i>Corvus orru</i>	Torresian crow	C		0	15	6/02/2021
1754	Aves	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo	C		0	1	22/08/1994
1747	Aves	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo	C		0	1	18/12/1999
1738	Aves	Cuculidae	<i>Eudynamis orientalis</i>	eastern koel	C		0	2	20/11/2008
1740	Aves	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo	C		0	3	20/11/2008
1611	Aves	Dicaeidae	<i>Dicaeum hirundinaceum</i>	mistletoebird	C		0	27	30/11/2009
1359	Aves	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch	C		0	1	18/12/1999
1342	Aves	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch	C		0	8	28/05/2017
1949	Aves	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar	C		0	5	19/12/1999
1716	Aves	Falconidae	<i>Falco berigora</i>	brown falcon	C		0	2	1/12/1997
1704	Aves	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel	C		0	1	22/08/1994
1572	Aves	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow	C		0	2	18/12/1999
1585	Aves	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin	C		0	1	1/12/1997
1573	Aves	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin	C		0	5	31/03/2005
1570	Aves	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren	C		0	21	12/07/2017
1556	Aves	Maluridae	<i>Malurus lamberti sensu lato</i>	variegated fairy- wren			0	2	20/11/2008

1552	Aves	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater	C		0	9	20/11/2008
1523	Aves	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater	C		0	66	6/11/2023
1539	Aves	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater	C		0	7	31/05/2005
1517	Aves	Meliphagidae	<i>Lichenostomus melanops</i>	yellow-tufted honeyeater	C		0	2	9/08/2009
1497	Aves	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater	C		0	6	6/11/2023
1500	Aves	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner	C		0	18	28/05/2017
1504	Aves	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater	C		0	2	28/05/2017
1508	Aves	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater	C		0	9	25/08/2001
1489	Aves	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater	C		0	1	18/12/1999
1516	Aves	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater	C		0	22	6/05/2010
1493	Aves	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird	C		0	3	7/03/2000
1494	Aves	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird	C		0	22	6/02/2021
1471	Aves	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater	C		0	31	5/11/2023
1513	Aves	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater	C		0	2	31/05/2005
1518	Aves	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater	C		0	10	20/12/2013
1764	Aves	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater	C		0	8	30/11/2009
1589	Aves	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark	C		0	19	5/11/2023
1600	Aves	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher	C		0	5	31/03/2005
1586	Aves	Monarchidae	<i>Myiagra rubecula</i>	leadend flycatcher	C		0	15	6/11/2023
1455	Aves	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit	C		0	1	22/08/1994
1453	Aves	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella	C		0	6	6/05/2010
1442	Aves	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole	C		0	5	5/11/2023
1449	Aves	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush	C		0	28	5/11/2023
1436	Aves	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler	C		0	3	27/05/2003

1437	Aves	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler	C		0	39	6/11/2023
1389	Aves	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote	C		0	7	6/05/2010
1392	Aves	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote	C		0	12	12/07/2017
1284	Aves	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	C		0	1	27/05/2003
1347	Aves	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin	C		0	25	19/03/2021
1339	Aves	Petroicidae	<i>Microeca fascians</i>	jacky winter	C		0	15	30/11/2009
1329	Aves	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin	C		0	8	6/05/2010
1332	Aves	Petroicidae	<i>Petroica rosea</i>	rose robin	C		0	2	24/07/2001
1261	Aves	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant	C		0	2	27/05/2003
1699	Aves	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail	C		0	1	7/03/2000
1955	Aves	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth	C		0	4	19/12/1999
1260	Aves	Podicipedidae	<i>Poliiocephalus poliocephalus</i>	hoary-headed grebe	C		0	1	31/03/2005
1249	Aves	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe	C		0	4	31/03/2005
1318	Aves	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler	C		0	18	19/03/2021
1180	Aves	Psittaculidae	<i>Alisterus scapularis</i>	Australian king-parrot	C		0	3	30/11/2009
1182	Aves	Psittaculidae	<i>Aprosmictus erythropterus</i>	red-winged parrot	C		0	6	12/05/2001
1154	Aves	Psittaculidae	<i>Neophema pulchella</i>	turquoise parrot	C		0	1	1/12/1997
1147	Aves	Psittaculidae	<i>Parvipsitta pusilla</i>	little lorikeet	C		0	2	28/03/2000
1136	Aves	Psittaculidae	<i>Platycercus adscitus</i>	pale-headed rosella	C		0	10	28/05/2017
1138	Aves	Psittaculidae	<i>Platycercus elegans</i>	crimson rosella	C		0	1	1/12/1997
1118	Aves	Psittaculidae	<i>Psephotus haematonotus</i>	red-rumped parrot	C		0	3	20/11/2008
1124	Aves	Psittaculidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet	C		0	6	12/05/2001
1125	Aves	Psittaculidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet	C		0	2	28/05/2017
1623	Aves	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird	C		0	1	28/05/2017

1673	Aves	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen	C		0	1	23/01/2011
1575	Aves	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail	C		0	26	6/05/2010
1576	Aves	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail	C		0	17	5/11/2023
1102	Aves	Strigidae	<i>Ninox boobook</i>	southern boobook	C		0	2	19/12/1999
1101	Aves	Strigidae	<i>Ninox connivens</i>	barking owl	C		0	1	18/12/1999
1314	Aves	Sturnidae	<i>Acridotheres tristis</i>	common myna			0	1	1/12/1997
1822	Aves	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill	C		0	1	25/08/1994
1091	Aves	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail	C		0	4	6/02/2021
1081	Aves	Turnicidae	<i>Turnix varius</i>	paintred button-quail	C		0	4	19/12/1999
1108	Aves	Tytonidae	<i>Tyto javanica</i>	eastern barn owl	C		0	1	1/12/1997
18292	Aves	Tytonidae	<i>Tyto novaehollandiae novaehollandiae</i>	masked owl (southern subspecies)	C		0	1	1/12/1997
1276	Aves	Zosteropidae	<i>Zosterops lateralis</i>	silveryeye	C		0	3	18/12/1999
35199	Insecta	Libellulidae	<i>Diplacodes bipunctata</i>	wandering percher			0	1	5/11/2023
35219	Insecta	Libellulidae	<i>Orthetrum caledonicum</i>	blue skimmer			0	1	5/11/2023
9	Insecta	Lycaenidae	<i>Jalmenus eubulus</i>	pale imperial hairstreak	V		0	1	6/01/1999
19316	Insecta	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)			0	1	28/05/2017
19179	Insecta	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer			0	1	6/05/2010
19177	Insecta	Nymphalidae	<i>Danaus plexippus</i>	monarch			0	1	28/05/2017
19185	Insecta	Nymphalidae	<i>Euploea corinna</i>	common crow			0	1	6/05/2010
19172	Insecta	Nymphalidae	<i>Junonia villida villida</i>	meadow argus			0	2	28/05/2017
19170	Insecta	Nymphalidae	<i>Vanessa itea</i>	yellow admiral			0	1	28/05/2017
19075	Insecta	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail			0	1	5/11/2023
19110	Insecta	Pieridae	<i>Belenois java teutonia</i>	caper white			0	1	5/11/2023
19098	Insecta	Pieridae	<i>Delias argenthona argenthona</i>	scarlet jezebel			0	1	28/05/2017

19086	Insecta	Pieridae	<i>Eurema hecabe</i>	large grass-yellow			0	1	6/05/2010
33583	Malacostraca	Parastacidae	<i>Cherax destructor</i>	common yabbie			0	1	12/07/2017
1084	Mammalia	Bovidae	<i>Bos taurus</i>	European cattle			0	13	19/03/2021
1067	Mammalia	Canidae	<i>Canis familiaris</i>	dog			0	2	6/02/2021
1069	Mammalia	Canidae	<i>Canis sp.</i>				0	1	31/07/2018
1006	Mammalia	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat	C		0	12	5/02/2000
1056	Mammalia	Felidae	<i>Felis catus</i>	cat			0	5	19/03/2021
832	Mammalia	Leporidae	<i>Lepus europaeus</i>	European brown hare			0	2	6/02/2021
901	Mammalia	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo	C		0	6	19/12/1999
914	Mammalia	Macropodidae	<i>Notamacropus dorsalis</i>	black-striped wallaby	C		0	1	4/05/2007
902	Mammalia	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby	C		0	1	1/12/1997
904	Mammalia	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby	C		0	3	6/11/2023
903	Mammalia	Macropodidae	<i>Osphranter robustus</i>	common wallaroo	C		0	1	31/12/1988
885	Mammalia	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby	C		0	3	18/12/1999
989	Mammalia	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat	C		0	10	19/12/1999
1000	Mammalia	Molossidae	<i>Mormopterus norfolkensis</i>	east coast freetail bat	C		0	1	1/12/1997
22060	Mammalia	Molossidae	<i>Mormopterus petersi</i>	inland free-tailed bat	C		2	13	12/10/1999
22061	Mammalia	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat	C		0	6	17/12/1999
988	Mammalia	Molossidae	<i>Mormopterus sp.</i>		C		5	12	5/02/2000
764	Mammalia	Muridae	<i>Mus musculus</i>	house mouse			0	3	23/01/2011
749	Mammalia	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse	C		0	3	17/12/1999
731	Mammalia	Muridae	<i>Rattus rattus</i>	black rat			0	1	15/12/1999
36762	Mammalia	Petauridae	<i>Petaurus notatus</i>	Krefft's glider	C		0	2	6/07/2013
859	Mammalia	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum	C		0	3	19/03/2021

860	Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala	E	E	0	3	21/12/2012
1080	Mammalia	Suidae	<i>Sus scrofa</i>	pig			0	3	12/07/2017
838	Mammalia	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna	SL		0	3	6/02/2021
971	Mammalia	Vespertilionidae	<i>Chalinolobus dwyeri</i>	large-eared pied bat	E	E	0	1	1/12/1997
972	Mammalia	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat	C		0	26	5/02/2000
973	Mammalia	Vespertilionidae	<i>Chalinolobus morio</i>	chocolate wattled bat	C		0	1	1/12/1997
948	Mammalia	Vespertilionidae	<i>Chalinolobus picatus</i>	little pied bat	C		0	2	5/02/2000
951	Mammalia	Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	eastern false pipistrelle	C		0	1	1/12/1997
935	Mammalia	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	lesser long-eared bat	C		0	2	5/02/2000
936	Mammalia	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat	C		3	11	5/02/2000
938	Mammalia	Vespertilionidae	<i>Nyctophilus sp.</i>		C		0	5	12/10/1999
943	Mammalia	Vespertilionidae	<i>Scoteanax rueppellii</i>	greater broad-nosed bat	C		0	1	1/12/1997
945	Mammalia	Vespertilionidae	<i>Scotorepens balstoni</i>	inland broad-nosed bat	C		0	18	5/02/2000
931	Mammalia	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat	C		7	16	5/02/2000
19464	Mammalia	Vespertilionidae	<i>Scotorepens orion</i>	south-eastern broad-nosed bat	C		0	1	1/12/1997
933	Mammalia	Vespertilionidae	<i>Scotorepens sp.</i>		C		1	19	17/12/1999
22059	Mammalia	Vespertilionidae	<i>Scotorepens sp. (Parnaby)</i>	central-eastern broad-nosed bat	C		4	87	5/02/2000
923	Mammalia	Vespertilionidae	<i>Vespadelus darlingtoni</i>	large forest bat	C		0	1	1/12/1997
927	Mammalia	Vespertilionidae	<i>Vespadelus sp.</i>		C		0	10	21/03/2005
929	Mammalia	Vespertilionidae	<i>Vespadelus vulturus</i>	little forest bat	C		3	23	5/02/2000
18847	Reptilia	Agamidae	<i>Amphibolurus burnsi</i>	Burns's dragon	C		0	1	5/05/2010
560	Reptilia	Agamidae	<i>Amphibolurus muricatus</i>	jacky lizard	C		0	1	1/12/1997
561	Reptilia	Agamidae	<i>Diporiphora nobbi</i>	nobbi	C		0	4	19/03/2021
556	Reptilia	Agamidae	<i>Pogona barbata</i>	bearded dragon	C		0	6	6/02/2021

519	Reptilia	Boidae	<i>Morelia spilota</i>	carpet python	C		0	2	19/03/2021
391	Reptilia	Diplodactylidae	<i>Amalosia robusta</i>	robust velvet gecko	C		0	1	23/01/2011
429	Reptilia	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko	C		0	2	19/12/1999
457	Reptilia	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake	C		0	1	15/05/2022
493	Reptilia	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake	C		0	1	5/11/2023
486	Reptilia	Elapidae	<i>Furina diadema</i>	red-naped snake	C		0	1	17/12/1999
476	Reptilia	Elapidae	<i>Hemiaspis damelii</i>	grey snake	E	E	0	1	13/10/1999
462	Reptilia	Elapidae	<i>Pseudechis porphyriacus</i>	red-bellied black snake	C		0	1	19/03/2021
438	Reptilia	Elapidae	<i>Suta dwyeri</i>	Dwyer's snake	C		0	1	16/12/1999
420	Reptilia	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella	C		0	12	23/01/2011
413	Reptilia	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko	C		0	14	19/12/1999
327	Reptilia	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot	C		0	1	19/12/1999
304	Reptilia	Scincidae	<i>Anomalopus leuckartii</i>	two-clawed worm-skink	C		0	1	28/02/2015
297	Reptilia	Scincidae	<i>Carlia pectoralis sensu lato</i>				0	2	19/12/1999
277	Reptilia	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink	C		0	1	1/12/1997
31898	Reptilia	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink	C		0	10	6/05/2010
240	Reptilia	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus	C		0	1	15/12/1999
241	Reptilia	Scincidae	<i>Ctenotus strauchii</i>	eastern barred wedgesnout ctenotus	C		0	1	1/12/1997
201	Reptilia	Scincidae	<i>Egernia striolata</i>	tree skink	C		0	5	7/10/2010
207	Reptilia	Scincidae	<i>Eremiascincus richardsonii</i>	broad-banded sand swimmer	C		0	1	18/12/1999
167	Reptilia	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider	C		0	3	18/12/1999
157	Reptilia	Scincidae	<i>Lerista punctatovittata</i>	eastern robust slider	C		0	1	19/12/1999
155	Reptilia	Scincidae	<i>Lerista timida</i>	timid slider	C		2	6	8/04/2021
226	Reptilia	Scincidae	<i>Liopholis modesta</i>	eastern ranges rock-skink	C		0	1	15/12/1999

150	Reptilia	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink	C		0	8	19/12/1999
134	Reptilia	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink	C		0	3	19/12/1999
103	Reptilia	Scincidae	<i>Tiliqua rugosa</i>	shingle-back	C		0	1	1/12/1997
107	Reptilia	Scincidae	<i>Tiliqua scincoides scincoides</i>	eastern bluetongue	C		0	1	6/02/2021
78	Reptilia	Varanidae	<i>Varanus gouldii</i>	sand monitor	C		0	11	19/03/2021
74	Reptilia	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor	C		0	1	30/11/2009
60	Reptilia	Varanidae	<i>Varanus tristis</i>	black-tailed monitor	C		0	6	19/03/2021
61	Reptilia	Varanidae	<i>Varanus varius</i>	lace monitor	C		0	23	19/03/2021

Table 3. Plants recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
16587	Equisetopsida	Amaranthaceae	<i>Nyssanthus erecta</i>		C		1	1	28/11/2003
15150	Equisetopsida	Apiaceae	<i>Platysace ericoides</i>	heath platysace	C		4	4	1/12/2022
15277	Equisetopsida	Araliaceae	<i>Hydrocotyle acutiloba</i>		C		1	1	2/01/2008
15279	Equisetopsida	Araliaceae	<i>Hydrocotyle laxiflora</i>	stinking pennywort	C		0	1	21/05/1998
16770	Equisetopsida	Asparagaceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		C		1	1	20/05/2014
16776	Equisetopsida	Asparagaceae	<i>Lomandra longifolia</i>		C		0	7	16/03/2000
16777	Equisetopsida	Asparagaceae	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>		C		0	1	12/09/1997
35555	Equisetopsida	Asteraceae	<i>Brachyscome dalbyensis</i>		C		2	3	19/04/2023
9570	Equisetopsida	Asteraceae	<i>Brachyscome multifida</i>		C		1	2	20/04/2023
15565	Equisetopsida	Asteraceae	<i>Calotis cuneifolia</i>	burr daisy	C		1	2	20/04/2023
15566	Equisetopsida	Asteraceae	<i>Calotis dentex</i>	white burr daisy	C		0	1	14/03/2000
15568	Equisetopsida	Asteraceae	<i>Calotis lappulacea</i>	yellow burr daisy	C		1	1	19/04/2023
8398	Equisetopsida	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons	C		0	6	16/03/2000
35905	Equisetopsida	Asteraceae	<i>Erigeron sumatrensis</i>				0	1	16/03/2000
13890	Equisetopsida	Asteraceae	<i>Isoetopsis graminifolia</i>	grass cushion	C		2	2	20/04/2023

26777	Equisetopsida	Asteraceae	<i>Leiocarpa semicalva</i> subsp. <i>tenuifolia</i>		C		1	1	12/03/2021
8373	Equisetopsida	Asteraceae	<i>Myriocephalus pluriflorus</i>		C		2	2	20/04/2023
22335	Equisetopsida	Asteraceae	<i>Rutidosia glandulosa</i>		NT		2	2	8/12/2022
6519	Equisetopsida	Asteraceae	<i>Rutidosia lanata</i>		NT		1	1	19/08/2025
30179	Equisetopsida	Asteraceae	<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>		C		1	2	20/04/2023
9562	Equisetopsida	Asteraceae	<i>Triptilodiscus pygmaeus</i>		C		1	1	12/03/2021
14958	Equisetopsida	Asteraceae	<i>Vittadinia pustulata</i>		C		1	2	20/04/2023
9535	Equisetopsida	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear			0	2	16/03/2000
8346	Equisetopsida	Campanulaceae	<i>Wahlenbergia tumidifructa</i>		SL		1	1	20/04/2023
17726	Equisetopsida	Capparaceae	<i>Capparis lasiantha</i>	nipan	C		1	1	19/08/2021
18011	Equisetopsida	Casuarinaceae	<i>Allocasuarina inophloia</i>		C		0	28	15/03/2002
18012	Equisetopsida	Casuarinaceae	<i>Allocasuarina littoralis</i>		C		0	1	21/05/1998
18013	Equisetopsida	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak	C		0	178	1/06/2004
18014	Equisetopsida	Casuarinaceae	<i>Allocasuarina torulosa</i>		C		0	1	1/01/1994
17707	Equisetopsida	Casuarinaceae	<i>Casuarina cristata</i>	belah	C		0	2	1/06/2004
22225	Equisetopsida	Celastraceae	<i>Elaeodendron australe</i> var. <i>integrifolium</i>		C		1	1	30/07/2021
9500	Equisetopsida	Chenopodiaceae	<i>Dysphania glomulifera</i> subsp. <i>glomulifera</i>		C		2	2	20/04/2023
9501	Equisetopsida	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>nutans</i>		C		0	1	16/03/2000
14720	Equisetopsida	Commelinaceae	<i>Commelina lanceolata</i>		C		0	2	15/03/2000
7047	Equisetopsida	Convolvulaceae	<i>Dichondra</i> sp. (Inglewood J.M.Dalby 86/93)		C		1	1	20/04/2023
9806	Equisetopsida	Crassulaceae	<i>Crassula peduncularis</i>		C		1	1	8/08/2025
27828	Equisetopsida	Crassulaceae	<i>Crassula tetramera</i>		C		1	1	20/04/2023
17757	Equisetopsida	Cupressaceae	<i>Callitris endlicheri</i>	black cypress pine	C		0	3	1/06/2004
8221	Equisetopsida	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine	C		0	73	1/06/2004

9750	Equisetopsida	Cyperaceae	<i>Cyperus betchei</i> <i>subsp. betchei</i>		C		1	1	27/08/2019
17519	Equisetopsida	Cyperaceae	<i>Cyperus fulvus</i>		C		1	1	30/08/2019
17340	Equisetopsida	Cyperaceae	<i>Eleocharis cylindrostachys</i>		C		1	1	17/10/2024
17107	Equisetopsida	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush	C		0	2	14/03/2000
17078	Equisetopsida	Cyperaceae	<i>Gahnia aspera</i>		C		1	3	31/10/2019
9381	Equisetopsida	Cyperaceae	<i>Lepidosperma laterale</i>		C		0	1	14/03/2000
14499	Equisetopsida	Dilleniaceae	<i>Hibbertia cistoidea</i>		C		1	2	19/04/2023
9452	Equisetopsida	Dilleniaceae	<i>Hibbertia stricta</i>		C		1	1	21/01/2021
34475	Equisetopsida	Droseraceae	<i>Drosera lunata</i>		SL		1	1	12/03/2021
17804	Equisetopsida	Ericaceae	<i>Brachyloma daphnoides</i>		C		2	2	2/01/2008
2569	Equisetopsida	Ericaceae	<i>Lissanthe pluriloculata</i>		C		1	1	19/04/2023
13593	Equisetopsida	Ericaceae	<i>Melichrus adpressus</i>		C		0	3	15/03/2000
16662	Equisetopsida	Ericaceae	<i>Melichrus urceolatus</i>	honey gorse	C		0	2	16/03/2000
41515	Equisetopsida	Ericaceae	<i>Styphelia mitchellii</i>		C		0	1	14/03/2000
41530	Equisetopsida	Ericaceae	<i>Styphelia mutica</i>		C		1	2	21/06/2021
42342	Equisetopsida	Ericaceae	<i>Styphelia sparsa</i>		C		0	3	16/03/2000
14008	Equisetopsida	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion	SL		1	1	16/07/2009
17058	Equisetopsida	Goodeniaceae	<i>Goodenia bellidifolia</i> <i>subsp. argentea</i>		C		1	1	19/08/2021
17060	Equisetopsida	Goodeniaceae	<i>Goodenia glabra</i>		C		1	1	20/04/2023
17062	Equisetopsida	Goodeniaceae	<i>Goodenia hederacea</i> <i>subsp. hederacea</i>		C		0	5	15/03/2000
10696	Equisetopsida	Haloragaceae	<i>Gonocarpus urceolatus</i>		C		7	13	12/03/2021
10281	Equisetopsida	Hemerocallidaceae	<i>Dianella longifolia</i>		C		0	1	21/05/1998
14594	Equisetopsida	Hemerocallidaceae	<i>Dianella revoluta</i>		C		1	1	28/11/2024
15283	Equisetopsida	Hypericaceae	<i>Hypericum gramineum</i>		C		0	1	14/03/2000

8127	Equisetopsida	Juncaceae	<i>Juncus ochrocoleus</i>		C		1	1	21/01/2022
13895	Equisetopsida	Juncaceae	<i>Juncus polyanthemus</i>		C		0	1	21/05/1998
3809	Equisetopsida	Lamiaceae	<i>Prostanthera cryptandroides</i> subsp. <i>euphrasioides</i>		C		2	2	19/04/2023
7445	Equisetopsida	Lamiaceae	<i>Prostanthera</i> sp. (Dunmore D.M.Gordon 8A)		V	V	3	3	20/01/2022
14963	Equisetopsida	Lamiaceae	<i>Westringia cheelii</i>		C		2	2	20/04/2023
11780	Equisetopsida	Lamiaceae	<i>Westringia parvifolia</i>		V	V	1	1	12/07/2024
17581	Equisetopsida	Lauraceae	<i>Cryptocarya laevigata</i>		C		0	1	15/03/2000
14436	Equisetopsida	Laxmanniaceae	<i>Laxmannia compacta</i>		C		1	1	16/04/2019
15780	Equisetopsida	Leguminosae	<i>Acacia burrowii</i>		C		0	2	15/03/2002
15784	Equisetopsida	Leguminosae	<i>Acacia caroleae</i>		C		1	2	27/02/2020
14903	Equisetopsida	Leguminosae	<i>Acacia chinchillensis</i>		C		8	9	6/03/2020
14932	Equisetopsida	Leguminosae	<i>Acacia conferta</i>		C		0	4	15/03/2002
9654	Equisetopsida	Leguminosae	<i>Acacia crassa</i>		C		0	3	15/03/2002
15792	Equisetopsida	Leguminosae	<i>Acacia crassa</i> subsp. <i>crassa</i>		C		1	1	20/04/2023
15798	Equisetopsida	Leguminosae	<i>Acacia excelsa</i>		C		0	1	15/03/2002
15752	Equisetopsida	Leguminosae	<i>Acacia harpophylla</i>	brigalow	C		0	1	15/03/2002
14916	Equisetopsida	Leguminosae	<i>Acacia ixiophylla</i>		C		1	2	20/04/2023
14917	Equisetopsida	Leguminosae	<i>Acacia ixodes</i>		C		1	1	18/09/2023
15760	Equisetopsida	Leguminosae	<i>Acacia jucunda</i>		C		1	1	25/11/2024
6372	Equisetopsida	Leguminosae	<i>Acacia juncifolia</i>		C		2	2	19/04/2023
15765	Equisetopsida	Leguminosae	<i>Acacia leiocalyx</i>		C		0	1	15/03/2002
19438	Equisetopsida	Leguminosae	<i>Acacia longispicata</i>		C		0	1	15/03/2002
15724	Equisetopsida	Leguminosae	<i>Acacia muelleriana</i>		C		1	5	18/04/2020
15727	Equisetopsida	Leguminosae	<i>Acacia neriifolia</i>	pechey wattle	C		1	6	5/05/2020

15735	Equisetopsida	Leguminosae	<i>Acacia penninervis</i> <i>var. penninervis</i>		C		1	1	18/04/2020
14872	Equisetopsida	Leguminosae	<i>Acacia polybotrya</i>	western silver wattle	C		1	1	5/05/2020
15695	Equisetopsida	Leguminosae	<i>Acacia semirigida</i>		C		1	1	12/05/2020
14891	Equisetopsida	Leguminosae	<i>Acacia spectabilis</i>	pilliga wattle	C		0	2	15/03/2002
34542	Equisetopsida	Leguminosae	<i>Bossiaea concolor</i>		C		1	1	13/11/2020
15529	Equisetopsida	Leguminosae	<i>Chorizema</i> <i>parviflorum</i>	eastern flame pea	C		1	1	20/04/2023
15444	Equisetopsida	Leguminosae	<i>Daviesia genistifolia</i>	broom bitter pea	C		1	3	20/04/2023
15460	Equisetopsida	Leguminosae	<i>Desmodium</i> <i>rhytidophyllum</i>		C		0	1	16/03/2000
15356	Equisetopsida	Leguminosae	<i>Glycine tabacina</i>	glycine pea	C		0	1	15/03/2000
18672	Equisetopsida	Leguminosae	<i>Indigofera australis</i> <i>subsp. australis</i>		C		1	1	19/04/2023
15260	Equisetopsida	Leguminosae	<i>Jacksonia scoparia</i>		C		0	3	15/03/2002
15191	Equisetopsida	Leguminosae	<i>Mirbelia pungens</i>		C		3	3	20/04/2023
10834	Equisetopsida	Leguminosae	<i>Pultenaea</i> <i>microphylla</i>		C		2	2	18/10/2024
15068	Equisetopsida	Leguminosae	<i>Senna aciphylla</i>	Australian senna	C		1	1	20/04/2023
8254	Equisetopsida	Leguminosae	<i>Swainsona</i> <i>queenslandica</i>		C		1	1	19/02/2015
34112	Equisetopsida	Leguminosae	<i>Vachellia karroo</i>	karroo thorn			1	1	1/11/2022
13057	Equisetopsida	Loranthaceae	<i>Amyema</i> <i>gaudichaudii</i>		C		0	1	14/03/2000
33123	Equisetopsida	Myrsinaceae	<i>Lysimachia arvensis</i>				1	1	27/06/2022
8993	Equisetopsida	Myrtaceae	<i>Angophora costata</i>		C		0	1	15/03/2002
17998	Equisetopsida	Myrtaceae	<i>Angophora</i> <i>floribunda</i>	rough-barked apple	C		0	20	1/06/2004
17999	Equisetopsida	Myrtaceae	<i>Angophora</i> <i>leiocarpa</i>	rusty gum	C		0	12	15/03/2000
42249	Equisetopsida	Myrtaceae	<i>Blakella citriodora</i>		C		1	2	10/04/2024
17764	Equisetopsida	Myrtaceae	<i>Calytrix longiflora</i>	pink fringe myrtle	C		1	1	17/07/2021
17766	Equisetopsida	Myrtaceae	<i>Calytrix tetragona</i>	fringe myrtle	C		1	1	3/01/2023

6421	Equisetopsida	Myrtaceae	<i>Corymbia terminalis</i>		C		0	1	1/06/2004
18729	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i>		C		0	2	15/03/2002
6443	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>trachyphloia</i>		C		2	9	13/06/2020
9309	Equisetopsida	Myrtaceae	<i>Eucalyptus apothalassica</i>		C		2	2	19/04/2023
13610	Equisetopsida	Myrtaceae	<i>Eucalyptus bakeri</i>	Baker's mallee	C		1	1	11/07/2020
17249	Equisetopsida	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum	C		2	7	4/01/2023
12506	Equisetopsida	Myrtaceae	<i>Eucalyptus conica</i>	fuzzy box	C		4	4	9/07/2020
17252	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark	C		1	86	13/06/2020
17256	Equisetopsida	Myrtaceae	<i>Eucalyptus curtisii</i>	Plunkett mallee	NT		1	1	15/12/2022
17257	Equisetopsida	Myrtaceae	<i>Eucalyptus dealbata</i>	tumble-down red gum	C		1	2	13/06/2020
17262	Equisetopsida	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint	C		2	10	19/04/2023
12500	Equisetopsida	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i>		C		0	3	15/03/2002
17263	Equisetopsida	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i>		C		1	4	13/06/2020
17224	Equisetopsida	Myrtaceae	<i>Eucalyptus microcarpa</i>	inland grey box	C		0	7	15/03/2000
17229	Equisetopsida	Myrtaceae	<i>Eucalyptus moluccana</i>	gum-topped box	C		0	1	1/06/2004
17188	Equisetopsida	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box	C		1	4	8/05/2020
8906	Equisetopsida	Myrtaceae	<i>Eucalyptus rhombica</i>		C		15	15	19/05/2023
17204	Equisetopsida	Myrtaceae	<i>Eucalyptus tereticornis</i>		C		0	1	21/05/1998
42159	Equisetopsida	Myrtaceae	<i>Gaudium lamellatum</i>		C		1	1	14/08/2023
31856	Equisetopsida	Myrtaceae	<i>Kardomia jucunda</i>		C		2	2	19/04/2023
14480	Equisetopsida	Myrtaceae	<i>Kunzea opposita</i>		C		0	1	15/03/2002
18863	Equisetopsida	Myrtaceae	<i>Kunzea opposita</i> var. <i>opposita</i>		C		3	4	3/01/2023
14441	Equisetopsida	Myrtaceae	<i>Leptospermum polygalifolium</i>	tantoon	C		0	1	21/05/1998
16744	Equisetopsida	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo	C		1	6	17/07/2021

13592	Equisetopsida	Myrtaceae	<i>Melaleuca decora</i>		C		2	61	12/09/2024
13423	Equisetopsida	Myrtaceae	<i>Melaleuca lanceolata</i>		C		0	1	15/03/2002
16694	Equisetopsida	Myrtaceae	<i>Melaleuca nodosa</i>		C		0	1	15/03/2000
31824	Equisetopsida	Orchidaceae	<i>Cyanicula caerulea</i>		SL		1	1	6/08/2015
9602	Equisetopsida	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>		C		0	1	21/05/1998
16409	Equisetopsida	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera	C		1	1	12/03/2021
41374	Equisetopsida	Phyllanthaceae	<i>Synostemon hirtellus</i>		C		0	1	15/03/2000
16505	Equisetopsida	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree	C		0	1	21/05/1998
26012	Equisetopsida	Pittosporaceae	<i>Pittosporum angustifolium</i>		C		0	1	15/03/2002
15670	Equisetopsida	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass	C		0	1	16/03/2000
11117	Equisetopsida	Poaceae	<i>Aristida acuta</i>		C		0	1	16/03/2000
15650	Equisetopsida	Poaceae	<i>Aristida caput-medusae</i>		C		1	4	14/03/2022
15652	Equisetopsida	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>		C		0	1	16/03/2000
15655	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>		C		0	4	15/03/2000
11124	Equisetopsida	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>		C		0	1	14/03/2000
9661	Equisetopsida	Poaceae	<i>Aristida ramosa</i>	purple wiregrass	C		0	1	15/03/2000
15658	Equisetopsida	Poaceae	<i>Aristida vagans</i>		C		0	3	15/03/2000
15634	Equisetopsida	Poaceae	<i>Arundinella nepalensis</i>	reedgrass	C		0	1	21/05/1998
15531	Equisetopsida	Poaceae	<i>Chrysopogon fallax</i>		C		0	1	12/09/1997
15498	Equisetopsida	Poaceae	<i>Cleistochloa subjuncea</i>		C		1	1	27/07/2021
15485	Equisetopsida	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass	C		0	8	16/03/2000
15467	Equisetopsida	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>		C		0	1	16/03/2000
10403	Equisetopsida	Poaceae	<i>Dichelachne crinita</i>	longhair plumegrass	C		0	1	16/03/2000
33749	Equisetopsida	Poaceae	<i>Dimorphochloa rigida</i>		C		0	1	21/05/1998

33788	Equisetopsida	Poaceae	<i>Entolasia minutifolia</i>		C		1	1	14/03/2022
15390	Equisetopsida	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass	C		0	7	16/03/2000
15364	Equisetopsida	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass	C		1	1	25/01/2021
15366	Equisetopsida	Poaceae	<i>Eragrostis leptocarpa</i>	drooping lovegrass	C		0	1	21/05/1998
15336	Equisetopsida	Poaceae	<i>Eulalia aurea</i>	silky browntop	C		0	1	15/03/2000
13607	Equisetopsida	Poaceae	<i>Panicum effusum</i>		C		0	2	21/05/1998
18424	Equisetopsida	Poaceae	<i>Panicum simile</i>		C		0	2	15/03/2000
14345	Equisetopsida	Poaceae	<i>Paspalidium distans</i>	shotgrass	C		0	1	21/05/1998
15056	Equisetopsida	Poaceae	<i>Schizachyrium fragile</i>	firegrass	C		0	1	16/03/2000
22166	Equisetopsida	Poaceae	<i>Sporobolus sessilis</i>		C		0	1	16/03/2000
14974	Equisetopsida	Poaceae	<i>Themeda triandra</i>	kangaroo grass	C		0	2	15/03/2000
2147	Equisetopsida	Poaceae	<i>Triodia vella</i>		C		1	1	19/04/2023
14995	Equisetopsida	Poaceae	<i>Tripogon loliiformis</i>	five minute grass	C		1	1	12/03/2021
30781	Equisetopsida	Poaceae	<i>Urochloa fusca</i>				1	1	13/12/2019
27672	Equisetopsida	Poaceae	<i>Walwhalleya subxerophila</i>		C		0	3	15/03/2000
17792	Equisetopsida	Portulacaceae	<i>Calandrinia eremaea</i>		C		1	1	9/06/2009
16497	Equisetopsida	Proteaceae	<i>Persoonia cornifolia</i>	broad-leaved geebung	C		1	1	6/08/2015
16500	Equisetopsida	Proteaceae	<i>Persoonia sericea</i>	silky geebung	C		2	2	6/08/2015
15892	Equisetopsida	Proteaceae	<i>Xylomelum cunninghamianum</i>		C		1	1	30/06/2023
17679	Equisetopsida	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern	C		0	1	16/03/2000
17682	Equisetopsida	Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		C		0	3	15/03/2000
41591	Equisetopsida	Pteridaceae	<i>Pteris platyzomopsis</i>		SL		1	1	27/10/2021
13110	Equisetopsida	Ranunculaceae	<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>		C		1	1	12/03/2021
9659	Equisetopsida	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree	C		0	2	15/03/2002

17567	Equisetopsida	Rhamnaceae	<i>Cryptandra armata</i>		C		2	2	20/04/2023
33970	Equisetopsida	Rhamnaceae	<i>Cryptandra propinqua</i> subsp. <i>maranoa</i>		C		1	1	19/05/2011
12283	Equisetopsida	Rubiaceae	<i>Asperula geminifolia</i>		C		1	1	20/04/2023
16543	Equisetopsida	Rubiaceae	<i>Opercularia diphylla</i>		C		1	1	20/04/2023
41802	Equisetopsida	Rubiaceae	<i>Paranotis mitrasacmoides</i>		C		0	1	15/03/2000
41461	Equisetopsida	Rubiaceae	<i>Paranotis mitrasacmoides</i> subsp. <i>trachymenoides</i>		C		1	1	15/12/2020
16407	Equisetopsida	Rubiaceae	<i>Pomax umbellata</i>		C		0	3	14/03/2000
29838	Equisetopsida	Rubiaceae	<i>Psydrax odorata</i> forma <i>subnitida</i>		C		1	1	10/05/2017
29823	Equisetopsida	Rubiaceae	<i>Psydrax oleifolia</i>		C		0	1	15/03/2002
8213	Equisetopsida	Rubiaceae	<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>		C		1	1	12/03/2021
17834	Equisetopsida	Rutaceae	<i>Boronia glabra</i>		C		2	2	5/12/2022
41636	Equisetopsida	Rutaceae	<i>Cyanothamnus occidentalis</i>		C		2	2	19/04/2023
11301	Equisetopsida	Rutaceae	<i>Flindersia brayleyana</i>	Queensland maple	C		0	4	14/03/2000
17085	Equisetopsida	Rutaceae	<i>Geijera parviflora</i>	wilga	C		0	3	1/06/2004
14304	Equisetopsida	Rutaceae	<i>Phebalium nottii</i>	pink phebalium	C		2	2	28/02/2023
21801	Equisetopsida	Rutaceae	<i>Philotheca sporadica</i>		E		2	2	20/01/2022
13244	Equisetopsida	Sapindaceae	<i>Dodonaea biloba</i>		C		1	1	27/07/2021
13655	Equisetopsida	Sapindaceae	<i>Dodonaea macrossanii</i>		C		6	8	27/07/2021
17377	Equisetopsida	Sapindaceae	<i>Dodonaea peduncularis</i>		C		2	2	27/07/2021
17383	Equisetopsida	Sapindaceae	<i>Dodonaea triangularis</i>		C		0	1	15/03/2002
17278	Equisetopsida	Scrophulariaceae	<i>Eremophila mitchellii</i>		C		0	1	15/03/2002
6197	Equisetopsida	Solanaceae	<i>Solanum coracinum</i>		C		1	1	20/04/2023
16175	Equisetopsida	Solanaceae	<i>Solanum parvifolium</i>		C		0	1	15/03/2000
12554	Equisetopsida	Stackhousiaceae	<i>Stackhousia muricata</i>		C		1	1	12/03/2021

14178	Equisetopsida	Stylidiaceae	<i>Stylidium eglandulosum</i>		SL		1	1	12/03/2021
41617	Equisetopsida	Violaceae	<i>Pigea monopetala</i>		C		1	1	11/08/2022

Table 4. Fungi recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
25903	Agaricomycetes	Geastraceae	<i>Geastrum</i>		C		1	1	30/07/2018
28677	Agaricomycetes	Hymenochaetaceae	<i>Phellinus badius</i>		C		1	1	30/07/2018
23015	Arthoniomycetes	Chrysothricaceae	<i>Chrysothrix candelaris</i>		C		1	1	7/12/2018
23016	Lecanoromycetes	Cladoniaceae	<i>Cladia aggregata</i>		C		1	1	1/09/2022
23117	Lecanoromycetes	Parmeliaceae	<i>Flavoparmelia rutidota</i>		C		1	1	7/12/2018
23507	Lecanoromycetes	Parmeliaceae	<i>Punctelia subflava</i>		C		1	1	7/12/2018

Table 5. Other species recorded within the area of interest and its one kilometre buffer

No species found within the area of interest and its one kilometre buffer.

Species table headings and codes

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Least Concern (C), Critically Endangered (CR), Endangered (E), Extinct (EX), Near Threatened (NT), Extinct in the Wild (PE), Special Least Concern (SL), and Vulnerable (V)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Vulnerable (V), and Extinct in the Wild (XW)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [WildNet Application](#) - public interface to find species information and species lists generated from the WildNet database.
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld WildNet Data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [Wetland Maps](#) - view species records, survey locations etc. approved for publication
- [Wetland Summary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
- [WildNet wildlife records - published - Queensland](#) - spatial layer of WildNet records approved for publication generated weekly
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the WildNet Team WildNet@detsi.qld.gov.au.

Other useful sites for accessing Queensland biodiversity data include:

- [Useful wildlife resources](#)
- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australasian Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

Disclaimer

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WildNet Records Species List

For the selected area of interest 48147.46 Custom input
Current as at 13/02/2026 3

Summary Information

The following table provides an overview of the area of interest: Custom input

Table 1. Area of interest details

Size (ha)	
48,147.46	
Local Government(s)	
Toowoomba Regional	
Western Downs Regional	
Catchment(s)	
Border Rivers	
Moonie	
Bioregion(s)	Subregion(s)
Brigalow Belt	Inglewood Sandstones
Brigalow Belt	Moonie R. - Commoron Creek Floodout

Protected Area(s) The following estates and/or reserves are located in the area of interest:

Boondandilla State Forest
Kumbarilla State Forest
Waar Waar State Forest
Western Creek State Forest

World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

Introduction

This WildNet report is derived from a spatial layer that is generated from the [WildNet database](#), managed by the Department of the Environment, Tourism, Science and Innovation. The layer, which is generated weekly, contains a subset of WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero. It does not include aspatial data such as some baseline species lists created for some protected areas.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest.

The [WildNet Application](#) may provide additional information on species occurrence within your area of interest.

Species data

Contextual location information is presented in Map 1.

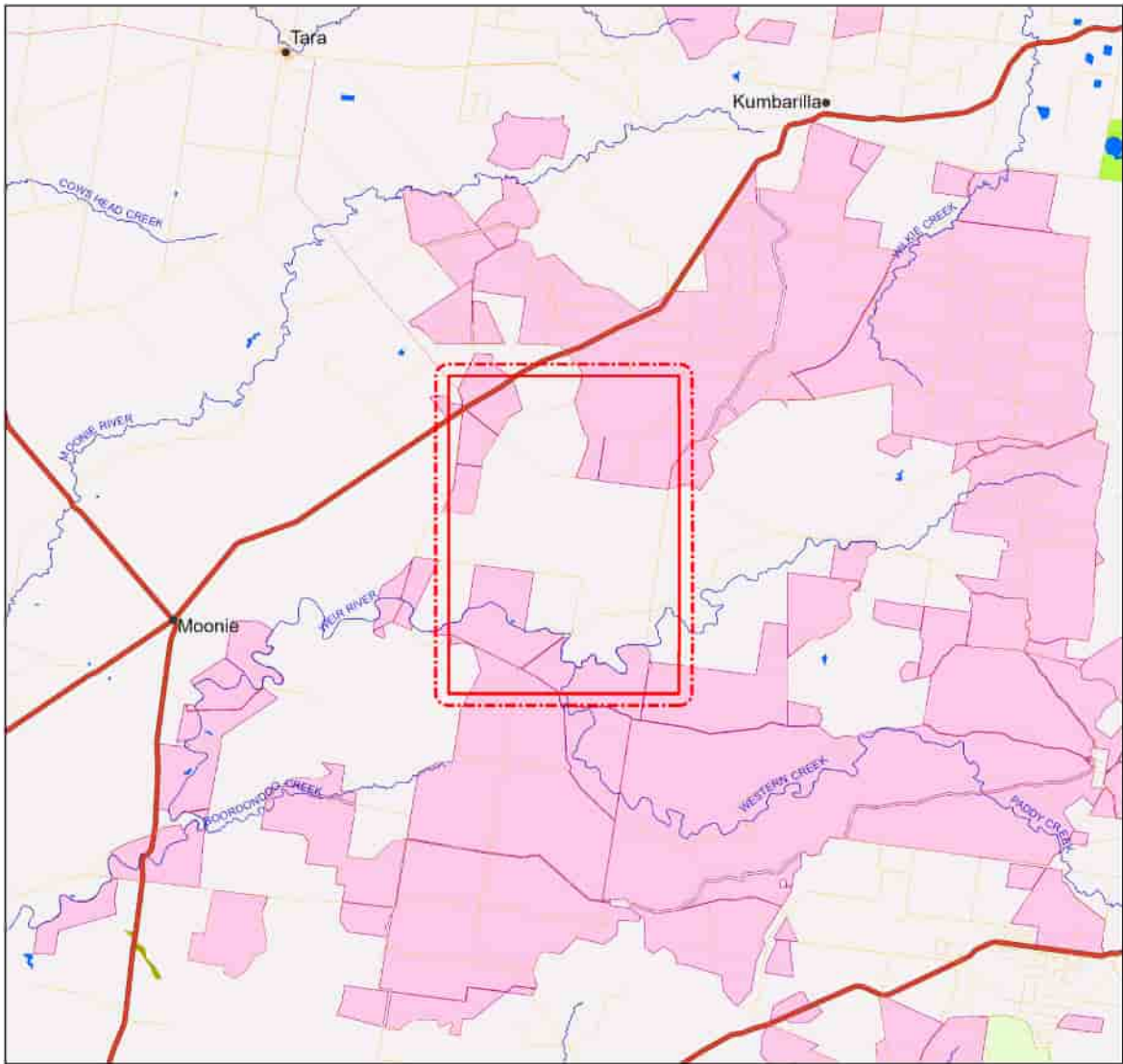
Table 2 lists the animals recorded within the area of interest and its one kilometre buffer.

Table 3 lists the plants recorded within the area of interest and its one kilometre buffer.

Table 4 lists the fungi recorded within the area of interest and its one kilometre buffer.

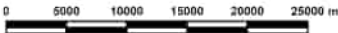
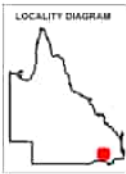
Table 5 lists the other species recorded within the area of interest and its one kilometre buffer.

Map 1. Locality Map



Locality Map

- Legend**
- Towns
 - Freeways/Highways
 - Connector
 - Street/Local Road
 - Lakes and reservoirs
 - National Park
 - National Park (Scientific)
 - National Park (CYPAL)
 - National Park (Aboriginal Land)
 - Conservation Park
 - Resources Reserve
 - Forest Reserve
 - State Forest
 - Timber Reserve
 - Nature Refuges
 - Coordinated Conservation Areas
 - Major rivers/creeks
 - Queensland
 - Custom area
 - 1 kilometre buffer



This product is displayed in GDA2020

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Table 2. Animals recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
624	Amphibia	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog	C		1	2	3/12/2020
643	Amphibia	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog	C		0	1	19/11/2008
620	Amphibia	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog	C		1	3	19/11/2008
623	Amphibia	Hylidae	<i>Cyclorana verrucosa</i>	rough collared frog	C		2	3	3/12/2020
627	Amphibia	Hylidae	<i>Litoria caerulea</i>	common green treefrog	C		0	1	19/11/2008
614	Amphibia	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog	C		0	3	6/11/2023
600	Amphibia	Hylidae	<i>Litoria rubella</i>	ruddy treefrog	C		0	3	6/11/2023
682	Amphibia	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog	C		0	1	19/11/2008
684	Amphibia	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog	C		0	4	6/11/2023
673	Amphibia	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk	C		0	2	19/11/2008
667	Amphibia	Limnodynastidae	<i>Neobatrachus sudellae</i>	meeowing frog	C		0	1	19/11/2008
680	Amphibia	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog	C		1	3	19/11/2008
696	Amphibia	Myobatrachidae	<i>Crinia parinsignifera</i>	beeping froglet	C		0	2	6/11/2023
639	Amphibia	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan	C		0	1	19/11/2008
1418	Aves	Acanthizidae	<i>Acanthiza apicalis</i>	inland thornbill	C		0	2	29/08/1998
1419	Aves	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill	C		0	1	7/08/2000
1422	Aves	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill	C		0	6	5/11/2023
1423	Aves	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill	C		0	3	2/09/1994
1425	Aves	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill	C		0	3	2/09/1994
1412	Aves	Acanthizidae	<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill	C		0	3	6/11/2023
1407	Aves	Acanthizidae	<i>Gerygone fusca</i>	western gerygone	C		0	1	27/09/2001
1396	Aves	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone	C		0	4	29/08/1998
1403	Aves	Acanthizidae	<i>Pyrholaemus sagittatus</i>	speckled warbler	C		0	3	5/11/2023

1371	Aves	Acanthizidae	<i>Smicromis brevirostris</i>	weebill	C		0	12	24/06/2015
1732	Aves	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle	C		0	4	23/05/2003
1723	Aves	Accipitridae	<i>Circus assimilis</i>	spotted harrier	C		0	1	4/08/1994
1305	Aves	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler	C		0	1	26/08/2003
1973	Aves	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar	C		0	1	16/12/2001
1767	Aves	Alcedinidae	<i>Dacelo novaeguineae</i>	laughing kookaburra	C		0	9	5/11/2023
1762	Aves	Alcedinidae	<i>Todiramphus sanctus</i>	sacred kingfisher	C		0	2	6/11/2023
1998	Aves	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C		0	5	7/08/2000
2003	Aves	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C		0	1	7/12/2011
1826	Aves	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron	C		0	1	26/08/2003
1658	Aves	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow	C		0	1	31/12/1978
1660	Aves	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow	C		0	1	26/08/2003
1647	Aves	Artamidae	<i>Artamus personatus</i>	masked woodswallow	C		0	1	6/11/2023
1649	Aves	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow	C		0	1	6/11/2023
1654	Aves	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird	C		0	3	7/12/2011
1656	Aves	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird	C		0	10	6/11/2023
1644	Aves	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie	C		0	5	7/12/2011
1645	Aves	Artamidae	<i>Strepera graculina</i>	pied currawong	C		0	8	24/06/2015
1191	Aves	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo	C		0	4	6/11/2023
1193	Aves	Cacatuidae	<i>Eolophus roseicapilla</i>	galah	C		0	8	3/06/2014
1173	Aves	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel	C		0	2	26/08/2003
1636	Aves	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike	C		0	6	6/11/2023
1637	Aves	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike	C		0	1	17/04/2001
1639	Aves	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird	C		0	2	4/11/2020

1642	Aves	Campephagidae	<i>Lalage tricolor</i>	white-winged triller	C		0	2	5/11/2023
1089	Aves	Casuariidae	<i>Dromaius novaehollandiae</i>	emu	C		0	2	26/08/2003
1940	Aves	Charadriidae	<i>Elseyornis melanops</i>	black-fronted dotterel	C		0	1	26/08/2003
1933	Aves	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)	C		0	1	7/08/2000
1820	Aves	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork	C		1	1	3/08/1886
1617	Aves	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper	C		0	5	5/11/2023
18293	Aves	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)	C		0	5	17/04/2001
1810	Aves	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove	C		0	4	5/11/2023
18323	Aves	Columbidae	<i>Geopelia placida</i>	peaceful dove	C		0	8	6/11/2023
1793	Aves	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon	C		0	6	7/12/2011
1795	Aves	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing	C		0	8	6/11/2023
1779	Aves	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird	C		0	1	25/11/2009
1603	Aves	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough	C		0	2	7/12/2011
1605	Aves	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird	C		0	4	26/08/2003
1608	Aves	Corvidae	<i>Corvus coronoides</i>	Australian raven	C		0	6	6/11/2023
1609	Aves	Corvidae	<i>Corvus orru</i>	Torresian crow	C		0	8	6/11/2023
1750	Aves	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo	C		0	1	26/08/2003
1744	Aves	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo	C		0	1	26/08/2003
1745	Aves	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo	C		0	1	29/08/1998
1756	Aves	Cuculidae	<i>Chalcites minutillus barnardi</i>	Eastern little bronze-cuckoo	C		0	1	25/11/2009
1611	Aves	Dicaeidae	<i>Dicaeum hirundinaceum</i>	mistletoebird	C		0	5	5/11/2023
1342	Aves	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch	C		0	3	4/05/2007
1704	Aves	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel	C		0	1	28/08/1998
1572	Aves	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow	C		0	1	26/08/2003

1573	Aves	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin	C		0	1	26/08/2003
1292	Aves	Locustellidae	<i>Cincloramphus mathewsi</i>	rufous songlark	C		0	1	26/08/2003
1570	Aves	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren	C		0	7	6/11/2023
1556	Aves	Maluridae	<i>Malurus lamberti sensu lato</i>	variegated fairy-wren			0	4	25/11/2009
1557	Aves	Maluridae	<i>Malurus leucopterus</i>	white-winged fairy-wren	C		0	1	7/08/2000
1552	Aves	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater	C		0	5	3/06/2014
1523	Aves	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater	C		0	12	5/11/2023
1539	Aves	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater	C		0	3	24/06/2015
1496	Aves	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater	C		0	2	26/08/2003
1497	Aves	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater	C		0	5	24/06/2015
1499	Aves	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner	C		0	1	11/12/2005
1500	Aves	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner	C		0	8	7/12/2011
1508	Aves	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater	C		0	5	11/12/2005
1489	Aves	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater	C		0	1	17/04/2001
1516	Aves	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater	C		0	9	3/06/2014
1493	Aves	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird	C		0	6	6/11/2023
1494	Aves	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird	C		0	11	6/11/2023
1471	Aves	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater	C		0	7	7/12/2011
1513	Aves	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater	C		0	1	7/12/2011
1518	Aves	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater	C		0	4	3/06/2014
1589	Aves	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark	C		0	13	5/11/2023
1600	Aves	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher	C		0	1	5/11/2023
1453	Aves	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella	C		0	3	2/09/1994
1442	Aves	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole	C		0	1	7/12/2011

1449	Aves	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush	C		0	9	5/11/2023
1436	Aves	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler	C		0	3	2/09/1994
1437	Aves	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler	C		0	15	6/11/2023
1389	Aves	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote	C		0	3	26/08/2003
1392	Aves	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote	C		0	9	24/06/2015
1347	Aves	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin	C		0	7	5/11/2023
1339	Aves	Petroicidae	<i>Microeca fascians</i>	jacky winter	C		0	11	6/11/2023
1329	Aves	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin	C		0	4	17/04/2001
1318	Aves	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler	C		0	1	7/08/2000
1180	Aves	Psittaculidae	<i>Alisterus scapularis</i>	Australian king-parrot	C		0	2	7/12/2011
1182	Aves	Psittaculidae	<i>Aprosmictus erythropterus</i>	red-winged parrot	C		0	4	4/11/2020
1154	Aves	Psittaculidae	<i>Neophema pulchella</i>	turquoise parrot	C		0	1	29/08/1998
1136	Aves	Psittaculidae	<i>Platycercus adscitus</i>	pale-headed rosella	C		0	7	24/06/2015
1118	Aves	Psittaculidae	<i>Psephotus haematonotus</i>	red-rumped parrot	C		0	2	1/08/2013
1575	Aves	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail	C		0	10	5/11/2023
1576	Aves	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail	C		0	10	5/11/2023
1303	Aves	Sturnidae	<i>Sturnus vulgaris</i>	common starling			0	1	28/08/1998
1822	Aves	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill	C		0	1	7/08/2000
1276	Aves	Zosteropidae	<i>Zosterops lateralis</i>	silveryeye	C		0	5	3/06/2014
35081	Insecta	Aeshnidae	<i>Anax papuensis</i>	Australian Emperor			0	1	6/11/2023
35199	Insecta	Libellulidae	<i>Diplacodes bipunctata</i>	wandering percher			0	1	6/11/2023
35219	Insecta	Libellulidae	<i>Orthetrum caledonicum</i>	blue skimmer			0	1	6/11/2023
19316	Insecta	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)			0	1	6/11/2023
19172	Insecta	Nymphalidae	<i>Junonia villida villida</i>	meadow argus			0	3	6/11/2023

19169	Insecta	Nymphalidae	<i>Vanessa kershawi</i>	Australian painted lady			0	1	6/11/2023
19110	Insecta	Pieridae	<i>Belenois java teutonia</i>	caper white			0	1	5/11/2023
901	Mammalia	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo	C		0	2	7/12/2011
904	Mammalia	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby	C		0	1	24/06/2015
885	Mammalia	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby	C		0	3	24/06/2015
989	Mammalia	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat	C		0	1	25/09/1999
1080	Mammalia	Suidae	<i>Sus scrofa</i>	pig			0	3	24/06/2015
929	Mammalia	Vespertilionidae	<i>Vespadelus vulturinus</i>	little forest bat	C		3	7	5/02/2000
556	Reptilia	Agamidae	<i>Pogona barbata</i>	bearded dragon	C		0	3	4/11/2020
325	Reptilia	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard	C		0	1	22/09/2012
74	Reptilia	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor	C		0	1	7/12/2011
61	Reptilia	Varanidae	<i>Varanus varius</i>	lace monitor	C		0	4	5/11/2023

Table 3. Plants recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
16262	Equisetopsida	Acanthaceae	<i>Rostellularia adscendens</i>		C		0	1	20/10/2021
15807	Equisetopsida	Aizoaceae	<i>Tetragonia tetragonoides</i>	New Zealand spinach	C		0	1	20/10/2021
18026	Equisetopsida	Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed	C		0	1	20/10/2021
16587	Equisetopsida	Amaranthaceae	<i>Nyssanthus erecta</i>		C		0	2	20/10/2021
9698	Equisetopsida	Apocynaceae	<i>Carissa ovata</i>	currantbush	C		0	1	14/03/1997
16521	Equisetopsida	Apocynaceae	<i>Parsonia lanceolata</i>	northern silkpod	C		0	1	27/06/2000
16771	Equisetopsida	Asparagaceae	<i>Lomandra filiformis</i>		C		0	1	14/03/1997
16776	Equisetopsida	Asparagaceae	<i>Lomandra longifolia</i>		C		2	3	15/12/2021
35555	Equisetopsida	Asteraceae	<i>Brachyscome dalbyensis</i>		C		1	1	3/01/2023
15596	Equisetopsida	Asteraceae	<i>Brachyscome microcarpa</i>		C		0	1	20/10/2021
9570	Equisetopsida	Asteraceae	<i>Brachyscome multifida</i>		C		1	2	3/01/2023

42296	Equisetopsida	Asteraceae	<i>Brachyscome pedleyi</i>		C		1	1	2/07/2024
42307	Equisetopsida	Asteraceae	<i>Brachyscome stenoloba</i>		C		1	1	2/07/2024
15565	Equisetopsida	Asteraceae	<i>Calotis cuneifolia</i>	burr daisy	C		2	3	20/04/2023
15568	Equisetopsida	Asteraceae	<i>Calotis lappulacea</i>	yellow burr daisy	C		1	2	15/12/2021
35896	Equisetopsida	Asteraceae	<i>Erigeron bonariensis</i>				0	1	14/03/1997
35903	Equisetopsida	Asteraceae	<i>Erigeron canadensis</i>				0	1	20/10/2021
6519	Equisetopsida	Asteraceae	<i>Rutidosia lanata</i>		NT		1	1	20/01/2022
30174	Equisetopsida	Asteraceae	<i>Senecio brisbanensis</i>		C		0	1	20/10/2021
29334	Equisetopsida	Asteraceae	<i>Senecio queenslandicus</i>		C		0	1	20/10/2021
12208	Equisetopsida	Asteraceae	<i>Sigesbeckia orientalis</i>	Indian weed	C		0	1	20/10/2021
34624	Equisetopsida	Asteraceae	<i>Sphaeromorphaea australis</i>		C		1	1	14/11/2018
14957	Equisetopsida	Asteraceae	<i>Vittadinia dissecta</i> var. <i>hirta</i>		C		1	1	5/02/2010
14959	Equisetopsida	Asteraceae	<i>Vittadinia sulcata</i>	native daisy	C		1	1	3/01/2023
41934	Equisetopsida	Brassicaceae	<i>Lemphoria eremigena</i>		C		1	1	3/01/2023
16549	Equisetopsida	Cactaceae	<i>Opuntia aurantiaca</i>	tiger pear			0	1	20/10/2021
19352	Equisetopsida	Cactaceae	<i>Opuntia stricta</i>				0	3	27/06/2000
9535	Equisetopsida	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear			0	3	20/10/2021
15918	Equisetopsida	Campanulaceae	<i>Wahlenbergia gracilis</i>	spreading bluebell	SL		0	1	20/10/2021
18011	Equisetopsida	Casuarinaceae	<i>Allocasuarina inophloia</i>		C		0	20	27/06/2000
18013	Equisetopsida	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak	C		0	73	20/10/2021
17707	Equisetopsida	Casuarinaceae	<i>Casuarina cristata</i>	belah	C		0	7	20/10/2021
34775	Equisetopsida	Celastraceae	<i>Denhamia cunninghamii</i>		C		0	1	14/03/1997
41274	Equisetopsida	Chenopodiaceae	<i>Dysphania melanocarpa</i>		C		0	1	20/10/2021
17372	Equisetopsida	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>linifolia</i>		C		0	1	20/10/2021

17296	Equisetopsida	Chenopodiaceae	<i>Enchylaena tomentosa</i>		C		0	2	20/10/2021
14253	Equisetopsida	Chenopodiaceae	<i>Rhagodia parabolica</i>		C		0	1	14/03/1997
16331	Equisetopsida	Chenopodiaceae	<i>Rhagodia spinescens</i>	thorny saltbush	C		0	1	20/10/2021
17176	Equisetopsida	Convolvulaceae	<i>Evolvulus alsinoides</i>		C		0	1	20/10/2021
9267	Equisetopsida	Crassulaceae	<i>Crassula sieberiana</i>		C		0	1	20/10/2021
8221	Equisetopsida	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine	C		0	49	20/10/2021
14779	Equisetopsida	Cyperaceae	<i>Carex inversa</i>	knob sedge	C		0	1	14/03/1997
17519	Equisetopsida	Cyperaceae	<i>Cyperus fulvus</i>		C		0	1	20/10/2021
17521	Equisetopsida	Cyperaceae	<i>Cyperus gracilis</i>		C		0	2	20/10/2021
11073	Equisetopsida	Cyperaceae	<i>Eleocharis plana</i>	ribbed spikerush	C		1	1	11/09/2019
17107	Equisetopsida	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush	C		0	2	20/10/2021
17078	Equisetopsida	Cyperaceae	<i>Gahnia aspera</i>		C		0	1	28/06/2000
11902	Equisetopsida	Cyperaceae	<i>Schoenus kennyi</i>		C		0	1	27/06/2000
16662	Equisetopsida	Ericaceae	<i>Melichrus urceolatus</i>	honey gorse	C		0	1	3/06/2014
14008	Equisetopsida	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion	SL		0	1	14/03/1997
17062	Equisetopsida	Goodeniaceae	<i>Goodenia hederacea</i> subsp. <i>hederacea</i>		C		0	2	28/06/2000
17065	Equisetopsida	Goodeniaceae	<i>Goodenia rotundifolia</i>		C		1	2	5/02/2010
16233	Equisetopsida	Goodeniaceae	<i>Scaevola spinescens</i>	prickly fan flower	C		0	1	14/03/1997
16606	Equisetopsida	Haloragaceae	<i>Myriophyllum crispatum</i>		C		1	1	29/06/2006
10281	Equisetopsida	Hemerocallidaceae	<i>Dianella longifolia</i>		C		0	1	20/10/2021
36213	Equisetopsida	Lamiaceae	<i>Teucrium puberulum</i>		C		0	1	27/06/2000
14963	Equisetopsida	Lamiaceae	<i>Westringia cheelii</i>		C		1	2	25/03/2023
11780	Equisetopsida	Lamiaceae	<i>Westringia parvifolia</i>		V	V	1	1	27/09/2024
16859	Equisetopsida	Laxmanniaceae	<i>Laxmannia gracilis</i>	slender wire lily	C		0	1	20/10/2021

15780	Equisetopsida	Leguminosae	<i>Acacia burrowii</i>		C		1	27	28/03/2020
15784	Equisetopsida	Leguminosae	<i>Acacia caroleae</i>		C		1	1	30/06/2023
14932	Equisetopsida	Leguminosae	<i>Acacia conferta</i>		C		1	1	27/02/2020
15792	Equisetopsida	Leguminosae	<i>Acacia crassa</i> <i>subsp. crassa</i>		C		2	2	6/03/2020
18780	Equisetopsida	Leguminosae	<i>Acacia deanei</i>		C		1	1	9/03/2020
15796	Equisetopsida	Leguminosae	<i>Acacia decora</i>	pretty wattle	C		1	1	6/03/2020
15752	Equisetopsida	Leguminosae	<i>Acacia harpophylla</i>	brigalow	C		0	1	14/03/1997
14916	Equisetopsida	Leguminosae	<i>Acacia ixiophylla</i>		C		0	1	28/06/2000
15765	Equisetopsida	Leguminosae	<i>Acacia leiocalyx</i>		C		0	2	27/06/2000
15727	Equisetopsida	Leguminosae	<i>Acacia neriifolia</i>	pechey wattle	C		1	2	5/05/2020
14872	Equisetopsida	Leguminosae	<i>Acacia polybotrya</i>	western silver wattle	C		1	2	21/10/2024
14082	Equisetopsida	Leguminosae	<i>Acacia semilunata</i>	crescent-leaved wattle	C		1	1	3/01/2023
15356	Equisetopsida	Leguminosae	<i>Glycine tabacina</i>	glycine pea	C		0	1	20/10/2021
15260	Equisetopsida	Leguminosae	<i>Jacksonia scoparia</i>		C		0	1	3/06/2014
42631	Equisetopsida	Leguminosae	<i>Oxytes brachypoda</i>		C		0	1	20/10/2021
15014	Equisetopsida	Leguminosae	<i>Swainsona galegifolia</i>	smooth Darling pea	C		1	1	22/03/2019
13056	Equisetopsida	Loranthaceae	<i>Amyema quandang</i> <i>var. quandang</i>		C		1	1	14/09/2021
18089	Equisetopsida	Malvaceae	<i>Abutilon oxycarpum</i>		C		0	2	20/10/2021
16197	Equisetopsida	Malvaceae	<i>Sida fibulifera</i>		C		0	1	14/03/1997
16150	Equisetopsida	Malvaceae	<i>Sida trichopoda</i>		C		0	2	27/06/2000
8993	Equisetopsida	Myrtaceae	<i>Angophora costata</i>		C		0	1	3/06/2014
17999	Equisetopsida	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum	C		0	4	27/06/2000
17766	Equisetopsida	Myrtaceae	<i>Calytrix tetragona</i>	fringe myrtle	C		1	1	3/02/2022
6445	Equisetopsida	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood	C		0	1	1/05/2004

6443	Equisetopsida	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>trachyphloia</i>		C		0	1	27/06/2000
13610	Equisetopsida	Myrtaceae	<i>Eucalyptus bakeri</i>	Baker's mallee	C		1	1	11/07/2020
17249	Equisetopsida	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum	C		0	4	20/10/2021
17252	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark	C		2	24	13/06/2020
22123	Equisetopsida	Myrtaceae	<i>Eucalyptus crebra</i> x <i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i>		C		1	1	24/06/2020
12500	Equisetopsida	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i>		C		1	1	13/06/2020
17263	Equisetopsida	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i>		C		0	18	28/06/2000
17224	Equisetopsida	Myrtaceae	<i>Eucalyptus microcarpa</i>	inland grey box	C		0	10	28/06/2000
17188	Equisetopsida	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box	C		0	25	20/10/2021
9020	Equisetopsida	Myrtaceae	<i>Homoranthus melanostictus</i>		C		1	1	17/07/2021
31856	Equisetopsida	Myrtaceae	<i>Kardomia jucunda</i>		C		4	4	17/07/2021
16685	Equisetopsida	Myrtaceae	<i>Melaleuca densispicata</i>		C		1	2	19/05/2023
16838	Equisetopsida	Oleaceae	<i>Jasminum didymum</i> subsp. <i>racemosum</i>		C		0	1	14/03/1997
12740	Equisetopsida	Oxalidaceae	<i>Oxalis perennans</i>		C		0	1	20/10/2021
16473	Equisetopsida	Phyllanthaceae	<i>Phyllanthus virgatus</i>		C		0	1	20/10/2021
15675	Equisetopsida	Poaceae	<i>Ancistrachne uncinulata</i>	hooky grass	C		0	4	20/10/2021
15650	Equisetopsida	Poaceae	<i>Aristida caput-medusae</i>		C		0	4	20/10/2021
15655	Equisetopsida	Poaceae	<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>		C		0	1	28/06/2000
9957	Equisetopsida	Poaceae	<i>Aristida leichhardtiana</i>		C		0	1	27/06/2000
11125	Equisetopsida	Poaceae	<i>Aristida muricata</i>		C		0	1	28/06/2000
9661	Equisetopsida	Poaceae	<i>Aristida ramosa</i>	purple wiregrass	C		0	1	20/10/2021
15634	Equisetopsida	Poaceae	<i>Arundinella nepalensis</i>	reedgrass	C		0	1	20/10/2021
30190	Equisetopsida	Poaceae	<i>Chloris divaricata</i>		C		0	1	14/03/1997
15524	Equisetopsida	Poaceae	<i>Chloris pectinata</i>	comb chloris	C		0	1	27/06/2000

15526	Equisetopsida	Poaceae	<i>Chloris ventricosa</i>	tall chloris	C		0	1	20/10/2021
15485	Equisetopsida	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass	C		0	2	20/10/2021
34492	Equisetopsida	Poaceae	<i>Dinebra decipiens</i>		C		0	2	20/10/2021
15390	Equisetopsida	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass	C		0	2	28/06/2000
15364	Equisetopsida	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass	C		0	1	20/10/2021
28420	Equisetopsida	Poaceae	<i>Megathyrsus maximus</i> var. <i>maximus</i>				0	1	14/03/1997
13607	Equisetopsida	Poaceae	<i>Panicum effusum</i>		C		0	2	20/10/2021
14346	Equisetopsida	Poaceae	<i>Paspalidium albobillosum</i>		C		0	1	27/06/2000
15184	Equisetopsida	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass	C		0	1	20/10/2021
14169	Equisetopsida	Poaceae	<i>Sporobolus elongatus</i>		C		0	1	14/03/1997
14170	Equisetopsida	Poaceae	<i>Sporobolus scabridus</i>		C		0	1	14/03/1997
14995	Equisetopsida	Poaceae	<i>Tripogon loliiformis</i>	five minute grass	C		0	2	28/06/2000
10781	Equisetopsida	Poaceae	<i>Urochloa panicoides</i> var. <i>panicoides</i>				0	1	20/10/2021
17791	Equisetopsida	Portulacaceae	<i>Calandrinia balonensis</i>	broad-leaved parakeelya	C		0	1	5/11/2020
17793	Equisetopsida	Portulacaceae	<i>Calandrinia pickeringii</i>		C		0	1	20/10/2021
9294	Equisetopsida	Proteaceae	<i>Banksia integrifolia</i>		C		0	2	24/06/2015
17679	Equisetopsida	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern	C		0	2	27/06/2000
17682	Equisetopsida	Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>		C		0	1	20/10/2021
11100	Equisetopsida	Pteridaceae	<i>Cheilanthes tenuifolia</i>	rock fern	C		0	1	28/06/2000
17567	Equisetopsida	Rhamnaceae	<i>Cryptandra armata</i>		C		1	1	19/07/2022
15950	Equisetopsida	Rhamnaceae	<i>Ventilago viminalis</i>	supplejack	C		0	1	14/03/1997
12283	Equisetopsida	Rubiaceae	<i>Asperula geminifolia</i>		C		1	1	3/01/2023
16407	Equisetopsida	Rubiaceae	<i>Pomax umbellata</i>		C		0	1	27/06/2000
41636	Equisetopsida	Rutaceae	<i>Cyanothamnus occidentalis</i>		C		1	1	5/12/2022

17085	Equisetopsida	Rutaceae	<i>Geijera parviflora</i>	wilga	C		0	2	20/10/2021
21801	Equisetopsida	Rutaceae	<i>Philotheca sporadica</i>		E		2	2	20/01/2022
18054	Equisetopsida	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree	C		0	1	14/03/1997
14840	Equisetopsida	Sapindaceae	<i>Alectryon oleifolius</i>		C		0	3	20/10/2021
13655	Equisetopsida	Sapindaceae	<i>Dodonaea macrossanii</i>		C		4	5	16/12/2022
8631	Equisetopsida	Scrophulariaceae	<i>Eremophila debilis</i>	winter apple	C		0	1	14/03/1997
17278	Equisetopsida	Scrophulariaceae	<i>Eremophila mitchellii</i>		C		0	1	14/03/1997
16157	Equisetopsida	Solanaceae	<i>Solanum americanum</i>				0	1	20/10/2021
16165	Equisetopsida	Solanaceae	<i>Solanum ellipticum</i>	potato bush	C		0	1	20/10/2021
16175	Equisetopsida	Solanaceae	<i>Solanum parvifolium</i>		C		0	1	14/03/1997
29802	Equisetopsida	Solanaceae	<i>Solanum parvifolium</i> subsp. <i>parvifolium</i>		C		0	1	20/10/2021
16440	Equisetopsida	Thymelaeaceae	<i>Pimelea microcephala</i> subsp. <i>microcephala</i>		C		0	1	27/06/2000
16441	Equisetopsida	Thymelaeaceae	<i>Pimelea neoanglica</i>	poison pimelea	C		1	2	15/12/2021
16444	Equisetopsida	Thymelaeaceae	<i>Pimelea trichostachya</i>	flaxweed	C		1	1	7/12/2007
34284	Equisetopsida	Verbenaceae	<i>Glandularia aristigera</i>				0	1	20/10/2021
28973	Equisetopsida	Zygophyllaceae	<i>Roepera apiculata</i>		C		1	1	3/01/2023

Table 4. Fungi recorded within the area of interest and its one kilometre buffer

Taxon Id	Class	Family	Scientific Name	Common Name	NCA	EPBC	Specimens	Records	Last record
26582	Lecanoromycetes	Parmeliaceae	<i>Hypogymnia pseudobitteriana</i>		C		0	1	5/11/2023

Table 5. Other species recorded within the area of interest and its one kilometre buffer

No species found within the area of interest and its one kilometre buffer.

Species table headings and codes

Taxon Id: Unique identifier of the taxon from the WildNet database.

NCA: Queensland conservation status of the taxon under the *Nature Conservation Act 1992* (Least Concern (C), Critically Endangered (CR), Endangered (E), Extinct (EX), Near Threatened (NT), Extinct in the Wild (PE), Special Least Concern (SL), and Vulnerable (V)).

EPBC: Australian conservation status of the taxon under the *Environment Protection and Biodiversity Conservation Act 1999* (Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Vulnerable (V), and Extinct in the Wild (XW)).

Specimens: The number of specimen-backed records of the taxon.

Records: The total number of records of the taxon.

Last record: Date of most recent record of the taxon.

Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [WildNet Application](#) - public interface to find species information and species lists generated from the WildNet database.
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld WildNet Data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [Wetland Maps](#) - view species records, survey locations etc. approved for publication
- [Wetland Summary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
- [WildNet wildlife records - published - Queensland](#) - spatial layer of WildNet records approved for publication generated weekly
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the WildNet Team WildNet@detsi.qld.gov.au.

Other useful sites for accessing Queensland biodiversity data include:

- [Useful wildlife resources](#)
- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australasian Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

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APPENDIX B LIKELIHOOD OF OCCURENCE

MSES LIKELIHOOD OF OCCURENCE

TABLE B-1: THREATENED SPECIES KNOWN, LIKELY OR POTENTIAL TO OCCUR WITHIN THE PROJECT AREA SUMMARY

Scientific Name	Common name	NC Act
Known		
<i>Stagonopleura guttata</i>	Diamond firetail	V
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V
<i>Phascolarctos cinereus</i>	Koala	E
<i>Tachyglossus aculeatus</i>	Short-beaked echidna	SLC
<i>Philotheca sporadica</i>	Kogan Waxflower	E
Likely		
<i>Hirundapus caudacutus</i>	White-throated needletail	V
Potential		
<i>Aphelocephala leucopsis</i>	Southern whiteface	V
<i>Gallinago hardwickii</i>	Latham's snipe	V
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V
<i>Apus pacificus</i>	Fork-tailed swift	SLC
<i>Petauroides volans</i>	Greater glider (southern and central)	E
<i>Petaurus australis australis</i>	Yellow-bellied glider (south-eastern)	V
<i>Acacia lauta</i>	Tara wattle	V
<i>Prostanthera sp. Dunmore (D.M. Gordon 8A)</i>	-	V
<i>Rutidosia glandulosa</i>	-	NT
<i>Rutidosia lanata</i>	-	NT
<i>Westringia parvifolia</i>	-	V

TABLE B-2: MSSES SPECIES LIKELIHOOD OF OCCURRENCE

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
Threatened Birds						
<i>Anthochaera phrygia</i>	Regent honeyeater	CE	CR	0	Occurring in box-ironbark woodland and eucalypt woodlands (sometimes found along riparian zones). Breeding habitat: Preference to nest in large mature trees with rough bark, e.g. ironbarks, sheoaks (<i>Casuarina</i>) and rough-barked apple (<i>Angophora</i>). Foraging habitat: Nectivorous species, taking nectar from eucalypts and mistletoe. However, have a preference for larger trees (often linked to high water soils and riparian zones) as they have higher rates of nectar.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Project Area does not contain box-ironbark woodland preferred by the species. - No recent records in Project Area or Locality.
<i>Aphelocephala leucopsis</i>	Southern whiteface	V	V	1	This species inhabits open woodlands (containing <i>eucalyptus</i> and <i>acacias</i>) with a moderate understory of shrubs and grasses, as this species forages on the ground amongst leaf litter. The species is largely confined to the south-west of the Mitchell Grass Downs. Breeding habitat: This species builds large bulky domed nest of grass, bark and roots, usually in a hollow or crevice, although sometimes in low bushes. Foraging habitat: Favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter.	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Suitable habitat does occur in the Project Area. - Recent record in Locality from 2024 from a roadside.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V, Mi	V	0	Prefers habitat on muddy edges of freshwater wetlands or brackish wetlands. Can be found at dams inland. Will often occupy coastal mudflats when ephemeral terrestrial wetlands have dried out. Breeding habitat: Does not breed in Australia. Foraging habitat: Foraging habitat is at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. Also among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often in hypersaline environments. After rain, they may forage in paddocks of short grass, well away	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Potential for foraging associated with farm dams in the Project Area, but no roosting or breeding habitat present. - No recent records in Project Area or Locality.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					from water. They may forage on coastal mudflats at low tide, and move to freshwater wetlands near the coast to feed at high tide. Roosting habitat: Roosting occurs at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. Occasionally, they roost on sandy beaches, stony shores or on rocks in water.	
<i>Calidris ferruginea</i>	Curlew sandpiper	CE, Mi	CR	0	This species is 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. Occasionally they are recorded around floodwaters. Breeding habitat: This species does not breed in Australia. Foraging habitat: Forage at the edges of shallow pools and drains of intertidal mudflats and sandy shores. At high tide, they forage among low sparse emergent vegetation, such as saltmarsh, and sometimes forage in flooded paddocks or inundated salt flats. Occasionally they forage on wet mats of algae or waterweed, or on banks of beach-cast seagrass or seaweed. Roosting habitat: This species roost in open situations with damp substrate, especially on bare shingle, shell, or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh.	Unlikely to occur: • The Project Area coincides with the likely modelled SPRAT distribution. • Potential for foraging associated with farm dams in the Project Area. • No recent records in Project Area or Locality.
<i>Calyptrorhynchus lathamii lathamii</i>	Glossy black cockatoo (south-eastern)	V	V	6	They are uncommon but widespread. They can be found from Mitchell, Queensland, through New South Wales and onto Victoria. Their distribution is continuous through the forested parts of the Great Dividing Range but becomes more scattered inland.	Known to Occur: • The Project Area coincides with the likely modelled SPRAT distribution • Foraging habitat present in the Project Area.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Breeding habitat: They are hollow nesters, utilising large hollows in both living and dead eucalypt trees. 1) >8 m above ground; 2) located in branches >30 cm in diameter; 3) branch or stem no more than 45° from vertical; and 4) minimum entrance diameter of >15 cm. Foraging habitat: This species feed almost exclusively on the seeds of sheoaks (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>), usually relying on one or two species within a region. In south-east Queensland and north-east New South Wales, they show preference for black sheoak (<i>A. littoralis</i>) and forest sheoak (<i>A. torulosa</i>).	- Recent records in locality. - Observations of the species in the Project Area in February 2024, February 2025 and July 2025.
<i>Climacteris picumnus victoriae</i>	Brown treecreeper (south-eastern)	V	V	0	The subspecies mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. The subspecies is not usually found in woodlands with a dense shrub layer, and it is absent from heavily degraded woodlands and steep rocky hills. Breeding habitat: Hollows in standing dead or live trees and tree stumps are essential for nesting. Foraging habitat: The subspecies forages both on the ground and in mature live and dead trees, primarily eating invertebrates, small reptiles or on occasion sap form selective trees.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Habitat in the Project Area is generally too shrubby, or if not, fragmented. - No recent records in Project Area or Locality.
<i>Erythrotriorchis radiatus</i>	Red goshawk	E	E	0	Occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Riverine forests are also used frequently. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. Breeding habitat: The red goshawk 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.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Limited suitable habitat in the Project Area due to a lack of tall, in-tact riverine forests. - No recent records in Project Area or Locality.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Foraging habitat: Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the goshawk requires for prey.	
<i>Falco hypoleucos</i>	Grey falcon	V	V	0	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Foraging habitat: Occurs near wetlands where surface water attracts prey. Breeding habitat: 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; peak laying season is in late winter and early spring; two or three eggs are laid.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Project Area is not considered arid enough to be suitable for the species. - No recent records in Project Area or Locality.
<i>Gallinago hardwickii</i>	Latham's snipe	V, Mi	V	0	In Australia the species occurs in permanent and ephemeral wetlands up to 2000 m above sea-. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Breeding habitat: Does not breed in Australia. Foraging habitat: characterised by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation).	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Project Area contains potential habitat in the form of farm dams for foraging. - No recent records in Project Area or Locality.
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V	1	The squatter pigeon (southern) habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by <i>Eucalyptus spp.</i>, <i>Corymbia spp.</i> or <i>Callitris spp.</i> Additionally, they also favour remnant regrowth or partly modified vegetation communities that are within 3 km of water bodies. Breeding habitat: Breeding habitat occurs on stony rises on sandy, gravelly soils, within 1 km of a suitable, permanent waterbody (including farm dams and watercourses). Foraging habitat: Natural foraging habitat for the species is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i>, <i>Corymbia</i>,	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Project Area contains suitable habitat for both breeding and foraging. - Recent record in Locality from 2021 from a roadside - No observation of species in Project Area.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					<i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3 km of a suitable, permanent, or seasonal waterbody. Dispersal habitat: Dispersal habitat is any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies.	
<i>Grantiella picta</i>	Painted honeyeater	V	V	0	This species is sparsely distributed throughout its range. Notably, populations move alongside mistletoe flowering and fruiting events as this species is highly specialised in consuming mistletoe fruit (sometimes nectar) during breeding season. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips. Breeding habitat: The species appears to prefer mistletoe as a nest substrate and selects nest sites in habitats where mistletoe prevalence and parasitism rates are high. Foraging habitat: The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Mistletoe is present; however, the Project Area lacks large abundances suitable for the species. - No recent records in Project Area or Locality. - Based on lack of recent records, observations and quantity of mistletoe it is unlikely this species inhabits the Project Area.
<i>Hirundapus caudacutus</i>	White-throated needletail	V, Mi	V	2	According to Higgins (1999), this species occurs over most types of habitat, but 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 they are less commonly recorded flying above woodland (as cited in TSSC, 2019). Whilst rare, they have been recorded on wooded ends of ridges, roosting after dark high in the eucalypt tree canopies (Tarburton, 1993). Breeding habitat; this species does not breed in Australia. Roosting habitat: the species is noted to roost in tall mature forests and woodlands amongst dense foliage and in hollows often associated with ridgelines. Foraging habitat: the species almost always will fly aerially at 'cloud level' and forage over farmland, heathland and mudflats.	Likely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Preferred foraging habitat is present in the form of wooded areas (remnant and regrowth) as well as open farmland. - Recent records in Locality from as recent as 2021. Records are mostly associated with State Forest.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Lathamus discolor</i>	Swift parrot	CE	E	0	Species over-winters in mainland Australia. On the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in Eucalyptus species, with the majority being found in Victoria and New South Wales (TSSC 2016).	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - No foraging habitat as the species is highly selective in its foraging areas. - No recent records in Project Area or Locality.
<i>Neophema chrysostoma</i>	Blue-winged parrot	V	V	0	Blue-winged Parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Limited suitable grassy woodlands and wetlands. - No recent records in Project Area or Locality.
<i>Rostratula australis</i>	Australian painted snipe	E	E	0	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Foraging and roosting habitat: Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter. Breeding habitat: Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Potential for foraging and roosting near farm dams present in the Project Area, but no breeding habitat present. - No recent records in Project Area or Locality.
<i>Stagonopleura guttata</i>	Diamond firetail	V	V	4	Occurs in eucalypt, acacia and casuarina woodlands, open forests and farmlands with scattered trees. Species prefers lower tree densities, high grass cover and low coarse woody debris. Species is largely sedentary but may also be locally nomadic.	Known to Occur: The Project Area coincides with the likely modelled SPRAT distribution.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
						- Preferred habitat of scattered woodlands with grass cover is present in the Project Area. - Multiple recent records within Project Area/locality from as recent as 2021 in remnant and non-remnant vegetation. High spatial uncertainty associated with these records.
<i>Turnix melanogaster</i>	Black-breasted button-quail	V	V	0	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. They may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes. Optimum habitat is located on highly fertile soils. It is believed that the highly fertile soils promote rapid leaf growth on plants. During dry periods, much of the foliage then drops to the ground thus maintaining the deep leaf litter layer which is crucial to the foraging requirements of the species. Known TECs it is associated with are the semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - No suitable habitat present. - No recent records in Project Area or Locality.
Threatened Fish						
<i>Bidyanus bidyanus</i>	Silver perch, bidyan	E	E	0	The silver perch is endemic to the Murray_Darling basin of east Australia, though it has been artificially translocated into several reservoirs and rivers outside this range.	Unlikely to occur: - The Project Area does not overlap with the modelled SPRAT distribution - No suitable habitat present in the Project Area - No recent records in Project Area or Locality

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
Threatened Invertebrates						
<i>Hypochrysops piceatus</i>	Bulloak jewel butterfly	CE	CE	0	The bulloak jewel butterfly is only known to exist in the one area and is regarded as being an extremely rare butterfly species. The butterfly species commonly occurs in bulloak woodlands. The flora species that are associated with the butterfly species are <i>Allocasuarina luehmannii</i>, <i>A. leiocarpa</i>, <i>Eucalyptus tetricornis</i> and <i>Acacia neriifolia</i>, with understorey <i>Jacksonia scoparia</i>, <i>Cassinia laevis</i>, <i>Acacia</i> sp. and <i>Callitris columellaris</i> var <i>campestris</i>. The habitat requirements of the bulloak jewel butterfly are complicated, in that the species requires the flora species (in particular <i>Allocasuarina</i> spp.) above and an undescribed ant species (<i>Anonychomyrma</i>) that occupies trees that permit female butterflies to dwell. Butterfly dispersal is unknown, but considered to be 1-3 kilometres or less by expert on the bulloak jewel butterfly D.P.A. Sands (pers. comm June 2022) Species has restricted distribution and only two known extant sub-populations that occur roughly 80 kms south and south-east of the Project Area.	Unlikely to occur: - The Project Area does not coincide with the likely modelled SPRAT distribution but is within the species' potential Distribution Area - Project Area does contain specific habitat attributes for the species, but is not considered suitable habitat given the species extremely confined distribution. - No recent records in Project Area or Locality.
<i>Jalmenus eubulus</i>	Pale imperial hairstreak	—	V	0	Occurs in open forest or woodland dominated by Brigalow (<i>Acacia harpophylla</i>). Breeding is confined to old-growth communities. Does not appear to colonise regrowth habitats following clearing or other major disturbance. Suitable habitat is dominated by brigalow (<i>Acacia harpophylla</i>) and belah (<i>Casuarina cristata</i>) on clay soils on flat to gently undulating plains, usually with scattered emergent eucalyptus such as poplar box (<i>Eucalyptus populnea</i>) and low trees of Wilga (<i>Geijera parviflora</i>) (OEH 2017).	Unlikely to Occur: - Project Area is within the Species Distribution Area. - Habitat features within the Project Area are highly disturbed due to clearing and grazing. - No recent records in the locality. Record is from 1999.
<i>Adclarkia cameroni</i>	Brigalow woodland snail	E	E	0	Species occurs in remnant, scattered and roadside brigalow and eucalypt woodland communities. The species occurs under logs and leaf litter, where it is thought to feed on fungi, lichen, algae and other biofilms. The species requires both canopy and on-ground timber for survival and reproduction.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Habitat for the species in the Project Area is highly degraded

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
						by cattle and significantly fragmented. No recent records in Project Area or Locality, or observations during field surveys despite targeted surveys
<i>Adclarkia dulacca</i>	Dulacca woodland snail	E	E	0	Species lives under rocks and timber in a range of habitats including vine thickets, brigalow woodlands, ironbark and lancewood woodlands on ridges and gum-topped box woodland. The species may occur in remnant, or isolated habitats. The species requires canopy and on-ground timber cover for survival and egg-laying. The species is thought to feed on fungi, lichen, algae and other biofilms.	Unlikely to occur: - The Project Area does not coincide with the likely modelled SPRAT distribution - Where brigalow and eucalypt woodlands occur they lack suitable microhabitat features and are degraded and fragmented. - No recent records in Project Area or Locality, or observations during field surveys despite targeted surveys.
Threatened Mammals						
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	E	E	0	This species is predominantly cave dwelling and requires the presence of foraging and roosting habitat in an environment to sustain a population. Foraging habitat includes large woodlands and fertile valleys however within Queensland this species has been observed foraging along ridge crests and upper slopes of escarpments. Foraging habitat: Foraging in highly fertile valleys and plains. As well as moderately tall woodlands along watercourses. Breeding habitat: Little information is available on the breeding behaviour for the species (most studies focused in NSW).	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - No preferred habitat of sandstone cliffs in proximity to woodland valley is present - No recent records in Project Area or Locality - Species was not recorded on Anabats during field surveys

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Roosting habitat: cliffs, escarpments and rocky outcrops are utilised for roosting (typically of sandstone composition or rhyolite) that contain caves, overhangs and cracks.	
<i>Nyctophilus corbeni</i>	Corben's long-eared bat	V	V	0	This microbat species has a scattered distribution mostly within the Murray-Darling Basin, but with some records outside of this area. It is more common in box, ironbark and cypress pine woodland on the western slopes and plains. Its stronghold seems to be the Pilliga scrub. It roosts in tree hollows, crevices and under loose bark. Foraging habitat: Foraging tends to be located around patches of trees in the landscape. Breeding habitat: Little information is available on the breeding behaviour for the species. Roosting habitat: Roosting behaviour is located within dead trees including ironbark's, cypress and bullocke.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Suitable habitat does occur in the form of cypress-pine and bullocke woodland to forest. - Targeted surveys for the species meeting survey guidelines were completed and failed to capture this species but did capture other <i>Nyctophilus</i> species. - No recent records in Project Area or locality.
<i>Petauroides volans</i>	Greater glider (southern and central)	E	E	0	Habitat attributes including live and dead hollow-bearing trees for denning, feed trees, large trees, habitat connectivity across the landscape. Associated trees include; <i>Corymbia citriodora</i>, <i>Eucalyptus moluccana</i>, <i>E. tereticornis</i>, <i>E. crebra</i>, <i>C. intermedia</i> and <i>E. portuensis</i>. Size of trees is also important for Queensland greater gliders, with trees > 30 cm diameter at breast height (DBH) preferentially selected for foraging and > 50 cm DBH for denning. Trees > 50 cm DBH are more likely to contain suitable hollows for sheltering by greater gliders. Hollow-bearing trees are an essential component of greater glider habitat, and their presence or absence may be used to indicate habitat suitability for greater gliders.	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Potential habitat present in Project Area, but is degraded and fragmented. Vegetation adjoining the adjacent State Forests are most suitable. - No recent records in Project Area or Locality
<i>Petaurus australis australis</i>	Yellow-bellied glider (south-eastern)	V	V	0	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	Potential to occur: The Project Area coincides with the likely modelled SPRAT distribution.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Breeding and denning habitat: Species shows a preference for hollows in old, mature, smooth bark living trees . Foraging and dispersal habitat: Species uses a variety of food sources, including insects in shed bark, manna, eucalypt nectar and tree sap (typically smooth-barked gums).	- Potential habitat present in Project Area, but is degraded and fragmented. Vegetation adjoining the adjacent State Forests are most suitable. - No recent records in Project Area or Locality.
<i>Phascolarctos cinereus</i>	Koala	E	E	3	Widely distributed species that can live in many different eucalypt forest and woodland environments ranging from dense, wet coastal forests to semi-arid scattered woodlands, and even suburban or rural landscapes, in patches or strips of native vegetation interspersed with isolated trees. Koalas can be found in habitats ranging from relatively open forests to woodlands, and in climates ranging from tropical to cool temperate. In semi-arid climates, they prefer riparian habitats, where nearby streams and creeks provide refuge during times of drought and extreme heat. Breeding and foraging habitat: Koala habitat can be broadly defined as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. Dispersal habitat: Dispersal habitat is recognised as habitat that the koala can disperse into and is typically open woodland, paddock trees, riparian habitat and habitat where there are koala food trees.	Known to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Foraging and breeding habitat associated with ironbark woodlands or sparse to open woodlands, and riparian vegetation occurs within the Project Area, and dispersal habitat associated with agricultural land with sparse eucalyptus species occurs within the Project Area. - Recent records in locality (latest record from 2012), and observation of koala scat on 3 occasions in the Project Area.
<i>Tachyglossus aculeatus</i>	Short-beaked echidna	-	SLC	2	Short-beaked echidna inhabit a wide range of habitats, both disturbed and undisturbed, including woodlands, forests, shrublands, grasslands, heathland, arid environments, rocky outcrops and agricultural lands. Within these habitats, the species resides under rocks and termite mounds, in hollow logs, under vegetation and woody debris piles, tree roots and may occasionally reside in wombat or rabbit burrows. Short-beaked echidnas burrow into the soil or shelter under tussock grass or bushes during wet and windy weather.	Known to Occur: - Project Area is within the Species Distribution Area. - Suitable habitat present in Project Area - Two recent WildNet records within the Project Area. - No observations during field surveys.

Threatened Flora

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Acacia lauta</i>	Tara wattle	V	V	0	The area where this species grows has a subhumid subtropical climate, with warm to hot, moist summers and cool to cold, dry winters. The localities are characterised by a gently undulating to flat landforms. Soils are moderately deep and hardsetting with a weakly acidic to neutral sandy loam surface grading into neutral to alkaline sandy clay subsoil. The vegetation varies from open forest to low woodland with a dense or moderately dense shrub layer. Tree species present at all sites include white cypress pine (<i>Callitris glaucophylla</i>) and buloke (<i>Allocasuarina luehmannii</i>). The understorey is rather diverse often including shrubs such as <i>Melaleuca nodosa</i>, <i>Melaleuca uncinata</i>, <i>Acacia caroleae</i>, <i>Westringia cheelii</i>, <i>Ozothamnus diotophyllus</i>, <i>Melaleuca diosmatifolia</i>, <i>Kunzea opposita</i> and <i>Hakea purpurea</i> and grasses like <i>Aristida caput-medusae</i>, <i>Aristida jerichoensis</i> var. <i>jerichoensis</i>, <i>Triodia scariosa</i> and <i>Cymbopogon refractus</i>.	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Preferred habitat present as well as co-dominant species - No recent records in Project Area or Locality
<i>Cadellia pentastylis</i>	Ooline	V	V	0	Species grows in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. Soils generally have low to medium nutrient content and are normally associated with upper and mid-slopes in the landscape. The altitude is generally 300-460 m above sea level, with some stands known to occur at 600 m above sea level.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Preferred habitat of vine thicket on undulating terrain is not present within Project Area - No recent records in Project Area or Locality
<i>Homopholis belsonii</i>	Belson's panic	V	E	0	Belson's panic is generally supported by three types of habitat: 1. Rocky, basaltic hills supporting <i>Eucalyptus albens</i>/<i>Geijera parviflora</i> (Wilga) woodland; 2. Flat to gently undulating alluvial areas supporting <i>Casuarina cristata</i> forest and sometimes Brigalow or Wilga; 3. Drainage lines supporting <i>C. cristata</i> and sandy country dominated by cypress pine-bloodwood-ironbark-she-oak forest.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Limited suitable habitat that is degraded by historical clearing and agriculture. - No recent records in Project Area or Locality

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Picris evae</i>	Hawkweed	V	V	0	Species occurs in eucalyptus open woodland with a grassy understorey composed of <i>Dichanthium spp.</i> Upper stratum species include <i>Eucalyptus melliodora</i> , <i>E. crebra</i> , <i>E. populnea</i> , <i>E. albens</i> , <i>Angophora subvelutina</i> , <i>Allocasuarina torulosa</i> , and <i>Casuarina cunninghamiana</i> . Collections have been made along roadsides and in cultivated areas, such as paddocks, on black, dark grey or red-brown soils, reddish clay-loam or medium clay soils.	Unlikely to occur: - The Project Area occurs on the edge of the likely modelled SPRAT distribution. - Sparse suitable habitat present as well as some co-dominant species. - No recent records in Project Area or Locality.
<i>Prostanthera sp. Dunmore (D.M.Gordon 8A)</i>	-	V	V	0	Species grows in <i>Eucalyptus</i> and <i>Callitris</i> woodland in shallow sandy soil or <i>Eucalyptus</i> woodland on hard sandstone ridge tops. The distribution of this species overlaps with the following EPBC Act-listed threatened ecological communities: - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; and - Brigalow (Acacia harpophylla dominant and co-dominant).	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Preferred habitat present as well as co-dominant species. - No recent records in Project Area or Locality.
<i>Leuzea australis</i>	Austral cornflower, native thistle	V	V	0	Species usually grows on heavy black or red-brown clay, or clay loams derived from basalt. Populations are often confined to roadsides and cultivation headlands. Species is often found in woodland and grassland and in association with narrow-leaved ironbark (<i>Eucalyptus crebra</i>), mountain coolibah (<i>E. orgadophila</i>), poplar box (<i>E. populnea</i>), forest red gum (<i>E. tereticornis</i>), silver-leaved ironbark (<i>E. melanophloia</i>), <i>Angophora subvelutina</i> (Broad leaved apple), <i>A. floribunda</i> (Rough-barked Apple), <i>Cirsium vulgare</i> (Spear Thistle - introduced species), <i>Dichanthium sericeum</i> (Queensland Bluegrass) and <i>Themeda triandra</i> (Kangaroo Grass). The Austral Cornflower is considered to be a poor competitor and prefers habitat where grass competition has been reduced by fire or other forms of disturbance. However, the species is unlikely to benefit from disturbance that allows the development of a dense cover of exotic grasses such as <i>Chloris Gayana</i> .	Unlikely to occur: - The Project Area occurs on the edge of the likely modelled SPRAT distribution. - Sparse suitable habitat present as well as some co-dominant species. - No recent records in Project Area or Locality.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Thesium australe</i>	Austral toadflax, toadflax	V	V	0	Species is semi-parasitic on roots of a range of grass species, notably kangaroo grass (<i>Themeda triandra</i>). It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams.	Unlikely to occur: - The Project Area occurs on the edge of the likely modelled SPRAT distribution. - Sparse suitable habitat present and no co-dominant species occurring. - No recent records in Project Area or Locality.
<i>Vincetoxicum forsteri</i> listed as <i>Tylophora linearis</i>	-	E	E	0	Species has rarely been collected and is known from eight localities in the Dubbo area and Mt Crow near Barraba in NSW, and "Myall Park" near Glenmorgan in Queensland. Species grows in dry scrub, open forest and woodlands associated with <i>Melaleuca uncinata</i> , <i>Eucalyptus fibrosa</i> , <i>E. sideroxylon</i> , <i>E. albens</i> , <i>Callitris endlicheri</i> , <i>C. glaucophylla</i> , <i>Allocasuarina luehmannii</i> , <i>Acacia hakeoides</i> , <i>A. lineata</i> , <i>Myoporum spp.</i> , and <i>Casuarina spp.</i>	Unlikely to occur: - The Project Area occurs on the edge of the likely modelled SPRAT distribution. - Sparse suitable habitat present as well as some co-dominant species. - No recent records in Project Area or Locality.
<i>Westringia parvifolia</i>	-	V	V	6	Known from a small area near Yelarbon and Inglewood, with recent records in Kumbarella State Forest. Species grows with <i>Eucalyptus bakeri</i> and <i>E. viridis</i> and with spinifex (<i>Tridia sp.</i>) on sandy and stony soils.	Potential to occur: - The Project Area occurs outside the modelled SPRAT distribution, but recent records in Project Area (with high spatial uncertainty) and Locality. - General habitat occurs in the Project Area. - Recent records in the Project Area from 2025 (with spatial uncertainty), and recent records in adjacent Kumbarella State Forest and Western Creek State Forest.
<i>Xerothamnella herbacea</i>	-	E	E	0	Species occurs in brigalow (<i>Acacia harpophylla</i>) dominated communities in shaded situations, often in leaf litter and is	Unlikely to occur:

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					associated with gilgais (shallow ground depressions). Soils are heavy, grey to dark brown clays.	- The Project Area occurs on the edge of the likely modelled SPRAT distribution. - Sparse suitable habitat present as well as some co-dominant communities. - No recent records in Project Area or Locality.
<i>Eucalyptus virens</i>	Shiny-leaved ironbark	V	V	0	Species occurs on sandy soils on low rises, hillslopes, sandstone escarpments and scree slopes. The species grows in woodland communities and is commonly associated with <i>Angophora leiocarpa</i> , <i>Corymbia trachyphloia</i> , <i>Eucalyptus exserta</i> , <i>Allocasuarina inophloia</i> and <i>Lysicarpus angustifolius</i> . Other species occasionally recorded with <i>E. virens</i> include <i>E. panda</i> , <i>E. apothalassica</i> , <i>E. sideroxylon</i> , <i>Allocasuarina luehmannii</i> and <i>Callitris glaucophylla</i>	Unlikely to occur: - The Project Area does not coincide with the modelled SPRAT distribution - Sparse suitable habitat present as well as some co-dominant communities - No recent records in Project Area or Locality
<i>Philotheca sporadica</i>	Kogan Waxflower	-	E	6	Species occur on soils derived from low fertility laterised Cretaceous sandstones (Kumbarilla Beds). Soils are shallow uniform sandy loams to clay loams or shallow texture contrast soils with loamy surfaces and medium clay subsoils. Ironstone gravel is usually present within the soil column. Topography of these areas is undulating to flat with low dissected flat top or rounded hills	Known to Occur: - Project Area is within the Species Distribution Area. - Suitable habitat present. - Recent records within locality and species was observed during field surveys.
<i>Rutidosia glandulosa</i>	-	-	NT	2	Species generally occurs on sandy or gravelly well drained soil in grassy open eucalypt woodland. Around Blackdown National Park, <i>R. glandulosa</i> was observed growing in open forest dominated by <i>Eucalyptus interstans</i> , <i>E. sphaerocarpa</i> and <i>Angophora leiocarpa</i> . In Carnarvon Gorge National Park the species was recorded within a very dense woodland dominated by <i>Corymbia clarksoniana</i> , <i>Eucalyptus crebra</i> and <i>Callitris glaucophylla</i> with a dense understorey composed of eucalypt saplings, <i>Petalostigma pubescens</i> , <i>Cassinia laevis</i> , <i>Acacia pustula</i> , <i>A. leiocalyx</i> and ground layer dominated by grasses and <i>Vittadinia sp.</i>	Potential to Occur: - Project Area is within the Species Distribution Area. - Suitable habitat present in Project Area - Recent record in locality from as recent as 2021, by roadside and in Kumbarilla State Forest.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Rutidosia lanata</i>	-	-	NT	2	Species occurs at 280 to 320 m altitude in open eucalypt forests and woodlands including <i>Eucalyptus populnea</i> - <i>Casuarina cristata</i> forest, ironbark and <i>Acacia sparsiflora</i> forest, box ironwood forest, and <i>E. populnea</i> woodland with <i>Eremophila mitchellii</i> . It has been recorded growing on flat land or stony red ridges in red-brown gravelly sands, grey clays, red-brown clay or sandy loams	Potential to Occur: - Project Area is within the Species Distribution Area. - Suitable habitat present in Project Area - Recent records in locality from as recent as 2025 in Kumbarilla State Forest.
<i>Eucalyptus curtisii</i>	plunkett mallee	-	NT	0	Species has two growth forms that occur in different habitats. The shorter mallee form is more likely to occur as the only eucalypt species on poorly drained lowland sites in shrubland dominated by banksia, with an understorey of heath plants, and sometimes <i>E. conglomerata</i> may also be present. The larger growth form occurs as scattered individuals on better drained soils in the more open areas of mixed eucalypt forests. Commonly associated species include <i>Corymbia citriodora</i> subsp. <i>variegata</i> , <i>C. trachyphloia</i> and <i>Callitris endlicheri</i> , less commonly associated with <i>E. fibrosa</i> , <i>E. planchoniana</i> and <i>E. acmenoides</i> . <i>E. curtisii</i> occurs on sandy podsoils with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones	Unlikely to Occur: - Project Area is within the Species Distribution Area. - Some suitable habitat present as well as some co-dominant communities - Recent record in Project Area.
Threatened Reptiles						
<i>Anomalopus mackayi</i>	Five-clawed worm-skink	V	E	0	The species is known to occur in both remnant and non-remnant woodlands and grasslands. In areas modified by agriculture and other human activities, the species has been found sheltering under artificial materials lying flat on the ground, such as discarded railway sleepers, sheet metal and hay bales.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Unlikely to occur due to species limited dispersal capabilities and no recds in the locality. - No recent records in Project Area or Locality
<i>Delma torquata</i>	Adorned delma	V	V	0	The species normally inhabits eucalypt-dominated woodlands and open-forests in Queensland Regional Ecosystem Land Zones (LZ); LZ 3 - Alluvium (river and creek flats), LZ 9 -	Unlikely to occur: The Project Area does not coincide with the likely

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Undulating country on fine-grained sedimentary rocks, and LZ 10 - Sandstone ranges. REs include: RE 11.3.2 - Poplar Box (<i>Eucalyptus populnea</i>) woodland on alluvial plains. Suitable habitats are commonly associated with exposed rocky outcrops on ridges or slopes in vegetation communities dominated by <i>Eucalyptus crebra</i>. Recorded from a number of different soil types (e.g. sandy loams, grey and black cracking clays, stony lithosols and basalt derived Podzolics). 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 Collared Delma microhabitat and is always present where the species occurs.	modelled SPRAT distribution but is within the species' potential Distribution Area - Minimal microhabitat requirements present (in the form of rocky outcrops) in suitable land zones that are poorly connected throughout the Project Area. - Land zones 3 and 9 are highly disturbed and fragmented due to clearing and grazing. - No recent records in Project Area or Locality.
<i>Egernia rugosa</i>	Yakka skink	V	V	0	Occur in open dry sclerophyll forest, woodland and scrub in a wide variety of vegetation types within Queensland Regional Ecosystem Land Zones (LZ); LZ 3 - Alluvium (river and creek flats), LZ 4 - Clay plains not associated with current alluvium, LZ 5 - Old loamy and sandy plains, LZ 7 - Ironstone jump-ups, LZ 9 - Undulating country on fine-grained sedimentary rocks, LZ 10 - Sandstone ranges. Common woodland and open forest types include; brigalow (<i>Acacia harpophylla</i>), mulga (<i>A. aneura</i>), bendee (<i>A. catenulata</i>), Lancewood (<i>A. shirleyi</i>), belah (<i>Casuarina cristata</i>), poplar box (<i>Eucalyptus populnea</i>), ironbark (<i>Eucalyptus</i> spp.), white cypress pine (<i>Callitris glaucophylla</i>). Commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. The species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation. In cleared habitat, this species can persist where there are shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens. The species has also been found sheltering under sheds and loading ramps.	Unlikely to occur: - The Project Area does not coincide with the likely modelled SPRAT distribution but is within the species' potential Distribution Area. - Land zones exist in the Project Area, however highly disturbed and fragmented. - No recent records in Project Area, Locality, or observations during field surveys.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Furina dunmalli</i>	Dunmall's snake	V	V	0	Species has been found in a broad range of habitats, including: Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (<i>Acacia harpophylla</i>), other wattles (<i>A. burowii</i>, <i>A. deanii</i>, <i>A. leioclyx</i>), native Cypress (<i>Callitris spp.</i>) or bullocke (<i>Allocasuarina luehmannii</i>); and various blue spotted gum (<i>Corymbia citriodora</i>), ironbark (<i>Eucalyptus crebra</i> and <i>E. melanophloia</i>), white cypress pine (<i>Callitris glaucophylla</i>) and bullocke open forest and woodland associations on sandstone derived soils The species has been found sheltering under fallen timber and ground litter and may use cracks in alluvial clay soils. Records indicate the species prefers habitats between 200 to 500 m above sea level.	Unlikely to occur: - The Project Area does not coincide with the likely modelled SPRAT distribution but is within the species' potential Distribution Area. - A lack of connected woodland and forest communities with suitable microhabitat features for the species such as black cracking clay soils. - Where bullocke and cypress-pine are present they occur in disturbed and fragmented patches due to clearing and grazing. - No recent records in Project Area or Locality.
<i>Hemiaspis damelii</i>	Grey snake	E	E	0	In Queensland, grey snake habitat is brigalow (<i>Acacia harpophylla</i>) and belah (<i>Casuarina cristata</i>) forests and woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks. Key attributes of grey snake habitat are the floodplains and ephemeral wetlands which provide breeding habitat for the frog species that are its main prey, the presence of the frog species themselves, and the heavy clay soils which provide cracks and crevices that the species uses to hunt and shelter.	Unlikely to occur: - The Project Area overlaps with the likely modelled SPRAT distribution. - Brigalow and belah communities occur only in small fragmented patches surrounded by highly disturbed agricultural land. There is a lack of the necessary microhabitat features, wetlands, and gullies present for the species in suitable woodland or forest communities. - No recent records in Project Area, Locality, or observations during field surveys. Nearest recent records are over 25km

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
						north-east associated with a large natural wetland and brigalow communities on alluvial soils.
<i>Tympanocryptis condaminensis</i>	Condamine earless dragon	E	E	0	The Condamine earless dragon has a restricted distribution in the Condamine River floodplain in a disturbed area. The species has been observed in cropland of cotton, sorghum, maize and sunflower and remnant native and exotic grasslands. Natural habitat for the species are natural grasslands.	Unlikely to occur: • The Project Area does not overlap with the SPRAT modelled Distribution Area. • There is a lack of suitable habitat in the Project Area, as no natural grasslands have been observed. • No recent records in Project Area, Locality, or observations during field surveys.



APPENDIX C BAT CALL ANALYSIS REPORT

Bat Call Analysis Report

Cattle Creek Project

Prepared for ERM

Prepared by:

The logo for Green Tape SOLUTIONS, featuring the company name in a green serif font with 'SOLUTIONS' in a smaller, spaced-out sans-serif font below it.

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I.0 Introduction

I.1 Background

Green Tape Solutions were commissioned to undertake bat call analysis for the Cattle Creek project located near Dalby in Queensland.

I.2 Scope of Work

The specific scope of works for this report includes the following:

- Outline the methodology used to analyse the microbat call within the subject site; and,
- Present the findings of all of the bat call surveys conducted at the project site.

2.0 Methodology

2.1 Capture Technique

Microbat calls were sampled using Anabat Swift detectors and Anabat Chorus detectors (Titley Electronics). Passive monitoring surveys were undertaken:

- from 4th to 8th December 2023; and,
- from 13th February to 10th May 2024; and,
- from 2nd to 19th December 2024.

The original call files display Australian Eastern Standard Time. The data was analysed using Anabat Insight.

Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Ultrasonic call monitoring surveys on anabat detectors were conducted using full-spectrum fitted with omnidirectional ultrasonic microphone.

2.2 Call Identification

Anabat recordings were analysed using Anabat software (Anabat Insight). Identifications were made by categorising call shape and frequency, with a species match given in consideration to region, known bat distributions, and habitats present. The focus of the bat surveys was to assess the presence of bat species found within the Project Area, and to assess the potential for rare and threatened species to occur.

Call identification for this dataset was based on call keys and descriptions published for Queensland (Reinhold *et al.*, 2001) and New South Wales (Pennay *et al.*, 2004).

Species' identification was further refined using the probability of occurrence of each species based on their geographic distribution (Churchill, 2008, Van Dyck and Strahan, 2008). Species nomenclature used in this report follows Churchill (2008).

The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and,
- **Possible** - call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

2.3 National Standard

The format and content of this report complies with the nationally accepted standards for the interpretation and reporting of Anabat and Songmeter data (Reardon, 2003), which is currently available from the Australasian Bat Society at www.ausbats.org.au.

3.0 Results

3.1 Total Species Recorded

The majority of calls were considered to be of medium to good quality calls.

The February 2024 survey suffered from some data issues. One device (CH7) has no usable data, this may have been caused by the device not writing properly or an SD card fault. Another device (CH25) had a corrupted SD card with no data available for analysis. Therefore, only two devices were successfully analysed for the Feb-May 2024 survey.

A total of 12,846 sequence files were analysed. A proportion of these files (850) in this dataset contained background noise or resulted in poor quality calls that did not provide bat calls for analysis. While some call sequences were recognised as bat calls, the quality was not sufficient to assign species identification.

The location of each detector, including both the locality and GPS coordinates, is included in **Table 1**.

A summary of the species identified through bat call analysis is provided in **Table 2**. The total number of calls per detector is also given in **Table 2**, this number is indicative of bat activity but may still include some background noise or poor quality calls which were not identifiable.

Table 1: Detector locations

Survey period	Detectors	Coordinates	Locality
February 2024	ANA3	-27.702657, 150.756848, 340m	West of Cecil Plains
	ANA14	-27.661068, 150.808747, 314	West of Cecil Plains
	ANA20	-27.597992, 150.863270, 351 m	West of Cecil Plains
	CH07	-27.632507, 150.751617, 373 m	West of Cecil Plains
	ANA16	-27.559062, 150.925633	West of Cecil Plains
	CH10 (Feb 2024)	-27.626486, 150.705521, 336 m	West of Cecil Plains
	CH1 (May 2024)	-27.559488, 150.816025, 440 m	West of Cecil Plains
December 2024	AS01	-27.617290, 150.753767	West of Cecil Plains
	AS02	-27.681790, 150.737860	West of Cecil Plains
	Chorus X	-27.653133, 150.867142	West of Cecil Plains
	Chorus 1	-27.542521, 150.982605	West of Cecil Plains
	Chorus 3	-27.709749, 150.739548	West of Cecil Plains

Survey period	Detectors	Coordinates	Locality
	Chorus 6	-27.663570,150.690704	West of Cecil Plains
	Chorus 9	-27.661674,150.808090	West of Cecil Plains
	Chorus 10	-27.668999,150.720856	West of Cecil Plains
	Chorus 18	-27.625948,150.779541	West of Cecil Plains
	Chorus 24	-27.536877,150.920853	West of Cecil Plains

Table 2: Summary of Bat Call Analysis 2023-2024

			Dec 2023					Feb 2024	May 2024
Species	NC Act	EPBC Act	ANA3	ANA14	ANA20	CH07	ANA16	CH10	CH1
Total Calls			390	92	204	369	10447	425	919
<i>Austronomus australis</i>	LC	NOC			Definite	Definite			Definite
<i>Chalinolobus gouldii</i>	LC	NOC	Definite		Definite		Definite	Definite	Definite
<i>Chalinolobus morio</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	
<i>Chalinolobus nigrogriseus</i>	LC	NOC	Probable		Probable	Definite	Definite	Probable	Definite
<i>Chalinolobus picatus</i>	LC	NOC	Definite	Definite			Definite	Probable	Probable
<i>Miniopterus orianae oceanensis</i>	LC	NOC	Probable	Definite	Definite	Definite	Definite	Definite	Definite
<i>Nyctophilus corbeni</i>	V	V	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Nyctophilus geoffroyi</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Nyctophilus gouldi</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Ozimops lumsdenae</i>	LC	NOC	Definite		Definite		Definite		Probable
<i>Ozimops ridei</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Probable
<i>Saccolaimus flaviventris</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Scotorepens balstoni</i>	LC	NOC	Probable			Probable	Probable		Probable
<i>Scotorepens greyii</i>	LC	NOC	Definite	Definite	Possible	Possible	Definite	Definite	
<i>Scotorepens sp. (Parnaby)</i>	LC	NOC	Possible	Possible	Probable	Probable	Possible	Probable	
<i>Vespadelus troughtoni</i>	LC	NOC		Probable	Probable	Probable	Probable		Possible
<i>Vespadelus vulturnus</i>	LC	NOC	Definite	Probable			Definite	Definite	Definite

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

Table 3: Summary of Bat Call Analysis December 2024

			Dec 2024 (Device names and device serial numbers)									
Species	NC Act	EPBC Act	AS01 (669177)	AS02 (669196)	CH1 (661657)	CH3 (661650)	CH6 (661631)	CH9 (661629)	CH10 (661665)	CH18 (661632)	CH24 (661634)	CH (661663)
Total Calls			8762	5069	11427	1900	7675	1418	10123	1206	17844	5148
<i>Austronomus australis</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Chalinolobus gouldii</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Chalinolobus morio</i>	LC	NOC			Definite		Definite		Definite		Definite	Definite
<i>Chalinolobus nigrogriseus</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite				
<i>Chalinolobus picatus</i>	LC	NOC			Definite	Definite		Definite				
<i>Miniopterus orianae oceanensis</i>	LC	NOC	Definite		Definite		Definite	Definite	Definite	Definite	Definite	Definite
<i>Nyctophilus corbeni</i>	V	V		Possible	Possible	Possible			Possible	Possible		Possible
<i>Nyctophilus geoffroyi</i>	LC	NOC		Possible	Possible	Possible			Possible	Possible		Possible
<i>Nyctophilus gouldi</i>	LC	NOC		Possible	Possible	Possible			Possible	Possible		Possible
<i>Ozimops lumsdenae</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Ozimops petersi</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Ozimops ridei</i>	LC	NOC	Possible	Possible	Possible	Possible	Definite	Definite	Possible	Possible	Definite	Definite
<i>Saccolaimus flaviventris</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Scoteanax rueppellii</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Scotorepens balstoni</i>	LC	NOC	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable
<i>Scotorepens greyii</i>	LC	NOC	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable

			Dec 2024 (Device names and device serial numbers)									
Species	NC Act	EPBC Act	AS01 (669177)	AS02 (669196)	CH1 (661657)	CH3 (661650)	CH6 (661631)	CH9 (661629)	CH10 (661665)	CH18 (661632)	CH24 (661634)	CH (661663)
<i>Scotorepens sp. (Parnaby)</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Vespadelus regulus</i>	LC	NOC			Probable	Probable		Probable	Probable	Probable	Probable	
<i>Vespadelus trougtoni</i>	LC	NOC	Probable	Probable	Possible	Possible		Possible	Possible	Possible	Possible	
<i>Vespadelus vulturnus</i>	LC	NOC			Possible	Possible		Possible	Possible	Possible	Possible	

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

3.2 Samples of Calls / Sequences Files

Samples of call extracted from the dataset for each species identified is provided in the following figures.

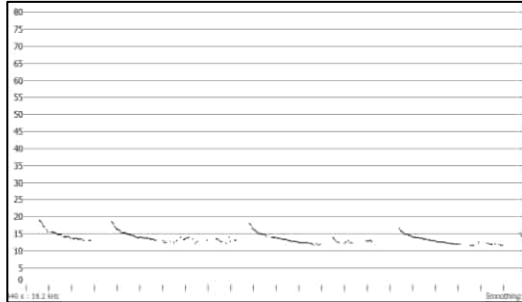
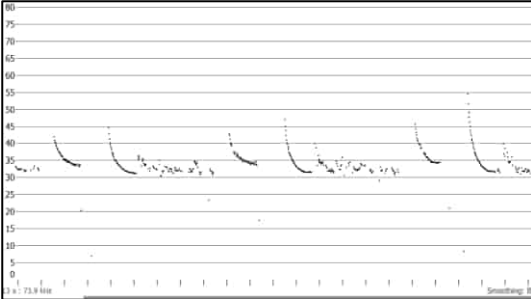
Species	Calls	Known distribution (Extract from Ausbats maps from Australian Bat Society)
Figure 1: <i>Austronomus australis</i> Definite call. This bat is easily recognised by its constant frequency calls range in bandwidth from 10.5 to 15 kHz (Pennay <i>et al.</i>, 2004).		
Figure 2: <i>Chalinolobus gouldii</i> Definite call. This species has a curved shape call with characteristic frequency 28 to 34kHz. Pulse alternates in frequency and mostly down-sweeping tail or no tail.		

Figure 3: *Chalinolobus morio*

Definite call.

C. morio has a down-sweeping tail curved pulse with characteristic frequency 47.5 to 53 kHz. It has often a very brief characteristic section. Species that overlap in frequency (*Vespadelus troughtoni*, *V. pumilus* and *V. vulturnus*) but all have up-sweeping tails.

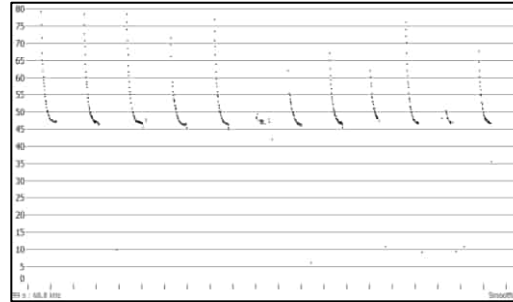


Figure 4: *Chalinolobus nigrogriseus*

Definite call.

This species has a curved shape pulse with characteristic frequency between 37 to 40 kHz. Usually with no tail or occasionally up sweeping tail. *C. nigrogriseus* have relatively longer characteristic and tail sections, usually 2/3 or more of the total pulse (Pennay et al 2004).

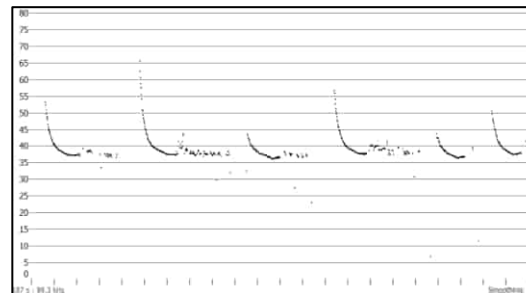


Figure 5: *Chalinolobus picatus*

Definite call.

The call is composed of alternate curved pulses without a tail or short up-sweeping tail when in search phase. Average characteristic frequency 38 to 42 kHz. Every second pulse is stepped-up by about 2 kHz.

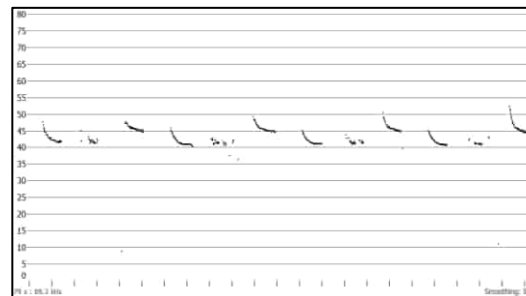


Figure 6: *Miniopterus orianae oceanensis*

Definite call.

The species call is characterised by its long curved pulse with a small down-sweeping tail and its frequency between 43-47kHz (Reinhold, 2001).

Pulse shape and time between calls usually variable within a sequence.

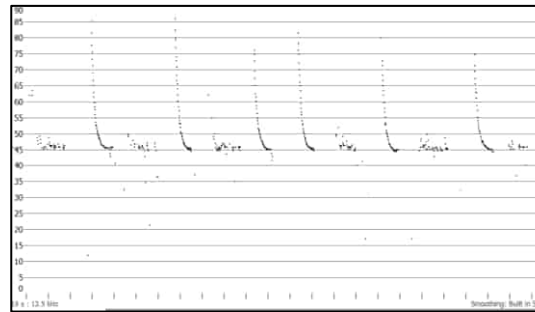
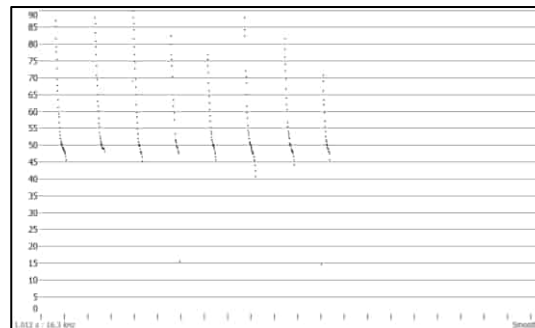


Figure 7: *Nyctophilus* spp

Possible call.

This species displays a near-vertical pulse, characteristic frequency between 80 and 35KHz (Pennay *et al*, 2004).

The species from this genus cannot be distinguished from each other. There are 3 species that are known to occur in the project area.



N. corbeni



N. geoffroyi



N. gouldi

Figure 8: *Ozimops lumsdenae*

Definite call.

Characteristic frequency higher than 22 and lower than 24kHz. *O. lumsdenae* pulse can be confused with *S. flaviventris*. However, the latest rarely have calls above 22kHz. *O. lumsdenae* reference calls have pulse rising in frequency and can get up to 27kHz.

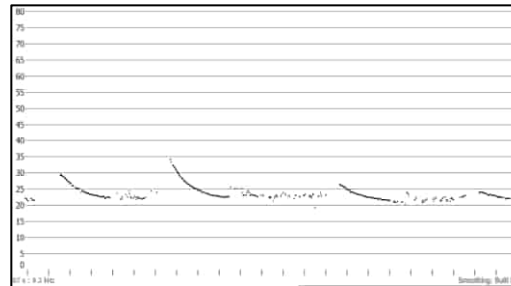


Figure 9: *Ozimops petersi*

Possible call.

This species has flat pulse with a characteristic frequency 29 to 31.5 kHz. Unless calling at lower than 30.5 kHz, it is indistinguishable from *Ozimops ridei*.

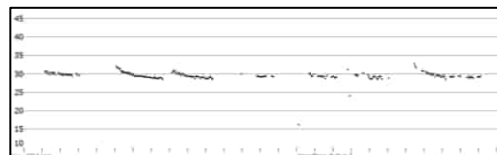
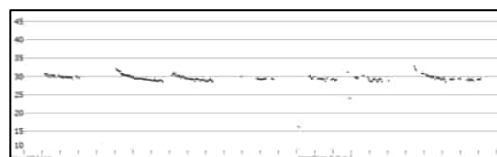


Figure 10: *Ozimops ridei*

Possible call.

O. ridei calls are flat and sometimes a bit curved with frequency a bit lower than 30kHz. Characteristic frequency of this species is between 28 to 36 kHz. Calls in the same frequency range as *Micronomus norfolkensis*, but *O. ridei* calls may jump up to a higher frequency than the surrounding pulses, this



does not occur in a regular pattern like in *M. norfolkensis*.

Figure 11: *Saccolaimus flaviventris*

Definite call.

Curved, characteristic frequency 18 to 21.5 kHz. The characteristic frequency does not go above 22 kHz. Other species that could overlap do not occur in this area.

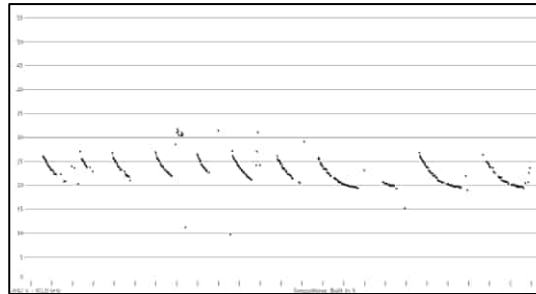


Figure 12: *Scoteanax rueppellii*

Definite Call

Curved call without tail and a characteristic frequency varying between 33 to 36 kHz. Frequency of the knee higher than 37 kHz. Pre-characteristic section drops over more than 3 kHz. This feature mostly distinguishes it from *Scotorepens* spp.

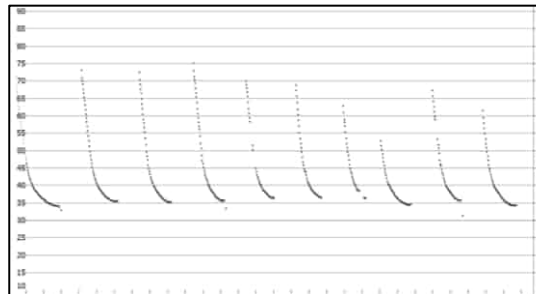


Figure 13: *Scotorepens balstoni*

Probable call.

Pulse of this species is curved with tail variable, but an up-sweeping tail is often more prominent with greater duration. Characteristic frequency 31 to 35 kHz (n = 28) and the frequency of the knee 33 to 37 kHz.

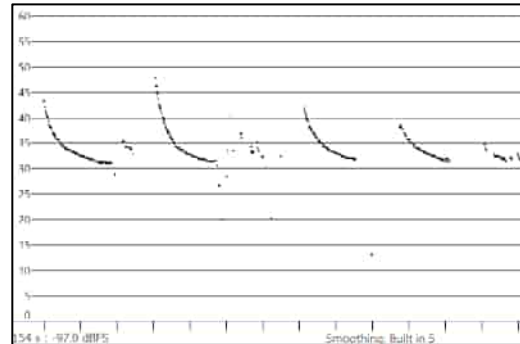


Figure 14: *Scotorepens greyii*

Definite call.

S. greyii has a curved and up-sweeping tail pulse. Its characteristic frequency is between 36 to 41.5 kHz. The up-sweeping tail and time of characteristic section + tail exceeding time of pre-characteristic section will distinguish this from *Falsistrellus tasmaniensis* most of the time.

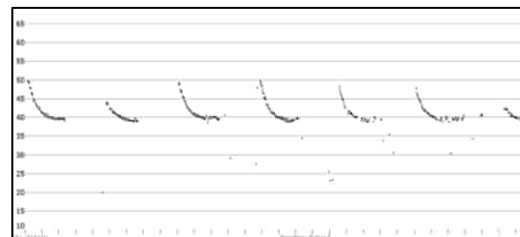


Figure 15: *Scotorepens* sp.

Possible call.

The pulse is curved with an up-sweeping tail. And a characteristic frequency between 36 to 41.5 kHz. The characteristic section and the tail of *S. sp.* takes up about half or less than half the time of the pulse. This distinguishes it from *Chalinolobus nigrogriseus*, which has a relatively longer characteristic section + tail. Indistinguishable from *S. greyii*.

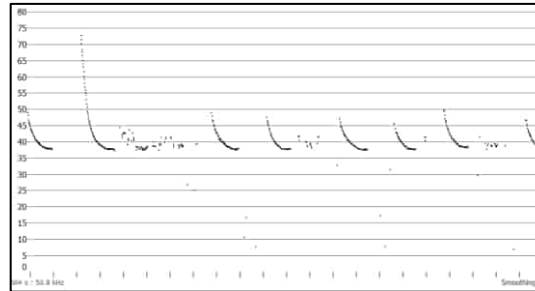


Figure 16: *Vespadelus troughtoni*

Definite call.

This species displays a curved pulse with not prominent up-sweeping tail. Its characteristic frequency is between 48.5 to 55 kHz (Pennay *et al*, 2004). If the end, frequency is lower than 51 kHz, then the call can be identified to *V. Troughtoni* and be differentiated from *V. pumilus*.

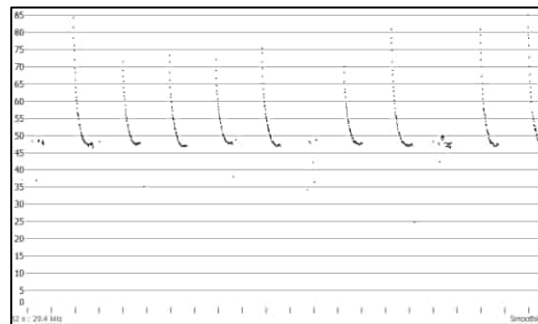


Figure 17: *Vespadelus regulus*

Possible call.

Characteristic frequency varies significantly over distribution from 40 to 55 kHz (n = 95). Call shape also varies between regions. Characteristic frequency 45 to 47 kHz (n = 19). Curved with up-sweeping tail.

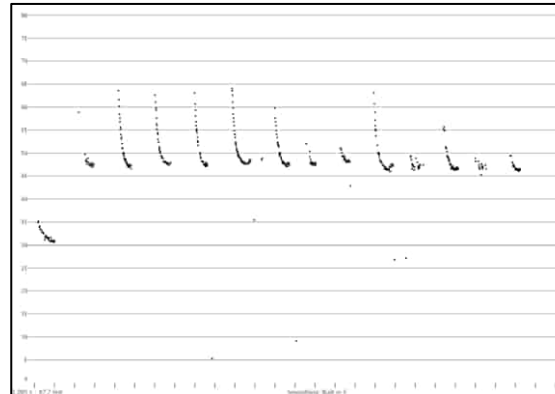
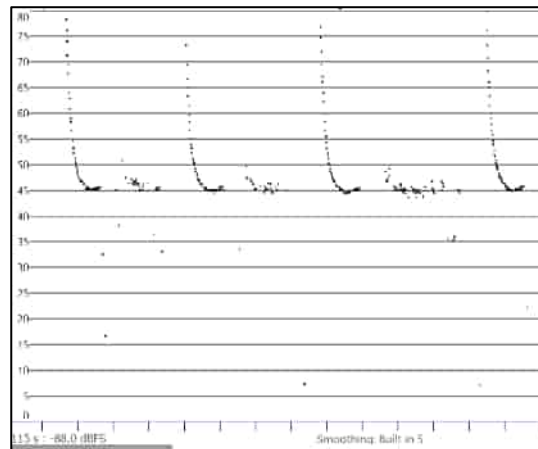


Figure 18: *Vespadelus vulturnus*

Definite call.

Curved and up-sweeping tail calls with characteristic frequency between 45 to 53 kHz.



4.0 Conclusion

A total of 20 microbat species were either confirmed 'definite', 'probable' or 'possible' within the Project area. Anabat 16 during the first survey had extremely high call numbers compared to the other sites with 10,446 calls recorded on this one detector.

Calls from *Nyctophilus sp* have been confirmed across the project areas. Three species of *Nyctophilus* possibly occur within the Project Area (*N. corbeni*, *N. geoffroyi*, and *N. gouldi*). *N. corbeni* is listed Vulnerable under the EPBC Act and NC Act. The calls of these species cannot be distinguished from each other.

- *Nyctophilus* species:
 - ✓ Steep, almost-linear (FM) call pulses are distinctive from those of other bat calls but cannot be reliably identified to species
 - ✓ Three species potentially occur in the project area (*N. corbeni*, *N. geoffroyi*, and *N. gouldi*)

5.0 References

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- REINHOLD, L., LAW, B., FORD, G. A. & PENNAY, M. 2001. *Key to the Bat Calls of South-east Queensland and North-east New South Wales*, Queensland Department of Natural Resources and Mines.
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APPENDIX D SPECIES LIST

APPENDIX A LOCALITY SPECIES LIST

TABLE 1: SUMMARY OF SPECIES

	Order	Family	Genus	Species
Birds	21	54	110	160
Amphibians	1	4	7	15
Mammals	5	11	16	17
Reptiles	1	8	21	24
Micro-bats	1	3	9	26
Flora	27	55	133	173

TABLE 2: BIRD SPECIES LIST

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
Accipitriformes	Accipitridae	Aquila	<i>Aquila audax</i>	wedge-tailed eagle		46	3	2/09/1994
		Milvus	<i>Milvus migrans</i>	black kite		31		
		Elanus	<i>Elanus axillaris</i>	black-shouldered kite		3		
				Kite spp.		2		
		Circus	<i>Circus assimilis</i>	spotted harrier		6		4/08/1994
		Haliastur	<i>Haliastur sphenurus</i>	whistling kite		5		
Aegotheliformes	Aegothelidae	Aegotheles	<i>Aegotheles cristatus</i>	Australian owlet-nightjar			8	23/04/2011
Anseriformes	Anatidae	Anas	<i>Anas gracilis</i>	grey teal		12	3	31/05/2005
			<i>Anas superciliosa</i>	Pacific black duck		89	8	31/05/2005
		Chenonetta	<i>Chenonetta jubata</i>	Australian wood duck		319	3	18/12/1999
		Dendrocygna	<i>Dendrocygna eytoni</i>	plumed whistling-duck		89	1	18/12/1999
			<i>Duck spp.</i>			5		
		Aythya	<i>Aythya australis</i>	hardhead		12		
		Malacorhynchus	<i>Malacorhynchus membranaceus</i>	pink-eared duck		6		
Apodiformes	Apodidae	Hirundapus	<i>Hirundapus caudacutus</i>	white-throated needletail	V; VU		4	19/12/1999
Caprimulgiformes	Eurostopodidae	Eurostopodus	<i>Eurostopodus mystacalis</i>	white-throated nightjar			4	19/12/1999
Casuariiformes	Casuariidae	Dromaius	<i>Dromaius novaehollandiae</i>	emu			3	26/08/2003
Charadriiformes	Turnicidae	Turnix	<i>Turnix maculosus</i>	red-backed buttonquail			1	6/02/2021
			<i>Turnix varius</i>	painted button-quail			3	19/12/1999
	Burhinidae	Burhinus	<i>Burhinus grallarius</i>	bush-stone curlew			3	19/12/1999

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
	Charadriidae	Elseyornis	<i>Elseyornis melanops</i>	black-fronted dotterel		3	1	26/08/2003
		Vanellus	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		46	1	7/08/2000
	Scolopacidae	Gallinago	<i>Gallinago hardwickii</i>	Latham’s snipe			1	06/09/2014
Ciconiiformes	Ciconiidae	Ephippiorhynchus	<i>Ephippiorhynchus asiaticus</i>	black-necked stork			8	3/08/1886
Columbiformes	Columbidae	Geopelia	<i>Geopelia humeralis</i>	bar-shouldered dove			13	5/11/2023
			<i>Geopelia placida</i>	peaceful dove		3	1	6/11/2023
			<i>Geopelia sp.</i>	-			4	6/02/2021
		Geophaps	<i>Geophaps scripta scripta</i>	squatter pigeon (southern)			12	14/03/2021
		Ocyphaps	<i>Ocyphaps lophotes</i>	crested pigeon		63	14	7/12/2011
		Phaps	<i>Phaps chalcoptera</i>	common bronzewing				6/11/2023
Coraciiformes	Alcedinidae	Dacelo	<i>Dacelo novaeguineae</i>	laughing kookaburra		9	4	5/11/2023
			<i>Dacelo leachii</i>	blue-winged kookaburra		1	2	
		Todiramphus	<i>Todiramphus sanctus</i>	sacred kingfisher			1	18/12/1999
	Coraciidae	Eurystomus	<i>Eurystomus orientalis</i>	Oriental dollarbird			1	25/11/2009
	Meropidae	Merops	<i>Merops ornatus</i>	rainbow bee-eater		7	1	31/03/2008
Cuculiformes	Cuculidae	Cacomantis	<i>Cacomantis pallidus</i>	pallid cuckoo			1	26/08/2003
			<i>Cacomantis variolosus</i>	brush cuckoo			1	
		Chalcites	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		3	1	26/08/2003
			<i>Chalcites lucidus</i>	shining bronze- cuckoo			3	29/08/1998
			<i>Chalcites minutillus</i>	Eastern little bronze -cuckoo				25/11/2009
			<i>Chalcites osculans</i>	black-eared cuckoo				18/12/1999
		Eudynamys	<i>Eudynamys orientalis</i>	eastern koel		4		20/11/2008
		Scythrops	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo			1	20/11/2008
Falconiformes	Falconidae	Falco	<i>Falco berigora</i>	brown falcon		4		
			<i>Falco cenchroides</i>	nankeen kestrel		9	5	28/08/1998
			<i>Falco longipennis</i>	Australina hobby		1	1	
Galliformes	Phasianidae	Coturnix	<i>Coturnix pectoralis</i>	stubble quail			21	7/03/2000
Gruiformes	Rallidae	Tribonyx	<i>Tribonyx ventralis</i>	black-tailed native-hen			3	5/12/2005



Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
Passeriformes	Passeridae	Passer	Passer montanus	Eurasian tree sparrow	1		15	
	Acanthizidae	Acanthiza	Acanthiza apicalis	inland thornbill		2	3	7/03/2000
			Acanthiza chrysorrhoa	yellow-rumped thornbill		5		7/08/2000
			Acanthiza nana	yellow thornbill		5	1	6/11/2023
			Acanthiza pusilla	brown thornbill			13	2/09/1994
			Acanthiza reguloides	buff-rumped thornbill		4	16	20/11/2008
			Acanthiza uropygialis	chestnut-rumped thornbill			17	3/06/2014
			Acanthiza spp.			4	1	
		Gerygone	Gerygone fusca	western gerygone			2	27/09/2001
			Gerygone olivacea	white-throated gerygone		3	2	6/11/2023
		Pyrrholaemus	Pyrrholaemus sagittatus	speckled warbler		1		5/11/2023
		Smicrornis	Smicrornis brevirostris	weebill		34	7	24/06/2015
	Acrocephalidae	Acrocephalus	Acrocephalus australis	Australian reed-warbler			24	26/08/2003
	Artamidae	Artamus	Artamus cinereus	black-faced woodswallow			9	31/12/1978
			Artamus leucorhynchus	white-breasted woodswallow		77	20	12/07/2017
			Artamus personatus	masked Woodswallow		1	9	6/11/2023
			Artamus superciliosus	white-browed woodswallow			4	6/11/2023
		Cracticus	Cracticus nigrogularis	pied butcherbird		38	3	20/11/2008
			Cracticus torquatus	grey butcherbird		23	2	20/11/2008
		Gymnorhina	Gymnorhina tibicen	Australian magpie		48	4	20/11/2008
		Strepera	Strepera graculina	pied currawong		17	25	6/11/2023
	Campephagidae	Coracina	Coracina novaehollandiae	black-faced cuckooshrike		16		20/11/2008
			Coracina papuensis	white-bellied cuckoo-shrike			1	20/12/2018
		Edolisoma	Edolisoma tenuirostre	common cicadabird			4	4/11/2020
		Lalage	Lalage tricolor	white-winged triller			10	5/11/2023
	Climacteridae	Cormobates	Cormobates leucophaea	white-throated treecreeper		1	14	5/11/2023
			Cormobates leucophaea metastasis	white-throated treecreeper (southern)			25	17/04/2001
		Climacteris	Climacteris picumnus	brown treecreeper		2	1	
	Corcoracidae	Corcorax	Corcorax melanorhamphos	white-winged chough		1		7/12/2011

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
		Struthidea	<i>Struthidea cinerea</i>	apostlebird		36	8	26/08/2003
	Corvidae	Corvus	<i>Corvus coronoides</i>	Australian raven		78		6/11/2023
			<i>Corvus orru</i>	Torresian crow		119		24/06/2015
	Dicaeidae	Dicaeum	<i>Dicaeum hirundinaceum</i>	mistletoebird		2		5/11/2023
	Estrildidae	Neochmia	<i>Neochmia temporalis</i>	red-browed finch			2	18/12/1999
			<i>Neochmia modesta</i>	plum-headed finch		5	3	
		Stagonopleura	<i>Stagonopleura guttata</i>	diamond firetail				24/04/2021
		Taeniopygia	<i>Taeniopygia bichenovii</i>	double-barred finch		1	1	20/11/2008
			<i>Taeniopygia guttata</i>	zebra finch		56		
	Motacillidae	Anthus	<i>Anthus novaeseelandiae</i>	Australian pipit		11		
	Alaudidae	Mirafra	<i>Mirafra javanica</i>	Horsfield's Bushlark		2		
	Hirundinidae	Hirundo	<i>Hirundo neoxena</i>	welcome swallow		8	18	26/08/2003
		Petrochelidon	<i>Petrochelidon nigricans</i>	tree martin		48	5	31/03/2005
			<i>Petrochelidon ariel</i>	fairy martin		31	1	
	Locustellidae	Cincloramphus	<i>Cincloramphus mathewsi</i>	rufous songlark				26/08/2003
			<i>Cincloramphus cruralis</i>	brown songlark		3		
	Sturnidae	Acridotheres	<i>Acridotheres tristis</i>	common myna		22	10	
		Sturnus	<i>Sturnus vulgaris</i>	common starling		1	65	28/08/1998
	Melanodryadidae	Aphelocephala	<i>Aphelocephala leucopsis</i>	southern whiteface			4	14/03/2024
	Maluridae	Malurus	<i>Malurus cyaneus</i>	superb fairy-wren		10	2	12/07/2017
			<i>Malurus lamberti sensu lato</i>	variegated fairy-wren		42	1	20/11/2008
			<i>Malurus leucopterus</i>	white-winged fairy-wren			6	7/08/2000
			<i>Malurus spp.</i>			12	1	
			<i>Malurus melanocephalus</i>	<i>Red-backed fairy-wren</i>		1	13	
	Meliphagidae	Acanthagenys	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		3	11	3/06/2014
		Caligavis	<i>Caligavis chrysops</i>	yellow-faced honeyeater		1		6/11/2023
		Entomyzon	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		7	1	24/06/2015
		Gavicalis	<i>Gavicalis virescens</i>	singing honeyeater			21	26/08/2003
		Lichenostomus	<i>Lichenostomus melanops</i>	yellow-tufted honeyeater			6	9/08/2009

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
		Lichmerasongla	<i>Lichmera indistincta</i>	brown honeyeater		32	17	6/11/2023
		Manorina	<i>Manorina flavigula</i>	yellow-throated miner			23	11/12/2005
			<i>Manorina melanocephala</i>	noisy miner		124	2	31/05/2005
		Melithreptus	<i>Melithreptus brevirostris</i>	brown-headed honeyeater			11	11/12/2005
			<i>Melithreptus gularis</i>	black-chinned honeyeater		2	21	
		Myzomela	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		2	5	18/12/1999
		Nesoptilotis	<i>Nesoptilotis leucotis</i>	white-eared honeyeater		1	13	3/06/2014
		Philemon	<i>Philemon citreogularis</i>	little friarbird		15		27/09/2001
			<i>Philemon corniculatus</i>	noisy friarbird		9	6	24/06/2015
		Plectorhyncha	<i>Plectorhyncha lanceolata</i>	striped honeyeater		13	2	12/07/2017
		Ptilotula	<i>Ptilotula fusca</i>	fuscous honeyeater			24	31/05/2008
			<i>Ptilotula penicillata</i>	white-plumed honeyeater		3	4	3/06/2014
	Monarchidae	Grallina	<i>Grallina cyanoleuca</i>	magpie-lark		82	40	5/11/2023
		Myiagra	<i>Myiagra inquieta</i>	restless flycatcher		4	6	5/11/2023
			<i>Myiagra rubecula</i>	leaden flycatcher		4	15	6/11/2023
			<i>Myiagra spp.</i>			1	21	
	Neosittidae	Daphoenositta	<i>Daphoenositta chrysoptera</i>	varied sittella		1	18	18/12/1999
	Oriolidae	Oriolus	<i>Oriolus sagittatus</i>	olive-backed oriole		3	6	20/11/2008
	Pachycephalidae	Colluricincla	<i>Colluricincla harmonica</i>	grey shrike-thrush		3	11	5/11/2023
		Pachycephala	<i>Pachycephala pectoralis</i>	golden whistler		1	24	27/05/2003
			<i>Pachycephala rufiventris</i>	rufous whistler		35	18	6/11/2023
	Pardalotidae	Pardalotus	<i>Pardalotus punctatus</i>	spotted pardalote			6	31/05/2005
			<i>Pardalotus striatus</i>	striated pardalote		20	1	12/77/2017
	Petroicidae	Eopsaltria	<i>Eopsaltria australis</i>	eastern yellow robin		8	1	5/11/2023
		Microeca	<i>Microeca fascinans</i>	jacky winter		10		24/06/2015
		Petroica	<i>Petroica goodenovii</i>	red-capped robin		1		19/12/1999
	Pomatostomidae	Pomatostomus	<i>Pomatostomus temporalis</i>	grey-crowned babbler		23	2	6/02/2021
	Rhipiduridae	Rhipidura	<i>Rhipidura albiscapa</i>	grey fantail		21	1	5/11/2023
			<i>Rhipidura leucophrys</i>	willie wagtail		35	1	5/11/2023

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
	Zosteropidae	Zosterops	<i>Zosterops lateralis</i>	silveryeye		1		3/06/2014
Pelecaniformes	Ardeidae	Ardea	<i>Ardea intermedia</i>	medium egret				20/12/2013
			<i>Ardea pacifica</i>	white-necked heron		6	4	12/07/2017
			<i>Ardea spp.</i>			1	1	
			<i>Ardea alba</i>	Great egret		2	3	
		Egretta	<i>Egretta novaehollandiae</i>	white-faced heron		9	13	26/08/2003
	Pelecanidae	Pelecanus	<i>Pelecanus conspicillatus</i>	Australian pelican		4	10	27/05/2003
	Threskiornithidae	Platalea	<i>Platalea flavipes</i>	yellow-billed spoonbill			2	7/08/2000
		Threskiornis	<i>Threskiornis spinicollis</i>	straw-necked ibis		11		
			<i>Threskiornis molucca</i>	Australian white ibis		1		
Podargiformes	Podargidae	Podargus	<i>Podargus strigoides</i>	tawny frogmouth				19/12/1999
Podicipediformes	Podicipedidae	Poliocephalus	<i>Poliocephalus poliocephalus</i>	hoary-headed grebe			3	31/03/2005
		Tachybaptus	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		19	1	31/03/2005
Psittaciformes	Cacatuidae	Cacatua	<i>Cacatua galerita</i>	sulphur-crested cockatoo		54	10	6/11/2023
		Eolophus	<i>Eolophus roseicapilla</i>	galah		67	3	3/06/2003
		Nymphicus	<i>Nymphicus hollandicus</i>	cockatiel			2	26/08/2003
		Cacatua	<i>Cacatua sanguinea</i>	little corella		10		
		Calyptorhynchus	<i>Calyptorhynchus lathami lathami</i>	Glossy black-cockatoo	V; VU	18		
	Psittacidae	Alisterus	<i>Alisterus scapularis</i>	King parrot		2	2	7/12/2011
	Psittaculidae	Aprosmictus	<i>Aprosmictus erythropterus</i>	red-winged parrot		12	1	27/09/2001
		Neophema	<i>Neophema pulchella</i>	turquoise parrot			2	29/08/1998
		Platycercus	<i>Platycercus adscitus</i>	pale-headed rosella		27		24/06/2015
		Psephotus	<i>Psephotus haematonotus</i>	red-rumped parrot		50		1/08/2013
		Trichoglossus	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet			2	18/12/1999
			<i>Trichoglossus moluccanus</i>	rainbow lorikeet		6		
		Polytelis	<i>Polytelis swainsonii</i>	superb parrot		15		
Strigiformes	Strigidae	Ninox	<i>Ninox boobook</i>	southern boobook				19/12/1999
			<i>Ninox connivens</i>	barking owl				18/12/1999
Suliformes	Phalacrocoracidae	Microcarbo	<i>Microcarbo melanoleucos</i>	little pied cormorant		1		27/05/2003



Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records	Last recorded
		Phalacrocorax	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		2		
			<i>Phalacrocorax varius</i>	pied cormorant		4		
	Anhingidae	Anhinga	<i>Anhinga novaehollandiae</i>	Australasian darter		7		31/05/2005

TABLE 3: SPECIES LIST - AMPHIBIANS

Order	Family	Genus	Scientific Name	Common Name	NCA	EPBC	Field Survey Records	Last recorded
Anura	Hylidae	Litoria	<i>Litoria caerulea</i>	common green treefrog	C		0	19/11/2008
			<i>Litoria latopalmata</i>	broad palmed rocketfrog	C	-	0	20/11/2008
			<i>Litoria nasuta</i>	striped rocketfrog	C	-	0	28/02/2015
			<i>Litoria rubella</i>	ruddy treefrog	C	-	0	6/11/2023
	Pelodyadidae	Cyclorana	<i>Cyclorana alboguttata</i>	greenstripe frog	C	-	0	20/11/2008
			<i>Cyclorana brevipes</i>	superb collared frog	C	-	0	20/11/2008
			<i>Cyclorana novaehollandiae</i>	eastern snapping frog	C	-	0	28/02/2015
			<i>Cyclorana verrucosa</i>	rough collared frog	C	-	0	20/11/2008
	Limnodynastidae	Limnodynastes	<i>Limnodynastes salmini</i>	salmon striped frog	C	-	0	20/11/2008
			<i>Limnodynastes tasmaniensis</i>	spotted grassfrog	C	-	0	20/11/2008
			<i>Limnodynastes terraereginae</i>	scarled sided pobblebonk	C	-	0	20/11/2008
		Neobatrachus	<i>Neobatrachus sudellae</i>	meeowing frog	C	-	0	20/11/2008
		Platyplectrum	<i>Platyplectrum ornatum</i>	ornate burrowing frog	C	-	0	20/11/2008
	Myobatrachidae	Uperoleia	<i>Uperoleia rugosa</i>	chubby gungan	C	-	0	20/11/2008
		Crinia	<i>Crinia parinsignifera</i>	beeping froglet	C	-	0	20/11/2008

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern

TABLE 4: SPECIES LIST – MAMMALS (EXCLUDING MICROBATS)

Order	Family	Genus	Scientific Name	Common Name	Status	Observed in Field?	Last recorded
Artiodactyla	Bovidae	Bos	<i>Bos taurus</i>	European cattle		Field observation	6/02/2021
	Suidae	Sus	<i>Sus scrofa</i>	Pig		Field observation	12/07/2017
Carnivora	Canidae	Canis	<i>Canis familiaris</i>	Dog		Field observation	18/12/1999
	Felidae	Felis	<i>Felis catus</i>	Cat		Field observation	6/02/2021
Diprotodontia	Macropodidae	Macropus	<i>Macropus giganteus</i>	Eastern grey kangaroo		Field observation	19/12/1999

Order	Family	Genus	Scientific Name	Common Name	Status	Observed in Field?	Last recorded
		Notamacropus	<i>Notamacropus dorsalis</i>	Black-striped wallaby			17/10/2019
			<i>Notamacropus rufogriseus</i>	Red-necked wallaby			6/11/2023
		Osphranter	<i>Osphranter robustus</i>	Common wallaroo			31/12/1988
		Wallabia	<i>Wallabia bicolor</i>	Swamp wallaby			24/06/2015
	Petauridae	Petaurus	<i>Petaurus notatus</i>	Kreffft's glider			6/07/2013
	Phalangeridae	Trichosurus	<i>Trichosurus vulpecula</i>	Common brushtail possum		Field observation	27/06/2017
	Phascolarctidae	Phascolarctos	<i>Phascolarctos cinereus</i>	Koala	E; EN		21/12/2012
Rodentia	Muridae	Mus	<i>Mus musculus</i>	House mouse			16/12/1999
		Pseudomys	<i>Pseudomys gracilicaudatus</i>	Eastern chestnut mouse			17/12/1999
		Rattus	<i>Rattus rattus</i>	Black rat	-		15/12/1999
Monotremata	Tachyglossidae	Tachyglossus	<i>Tachyglossus aculeatus</i>	Short-beaked echidna	SLC		6/02/2021

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern

TABLE 5: SPECIES LIST - REPTILES

Order	Family	Genus	Scientific Name	Common Name	Status	Observed in Field?	Last recorded
Testudines	Chelidae	Chelodina	<i>Chelodina longicollis</i>	eastern long-necked turtle		Field observation	
			Unidentified			Field observation	
Squamata	Agamidae	Pogona	<i>Pogona barbata</i>	bearded dragon		Field observation	24/01/2004
	Colubridae	Dendrelaphis	<i>Dendrelaphis punctulatus</i>	green tree snake			5/02/2008
	Diplodactylidae	Diplodactylus	<i>Diplodactylus vittatus</i>	wood gecko			19/12/1999
		Lucasium	<i>Lucasium steindachneri</i>	steindachner's gecko			31/12/1996
	Elapidae	Cryptophis	<i>Cryptophis nigrescens</i>	eastern small-eyed snake			15/05/2022
		Demansia	<i>Demansia psammophis</i>	yellow-faced whipsnake		Field observation	
		Furina	<i>Furina diadema</i>	red-naped snake			17/12/1999
		Pseudechis	<i>Pseudechis guttatus</i>	spotted black snake		Field observation	
	Gekkonidae	Gehyra	<i>Gehyra dubia</i>	dubious dtella		Field observation	18/12/1999
		Heteronotia	<i>Heteronotia binoei</i>	bynoe's gecko		Field observation	18/12/1999
	Pygopodidae	Delma	Unidentified			Field observation	
		Lialis	<i>Lialis burtonis</i>	burton's legless lizard			22/09/2012
		Paradelma	<i>Paradelmaorientalis</i>	brigalow scaly-foot		Field observation	19/12/1999



Order	Family	Genus	Scientific Name	Common Name	Status	Observed in Field?	Last recorded
	Scincidae	Anomalopus	<i>Anomalopus leuckartii</i>	two-clawed worm-skink			28/02/2015
		Carlia	<i>Carlia pectoralis sensu lato</i>				15/12/1999
			<i>Carlia rubigo</i>	orange-flanked rainbow skink		Field observation	
		Cryptoblepharus	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		Field observation	18/12/1999
		Ctenotus	<i>Ctenotus spaldingi</i>	straight-browed ctenotus			15/12/1999
			Unidentified			Field observation	
		Cyclodomorphus	<i>Cyclodomorphus gerrardii</i>	pink-tongued lizard		Field observation	
		Egernia	<i>Egernia striolata</i>	tree skink		Field observation	18/12/1999
		Eremiascincus	<i>Eremiascincus richardsonii</i>	broad-banded sand swimmer			18/12/1999
		Lerista	<i>Lerista fragilis</i>	eastern mulch slider			18/12/1999
			<i>Lerista punctatovittata</i>	eastern robust slider		Field observation	
			<i>Lerista timida</i>	timid slider		Field observation	18/12/1999
		Liopholis	<i>Liopholis modesta</i>	eastern ranges rock-skink			15/12/1999
		Lygisaurus	<i>Lygisaurus foliorum</i>	tree-base litter-skink			19/12/1999
		Morethia	<i>Morethia boulengeri</i>	south-eastern morethia skink			18/12/1999
	Varanidae	Varanus	<i>Varanus gouldii</i>	sand monitor			6/02/2021
			<i>Varanus panoptes</i>	yellow-spotted monitor			7/12/2011
			<i>Varanus tristis</i>	black-tailed monitor			6/02/2021
			<i>Varanus varius</i>	lace monitor			5/11/2023

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TABLE 6: SPECIES LIST - MICROBATS

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	Last recorded
Chiroptera	Emballonuridae	Saccolaimus	<i>Saccolaimus flaviventris</i>	Yellow-bellied sheathtail bat		Definite	17/12/1999
	Vespertilionidae	Chalinolobus	<i>Chalinolobus gouldii</i>	Gould's wattled bat		Definite	17/12/1999
			<i>Chalinolobus morio</i>	Chocolate wattled bat		Definite	
			<i>Chalinolobus nigrogriseus</i>	Hoary wattled bat		Definite	
			<i>Chalinolobus picatus</i>	Little pied bat		Definite	
		Nyctophilus	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		Definite	16/12/1999
			<i>Nyctophilus corbeni</i>	Corben’s long-eared bat	V; VU	Possible	

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	Last recorded
			<i>Nyctophilus geoffroyi</i>	Lesser long-eared bat		Definite	
		Miniopterus	<i>Miniopterus orianae oceanensis</i>	Large bent-wing bat		Definite	
		Scotorepens	<i>Scotorepens balstoni</i>	Inland broad-nosed bat		Probable	17/12/1999
			<i>Scotorepens greyii</i>	Little broad-nosed bat		Definite	5/02/2000
			<i>Scotorepens spp.</i>			Probable	17/12/1999
			<i>Scotorepens spp. (Parnaby)</i>	Central-eastern broad-nosed bat			5/02/2000
		Scoteanax	<i>Scoteanax rueppellii</i>	Greater-broad nosed bat		Definite	
		Vespadelus	<i>Vespadelus spp.</i>				21/03/2005
			<i>Vespadelus troughtoni</i>	Large forest bat		Probable	
			<i>Vespadelus vulturnus</i>	Little forest bat		Definite	5/02/2000
			<i>Vespadelus braverstoki</i>	Inland forest bat		Definite	
			<i>Vespadelus regulus</i>	Southern forest bat		Probable	
	Molossidae	Austronomus	<i>Austronomus australis</i>	White-striped freetail bat		Definite	19/12/1999
		Mormopterus	<i>Mormopterus petersi</i>	Inland free-tailed bat			10/10/1999
			<i>Mormopterus ridei</i>	Eastern free-tailed bat			17/12/1999
			<i>Mormopterus spp.</i>				17/12/1999
		Ozimops	<i>Ozimops lumsdenae</i>	Northern free-tailed bat		Definite	
			<i>Ozimops petersi</i>	Eastern free-tailed bat		Definite	
			<i>Ozimops ridei</i>	Eastern free-tailed bat		Definite	

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TABLE 7: SPECIES LIST - AQUATIC

Order	Family	Genus	Scientific Name	Common Name	Status	Last recorded	Invasive Species
Odonata	Aeshnidae	Anax	<i>Anax papuensis</i>	Australian Emperor		6/11/2023	
	Libellulidae	Diplacodes	<i>Diplacodes bipunctata</i>	bipunctata wandering percher		6/11/2023	
	Libellulidae	Orthetrum	<i>Orthetrum caledonicum</i>	caledonicum blue skimmer		6/11/2023	
Lepidoptera	Nymphalidae	Vanessa	<i>Vanessa kershawi</i>	Australian painted lady		6/11/2023	
Cyprinodontiformes	Poeciliidae	Gambusia	<i>Gambusia holbrooki</i>	Mosquitofish	-	2017	Yes
Malacostraca	Parastacidae	Cherax	<i>Cherax destructor</i>	Common yabbie	-	12/07/2017	No

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TABLE 8: SPECIES LIST - INSECTA

Order	Family	Genus	Scientific Name	Common Name	Status	Last recorded	Invasive Species
Lepidoptera	Lycaenidae	Jalmenus	<i>Jalmenus eubulus</i>	Pale imperial hairstreak	VU (NC Act	6/01/1999	No
	Nymphalidae	Junonia	<i>Junonia villida villida</i>	Meadow argus	-	5/11/2023	No
	Pieridae	Belenois	<i>Belenois java teutonia</i>	Caper white	-	5/11/2023	No

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TABLE 9: SPECIES LIST - FLORA

Order	Family	Genus	Confirmed Species
Apiales	Apiaceae	Apium	<i>Apium graveolens</i>
		Cyclospermum	<i>Cyclospermum leptophyllum*</i>
	Pittosporaceae	Pittosporum	<i>Pittosporum angustifolium</i>
			<i>Pittosporum multiflorum</i>
			<i>Pittosporum spinescens</i>
Asparagales	Asparagaceae	Eustrephus	<i>Eustrephus latifolius</i>
		Lomandra	<i>Lomandra filiformis</i>
			<i>Lomandra leucocephala</i>
			<i>Lomandra longifolia</i>
			<i>Lomandra multiflora</i>
			Unidentified
	Asphodelaceae	Bulbine	<i>Bulbine alata</i>
			<i>Bulbine semibarbata</i>
	Hemerocallidaceae	Dianella	<i>Dianella caerulea</i>
			<i>Dianella longifolia</i>
	Orchidaceae	Caladenia	Unidentified
Asterales	Asteraceae	Bidens	<i>Bidens pilosa*</i>
		Brachyscome	<i>Brachyscome microcarpa</i>
			<i>Brachyscome dalbyensis</i>
			<i>Brachyscome multifida</i>
			<i>Brachyscome pedleyi</i>

Order	Family	Genus	Confirmed Species
			<i>Brachyscome stenoloba</i>
			Unidentified
		Calotis	<i>Calotis cuneifolia</i>
			<i>Calotis lappulacea</i>
		Cassinia	<i>Cassinia laevis</i>
		Chrysocephalum	<i>Chrysocephalum apiculatum</i>
		Conyza	Unidentified*
		Cotula	Unidentified
		Cyanthillium	<i>Cyanthillium cinereum</i>
		Dittrichia	<i>Dittrichia graveolens*</i>
		Emilia	<i>Emilia sonchifolia*</i>
		Erigeron	<i>Erigeron bonariensis*</i>
			<i>Erigeron canadensis</i>
		Leiocarpa	Unidentified
		Ozothamnus	<i>Ozothamnus diosmafolius</i>
		Rutidosia	<i>Rutidosia lanata</i>
		Senecio	<i>Senecio brigalowensis</i>
			<i>Senecio queenslandicus</i>
		Sigesbeckia	<i>Sigesbeckia orientalis</i>
		Sphaeromorphaea	<i>Sphaeromorphaea australis</i>
		Tridax	<i>Tridax procumbens*</i>
		Vittadinia	<i>Vittadinia dissecta</i>
			<i>Vittadinia sulcata</i>
			Unidentified
		Xerochrysum	<i>Xerochrysum bracteatum</i>
	Campanulaceae	Wahlenbergia	<i>Wahlenbergia gracilis</i>
			<i>Wahlenbergia stricta</i>
			Unidentified
	Goodeniaceae	Brunonia	<i>Brunonia australis</i>

Order	Family	Genus	Confirmed Species
		Brunoniella	<i>Brunoniella australis</i>
		Goodenia	<i>Goodenia delicata</i>
			<i>Goodenia glabra</i>
			<i>Goodenia rotundifolia</i>
			Unidentified
		Scaevola	<i>Scaevola spinescens</i>
Boraginales	Boraginaceae	Heliotropium	Unidentified
Brassicales	Brassicaceae	Lemphoria	<i>Lemphoria eremigena</i>
		Lepidium	<i>Lepidium africanum</i> *
		Rapistrum	<i>Rapistrum rugosum</i> *
	Capparaceae	Capparis	<i>Capparis lasiantha</i>
Caryophyllales	Aizoaceae	Tetragonia	<i>Tetragonia tetragonoides</i>
	Amaranthaceae	Alternanthera	<i>Alternanthera denticulata</i>
		Atriplex	<i>Atriplex nummularia</i>
		Dysphania	<i>Dysphania melanocarpa</i>
		Einadia	<i>Einadia nutans</i>
		Enchylaena	<i>Enchylaena tomentosa</i>
		Gomphrena	Unidentified*
		Maireana	<i>Maireana microphylla</i>
		Nyssanthes	<i>Nyssanthes erecta</i>
		Ptilotus	<i>Ptilotus exaltatus</i>
		Rhagodia	<i>Rhagodia parabolica</i>
			<i>Rhagodia spinescens</i>
		Sclerolaena	<i>Sclerolaena birchii</i>
			<i>Sclerolaena diacantha</i>
			<i>Sclerolaena lanicuspis</i>
			<i>Sclerolaena muricata</i>
			<i>Sclerolaena tricuspis</i>
	Cactaceae	Cylindropuntia	<i>Cylindropuntia imbricata</i> *

Order	Family	Genus	Confirmed Species
		Harrisia	Unidentified*
		Opuntia	Opuntia aurantiaca
			Opuntia humifusa*
			Opuntia stricta*
			Opuntia tomentosa*
			Unidentified
	Nyctaginaceae	Boerhavia	Unidentified
	Polygonaceae	Rumex	Rumex brownii
	Portulacaceae	Calandrinia	Calandrinia balonensis
			Calandrinia pickeringii
		Portulaca	Portulaca pilosa*
Celastrales	Celastraceae	Denhamia	Denhamia cunninghamii
Ericales	Primulaceae	Lysimachia	Lysimachia arvensis*
	Ericaceae	Melichrus	Melichrus urceolatus
Fabales	Fabaceae	Acacia	Acacia burrowwii
			Acacia caroleae
			Acacia conferta
			Acacia crassa
			Acacia deanei
			Acacia decora
			Acacia excelsa
			Acacia harpophylla
			Acacia ixiophylla
			Acacia ixodes
			Acacia jucunda
			Acacia leiocalyx
			Acacia muelleriana
			Acacia neriifolia
			Acacia podaryllifolia

Order	Family	Genus	Confirmed Species
			<i>Acacia polybotrya</i>
			<i>Acacia salicina</i>
			<i>Acacia semilunata</i>
			Unidentified
		Aeschynomene	<i>Aeschynomene brevifolia</i> *
		Daviesia	<i>Daviesia villifera</i>
			Unidentified
		Desmodium	<i>Desmodium varians</i>
			Unidentified
		Glycine	<i>Glycine tabacina</i>
			Unidentified
		<i>Jacksonia</i>	<i>Jacksonia scoparia</i>
		Mirbelia	<i>Mirbelia pungens</i>
		Oxytes	<i>Oxytes brachypoda</i>
		Pultenaea	Unidentified
		Senna	<i>Senna artemisoides</i>
			<i>Senna multiglandulosa</i> *
			Unidentified
		Swainsona	<i>Swainsona galegifolia</i>
			Unidentified
Fagales	Casuarinaceae	Allocasuarina	<i>Allocasuarina inophloia</i>
			<i>Allocasuarina luehmannii</i>
			Unidentified
		Casuarina	<i>Casuarina cristata</i>
			Unidentified
Geraniales	Geraniaceae	Genarium	Unidentified
Gentianales	Apocynaceae	Carissa	<i>Carissa lanceolata</i>
			<i>Carissa ovata</i>
		Gomphocarpus	<i>Gomphocarpus physocarpus</i> *

Order	Family	Genus	Confirmed Species
		Parsonsia	<i>Parsonsia lanceolata</i>
		Vinca	<i>Vinca major</i> *
	Rubiaceae	Asperula	<i>Asperula geminifolia</i>
		Breynia	<i>Breynia oblongifolia</i>
		Cinchona	<i>Cinchona pubescens</i> *
		Pomax	<i>Pomax umbellata</i>
		Psydrax oleifolia	<i>Psydrax oleifolia</i>
Lamiales	Acanthaceae	Rostellularia	<i>Rostellularia adscendens</i>
	Lamiaceae	Prostanthera	Unidentified
		Teucrium	<i>Teucrium puberulum</i>
		Westringia	<i>Westringia cheelii</i>
			<i>Westringia parvifolia</i>
	Laxmanniaceae	Laxmannia	<i>Laxmannia gracilis</i>
	Oliaceae	Jasminum	<i>Jasminum didymum</i>
	Scrophulariaceae	Eremophila	<i>Eremophila mitchellii</i>
			<i>Eremophila deserti</i>
			<i>Eremophila debilis</i>
		Myoporum	<i>Myoporum microphyllum</i>
	Verbenaceae	Glandularia	<i>Glandularia aristigera</i> *
		Verbena	<i>Verbena bonariensis</i> *
Lophocoleineae	Trichocoleaceae	Bryophyta	Unidentified
Malpighiales	Euphorbiaceae	Croton	Unidentified
		Euphorbia	<i>Euphorbia prostrata</i> *
	Linaceae	Linum	<i>Linum marginale</i>
	Phyllanthaceae	Phyllanthus	<i>Phyllanthus virgatus</i>
			Unidentified
	Picrodendraceae	Petalostigma	<i>Petalostigma pubescens</i>
Malvales	Malvaceae	Abutilon	<i>Abutilon oxycarpum</i>
			Unidentified

Order	Family	Genus	Confirmed Species
		Hibiscus	<i>Hibiscus sturtii</i>
		Sida	<i>Sida corrugata</i>
			<i>Sida fibulifera</i>
			<i>Sida trichopoda</i>
			Unidentified
	Thymelaeaceae	Pimelea	<i>Pimelea microcephala</i>
			<i>Pimelea neoanglica</i>
			<i>Pimelea trichostachya</i>
Myrtales	Combretaceae	Terminalia	<i>Terminalia oblongata</i>
	Myrtaceae	Angophora	<i>Angophora floribunda</i>
			<i>Angophora leiocarpa</i>
			Unidentified
		Calytrix	<i>Calytrix tetragona</i>
		Corymbia	<i>Corymbia clarksoniana</i>
			<i>Corymbia intermedia</i>
			<i>Corymbia tessellaris</i>
			<i>Corymbia trachyphloia</i>
			Unidentified
		Eucalyptus	<i>Eucalyptus apothalassica</i>
			<i>Eucalyptus bakeri</i>
			<i>Eucalyptus camaldulensis</i>
			<i>Eucalyptus chloroclada</i>
			<i>Eucalyptus crebra</i>
			<i>Eucalyptus decorticans</i>
			<i>Eucalyptus exserta</i>
			<i>Eucalyptus fibrosa nubilis</i>
			<i>Eucalyptus melanophloia</i>
			<i>Eucalyptus microcarpa</i>
			<i>Eucalyptus moluccana</i>

Order	Family	Genus	Confirmed Species
			<i>Eucalyptus populnea</i>
			<i>Eucalyptus tereticornis</i>
			<i>Eucalyptus woollsiana</i>
			Unidentified
		Homoranthus	<i>Homoranthus melanostictus</i>
		Kardomia	<i>Kardomia jucunda</i>
		Kunzea	<i>Kunzea opposita</i>
		Lysicarpus	Unidentified
		Melaleuca	<i>Melaleuca decora</i>
			<i>Melaleuca densispicata</i>
			Unidentified
Oxalidales	Oxalidaceae	Oxalis	<i>Oxalis perennans</i>
			Unidentified*
Plantaginales	Plantaginaceae	Plantago	<i>Plantago debilis</i>
Poales	Cyperaceae	Carex	<i>Carex inversa</i>
		Cyperus	<i>Cyperus fulvus</i>
			<i>Cyperus gracilis</i>
			Unidentified
		Eleocharis	<i>Eleocharis plana</i>
		Fimbristylis	<i>Fimbristylis dichotoma</i>
		Gahnia	<i>Gahnia aspera</i>
		Schoenus	<i>Schoenus kennyi</i>
	Juncaceae	Juncus	<i>Juncus usitatus</i>
			Unidentified
	Poaceae	Ancistrachne	<i>Ancistrachne uncinulata</i>
		Aristida	<i>Aristida annua</i>
			<i>Aristida calycina</i>
			<i>Aristida caput-medusae</i>
			<i>Aristida holathera</i>

Order	Family	Genus	Confirmed Species
			<i>Aristida jerichoensis</i>
			<i>Aristida leichhardtiana</i>
			<i>Aristida ramosa</i>
			<i>Aristida muricata</i>
		Austrostipa	<i>Austrostipa verticillata</i>
			Unidentified
		Arundinella	<i>Arundinella nepalensis</i>
		Axonopus	<i>Axonopus compressus</i> *
		Bothriochloa	<i>Bothriochloa decipiens</i>
			<i>Bothriochloa pertusa</i> *
		Cenchrus	<i>Cenchrus ciliaris</i> *
		Chloris	<i>Chloris divaricata</i>
			<i>Chloris gayana</i> *
			<i>Chloris pectinata</i>
			<i>Chloris truncata</i>
			<i>Chloris ventricosa</i>
		Cymbopogon	<i>Cymbopogon refractus</i>
		Cynodon	Unidentified
		Dichanthium	<i>Dichanthium sericeum</i>
			Unidentified
		Digitaria	<i>Digitaria didactyla</i> *
			<i>Digitaria divaricatissima</i>
		Dinebra	<i>Dinebra decipiens</i>
		Enteropogon	Unidentified
		Eragrostis	<i>Eragrostis brownii</i>
			<i>Eragrostis curvula</i> *
			<i>Eragrostis elongata</i>
			<i>Eragrostis lacunaria</i>
			Unidentified

Order	Family	Genus	Confirmed Species
		Eriachne	<i>Eriachne mucronata</i>
		Heteropogon	<i>Heteropogon contortus</i>
		Imperata	<i>Imperata cylindrica</i>
		Themeda	<i>Themeda triandra</i>
		Megathyrsus	<i>Megathyrsus maximus*</i>
		Panicum	<i>Panicum decompositum</i>
			<i>Panicum effusum</i>
			Unidentified
		Paspalidium	<i>Paspalidium albovillosum</i>
			<i>Paspalidium caespitosum</i>
			Unidentified
		Rytidosperma	<i>Rytidosperma tenuius</i>
			Unidentified
		Sporobolus	<i>Sporobolus creber</i>
			<i>Sporobolus caroli</i>
			<i>Sporobolus elongatus</i>
			<i>Sporobolus scabridus</i>
			Unidentified
		Tripogon	<i>Tripogon loliiformis</i>
		Urochloa	<i>Urochloa decumbens*</i>
			<i>Urochloa panicoides</i>
Pinales	Cupressaceae	Callitris	<i>Callitris endlicheri</i>
			<i>Callitris glaucophylla</i>
			Unidentified
Polypodiales	Pteridaceae	Cheilanthes	<i>Cheilanthes distans</i>
			<i>Cheilanthes sieberi</i>
			<i>Cheilanthes tenuifolia</i>
			Unidentified
Proteales	Proteaceae	Banksia	<i>Banksia integrifolia</i>
		Persoonia	Unidentified

Order	Family	Genus	Confirmed Species
Rosales	Rhamnaceae	Alphitonia	<i>Alphitonia excelsa</i>
		Cryptandra armata	<i>Cryptandra armata</i>
		Ventilago	<i>Ventilago viminalis</i>
Santalales	Loranthaceae	Mistletoe spp.	Unidentified
	Santalaceae	Santalum	<i>Santalum lanceolatum</i>
Sapindales	Meliaceae	Owenia	<i>Owenia acidula</i>
	Rutaceae	Cyanothamnus	<i>Cyanothamnus occidentalis</i>
		Geijera	<i>Geijera parviflora</i>
		Philotheca	<i>Philotheca sporadica</i>
	Sapindaceae	Alectryon	<i>Alectryon diversifolius</i>
			<i>Alectryon oleifolius</i>
		Dodonaea	<i>Dodonaea macrossanii</i>
			<i>Dodonaea triangularis</i>
			<i>Dodonaea viscosa viscosa</i>
		Drypetes	<i>Drypetes deplanchei</i>
Saxifragales	Haloragaceae	Myriophyllum	<i>Myriophyllum crispatum</i>
	Crassulaceae	Crassula	<i>Crassula sieberiana</i>
		Sedum	Unidentified*
Solanales	Convolvulaceae	Dichondra	Unidentified*
		Evolvulus	<i>Evolvulus alsinoides</i>
	Solanaceae	Solanum	<i>Solanum americanum</i>
			<i>Solanum ellipticum</i>
			<i>Solanum parvifolium</i>
			Unidentified
Zygophyllales	Zygophyllaceae	Roepera	<i>Roepera apiculata</i>

*Indicates non-native to Australia



APPENDIX E PRELIMINARY BBMP



PREPARED FOR



RWE Cattle Creek Onshore Wind
Pty Ltd

DATE
09 July 2026

REFERENCE
0706881

Preliminary Bird and Bat Management Plan

Cattle Creek Wind Farm



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Preliminary Bird and Bat Management Plan

Cattle Creek Wind Farm

0706881



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ACRONYMS AND ABBREVIATIONS

Acronym	Description
ALA	Atlas of Living Australia
ARENA	Australian Renewable Energy Agency
AusWind	Australian Wind Energy Association
BACI	Before-After-Control-Impact
BBMP	Bird and Bat Management Plan
BBUS	Bird and Bat Utilisation Surveys
BESS	Battery Energy Storage System
BHT	Broad Habitat Type
BUS	Bird Utilisation Surveys
cm	Centimetre
CRM	Collision Risk Modelling
CCRA	Cumulative Collision Risk Assessment
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DETSI	Department of the Environment, Tourism, Science and Innovation
DEWHA	Department of the Environment, Water, Heritage and the Arts
DHLGPPW	Department of Housing, Local Government, Planning and Public Works
DoR	Department of Resources
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning
E	Endangered
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERM	Environmental Resources Management Australia Pty Ltd
GenEst	Generalised Estimator
Ha	Hectare
HV	High voltage
IBAs	Important Bird and Biodiversity Areas
IBRA	Interim Biogeographic Regionalisation for Australia
IFC	International Finance Corporation
km	Kilometre
LC	Least concern
LoO	Likelihood of Occurrence
LV	Low voltage

Acronym	Description
m	Metre
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
MW	Megawatts
MV	Medium voltage
<i>NC Act</i>	<i>Nature Conservation Act 1992</i>
OSOM	Over-size over-mass
PCFM	Post-construction Bird and Bat Fatality Monitoring
PMST	Protected Matters Search Tool
RAP	Road and Plot
RE	Regional Ecosystem
RSA	Rotor Swept Area
RWE	RWE Cattle Creek Onshore Wind Pty Ltd
SDAP	State Development Assessment Provisions
SLC	Special Least Concern
SNH	Scottish Natural Heritage
SPRAT	Species Profile and Threats Database
SQE	Suitably qualified ecologist
TEC	Threatened Ecological Communities
TSSC	Threatened Species Scientific Committee
<i>VM Act</i>	<i>Vegetation Management Act 1999</i>
WTG	Wind Turbine Generator
Qld	Queensland

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by RWE Cattle Creek Onshore Wind Pty (RWE) to prepare a Preliminary Bird and Bat Management Plan (BBMP) for the proposed Cattle Creek Wind Farm (herein referred to as the 'Proposed Development').

The Proposed Development will consist of up to 135 Wind Turbine Generators (WTGs), Battery Energy Storage System (BESS) of up to 450 MW and ancillary infrastructure (supporting infrastructure) consisting of:

- WTG foundations, crane hardstands, crane boom laydown, blade laydown and rotor assembly area;
- Access tracks, including:
 - New and upgraded tracks within the Project Area, generally comprising of a nominal range of 5.5 m – 10 m wide permanent access track, and a maximum 50 - 95 m wide cleared corridor for Oversize Overmass (OSOM) vehicles;
- Low voltage (LV) and medium voltage (MV) underground cabling, as well as MV and high voltage (HV) overhead transmission lines;
- Internal collector substations;
- A switching station adjacent to the existing 330 kV Powerlink transmission line. This has been accounted for within the Disturbance Footprint, thereby allowing the clearing of the site to be assessed as part of the impacts associated with the Proposed Development (noting, however, that the switching station infrastructure will be constructed, owned and operated by Powerlink);
- Permanent meteorological masts;
- Construction compounds and laydown areas;
- Washdown areas;
- Operational and maintenance facilities; and
- A construction workers accommodation facility.

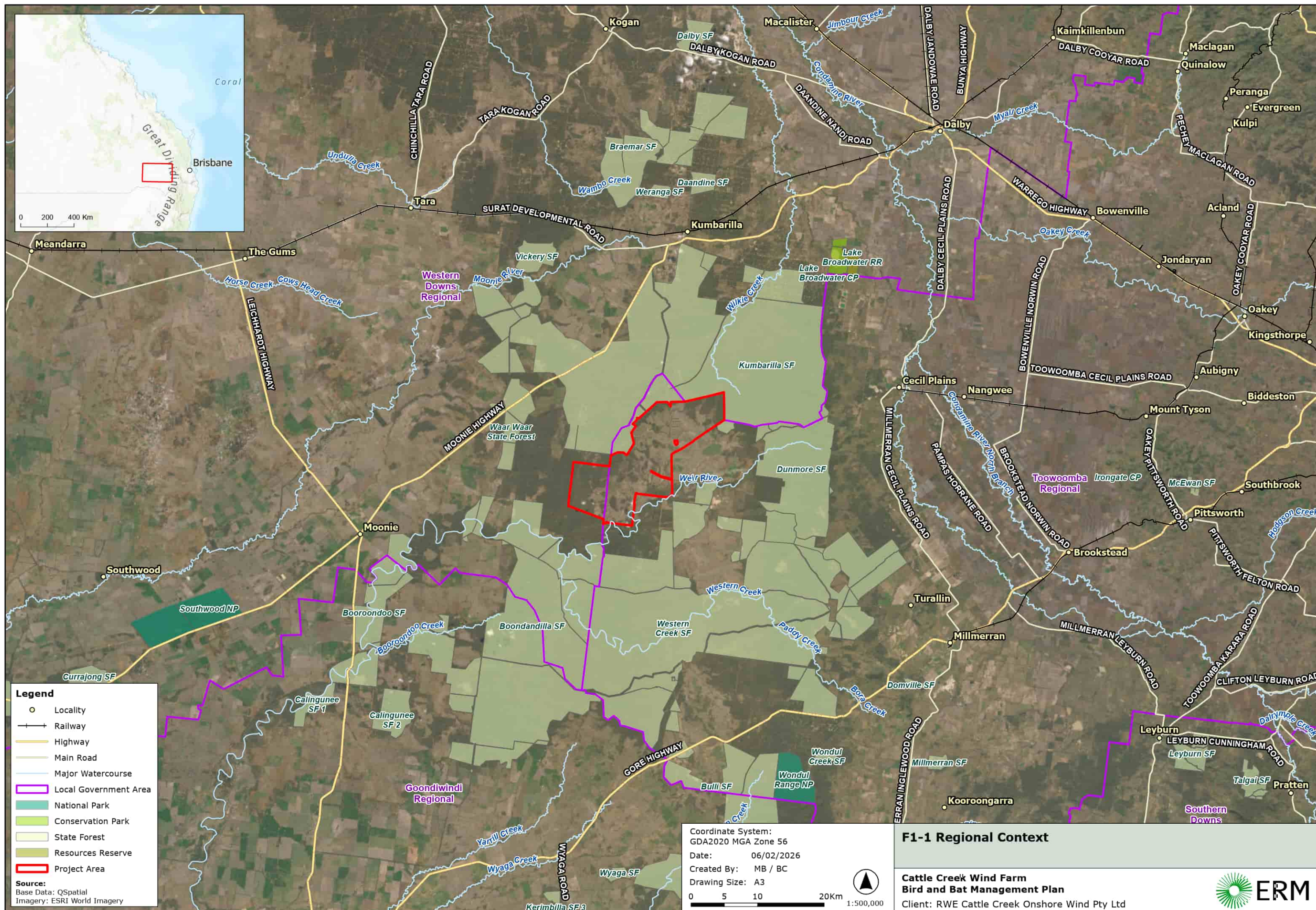
Further, there is the potential for the inclusion of the below infrastructure:

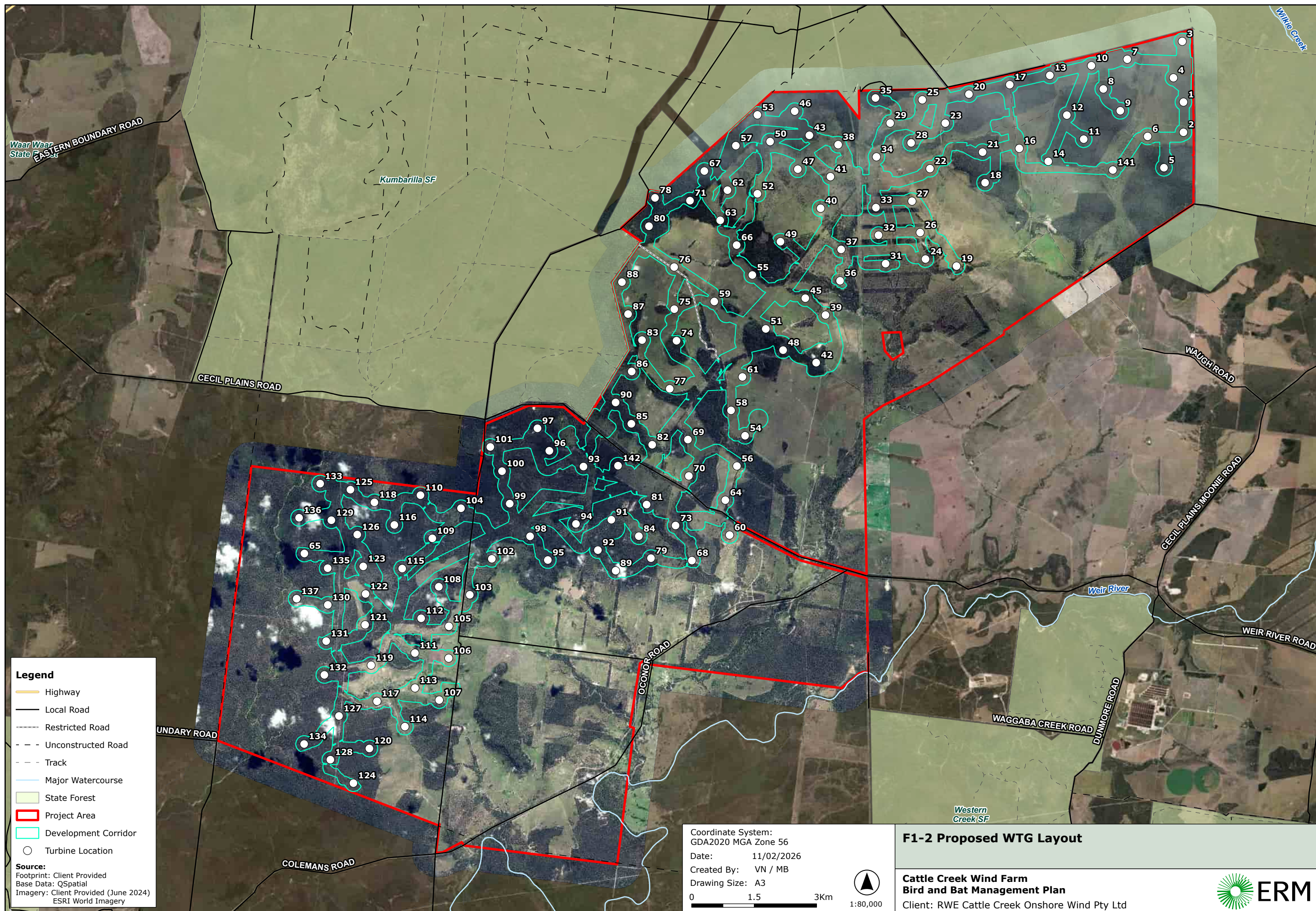
- Concrete batching plants;
- Borrow pits; and
- Communications tower.

For the purpose of this BBMP Report, the following definitions apply:

- **Project Area:** The host properties over which the Proposed Development will be undertaken, covering a total area of 20,404.5 ha;
- **Development Corridor:** The corridor of land on which the final Disturbance Footprint will be located, a 100 m buffer for micro-siting; and
- **Disturbance Footprint:** The area of direct disturbance associated with the construction, operation and decommissioning of the Proposed Development within the Project Area, encompassing approximately 2,221.2 ha.

It is important to note that this BBMP applies largely to the proposed infrastructure in the Project Area, as the operation of WTGs is the primary impact vector relevant to the assessment of collision risk, flight paths and potential barrier effects for aerial species in wind farm developments. As such, the Project Area, proposed WTG locations and Development Corridor are presented in Figure 1-2.





1.1 REGULATORY REQUIREMENTS

State Code 23: Wind farm development (State Code 23) (DHLGPPW, 2024) details the requirement for wind farms to have a BBMP that:

- Are prepared by a suitably qualified ecologist (SQE);
- Are based on 'as-constructed' project details;
- Identifies all 'at risk' bird and bat species (i.e. all threatened and common species), seasons, and areas within the Project Area which may attract high levels of mortality;
- Incorporates baseline (pre-operational) data, including where relevant, additional pre-operational surveys, Collision Risk Modelling (CRM) and Population Viability Analysis;
- Identifies threshold (trigger) levels for all at risk species;
- Identifies mitigation measures and implementation strategies to reduce impacts on bird and bat species;
- Includes a decision-making framework and adaptive management approach, including triggers for mitigation measures such as operational shut-down of relevant turbines during certain periods;
- Outlines a monitoring regime that requires operators to undertake regular searches for evidence of bird and bat mortality and to maintain records of details of all incidences of bird and/or bat mortality; and
- Recommends the use of technologies that may assist in reducing bird and bat strikes. Operators are encouraged to be informed of and deploy latest technologies that may assist with minimising bird and bat strikes.

The Onshore Wind Farm Guidance (Department of Climate Change, Energy, the Environment and Water (DCCEEW, 2024)), also provides advice on what should be included in a wind farm BBMP to gain approval under the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. In addition to both *State Code 23* and Onshore Wind Farm Guidance requirements, this BBMP has been prepared to manage impacts to bird and bat species that are Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) protected under the *EPBC Act* and *Nature Conservation Act 1992 (NC Act)*.

1.2 BIRD AND BAT MANAGEMENT PLAN OBJECTIVES

The objective of this BBMP is to minimise and manage the overall impact of the Proposed Development on birds and bats. This BBMP aims to:

- Detail potential mitigation measures and implementation strategies to minimise impacts to birds and bats;
- Establish an adaptive management framework for managing and mitigating impacts on birds and bats;
- Outline a bird and bat monitoring program to understand the impact of the Proposed Development to at-risk birds and bats;
- Identify any additional measures that can be used to manage impacts based on the outcomes of operational phase bird and bat monitoring;

- Document an agreed decision-making framework that identifies operational-phase impact triggers leading to an effective management response; and
- Outline corrective actions that may be implemented as required through the decision-making framework to avoid, minimise and mitigate any significant impacts occurring to at-risk species.

This BBMP is a live document and will be continuously adapted in response to the outcomes of operational bird and bat monitoring. As the Proposed Development is also seeking approval under the *EPBC Act*, this BBMP will involve ongoing consultation with the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for management responses following the identification of species mortality considered to meet trigger levels for at-risk species.

This BBMP is utilising data collected from two years of pre-operational bird and bat utilisation surveys (BBUS) (eight survey periods). This BBMP will proceed through a review process prior to the commissioning phase.

1.3 PROJECT AREA AND CONTEXT

The Project Area is located approximately 60 km south-west of Dalby in the Toowoomba Regional Council and Western Downs Regional Council Local Government Areas (LGA). The closest major town is Toowoomba, 110 km east of the Project Area, with Queensland's capital, Brisbane, located 220 km east of the Project Area.

The Project Area is located within the Rural Zone of the Toowoomba Regional Council and Western Downs Regional Council.

The Project Area has been used predominantly for cattle grazing for many decades, and this remains the primary land use. Limited cropping also occurs, mainly to produce fodder for livestock. These ongoing agricultural disturbances have constrained the natural recovery of native ecological communities across much of the area. Remnant vegetation is mostly confined to the western portion of the Project Area, where some patches are affected by severe dieback. Additional small pockets of remnant and regrowth vegetation occur elsewhere but are highly fragmented. Cleared areas are dominated by improved pasture, scattered shrubs, and mixed-age regrowth. Riparian fringing woodlands persist only along creek lines, where historical clearing and continued grazing have resulted in sparse and degraded vegetation structure.

The Project Area lies adjacent to and within the locality (10 km) of several State Forests:

- The Kumbarilla State Forest is located on the northern boundary of the Project Area and has an area of approximately 86,000 ha;
- The Western Creek State Forest is located approximately 5 km south-east and has an area of approximately 100,000 ha; and
- Dunmore State Forest is located approximately 10 km south-east and has an area of approximately 20,000 ha.

The Project Area is approximately 20,404.5 ha in size (refer to Figure 1-1) and consists of 12 individual land parcels (lots) on five properties and road reserves. The property lots and their respective sizes are outlined in Table 1-1.

TABLE 1-1 PROJECT AREA PROPERTY LIST

Property	Lot on Plan	Tenure	Size (ha)
Landowner 1	2DY452	Freehold	4,698.8
Landowner 2	27CP882781	Freehold	2,406.6
	2DY831	Freehold	3,013.8
Landowner 3	1RP174414	Freehold	2,049.6
	16SP201705	Freehold	1,019.9
	15SP201705	Freehold	1,032.3
	3RP174414	Freehold	823.6
Landowner 4	2RP174414	Freehold	1,176.7
Landowner 5	8DY247	Freehold	964.9
	9DY247	Freehold	965.5
	22DY800	Freehold	1028.3
	21DY218	Freehold	1,041.1
Road Reserves	Part of O'Connor Road Unnamed Road Reserves	Road Reserve	179.5 ¹
TOTAL			20,404.5

¹ This includes the total of mapped road reserve areas within the Project Area.

The Project Area is located within the Southern Brigalow Belt bioregion as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) framework, within the Toowoomba Regional Council and Western Downs local government areas of Queensland.

Ecological and landscape features observed within the Project Area are typical of the region and include eucalypt dominated open forest and woodlands on alluvial plains and igneous rock. The landscape is characterised largely by non-remnant grasslands with historic clearing and dieback. Numerous regions of the Project Area are less degraded and offer higher ecological value due to the retention of areas of remnant and regrowth native vegetation communities.

Six entrances to the Project Area will occur along Cecil Plains Moonie Road through the various landowners properties. Throughout the duration of the construction and operational phases of the Proposed Development, host properties will continue to use land for agricultural activities and it is anticipated that tracks established during construction of the Proposed Development will aid continued agricultural activities.

2. PRE-OPERATIONAL BIRD AND BAT INFORMATION

Pre-operational bird and bat utilisation data was obtained through a detailed field survey program developed based on an assessment of desktop resources.

Oversight, guidance and technical review has been undertaken by Dr David Dique, a lead Partner at ERM with 30 years of experience in research, government and ecological consulting. David has led the design of all field surveys. Matt Davis, a Technical Consulting Director at ERM with 19 years of experience in ecology with expertise in in both flora and fauna surveys and the development of ecological survey programs and assessment methods. Matt was also present on the initial field surveys. Principal Ecologist, Adam Pavitt, and Senior Ecologist, Timothy Callaghan, each with 10 years' experience, also played advisory roles in the development of the field survey program and attended several of the surveys.

Field investigations focused on bird and bat surveys, to identify at-risk species required for consideration during the operation of the Proposed Development. Desktop information was utilised to inform an understanding of the at-risk species ecology and biology to support the development of management measures, as defined in this BBMP.

2.1 PRE-OPERATIONAL SURVEY METHODS

2.1.1 DESKTOP REVIEW

Prior to conducting field investigations, a review of desktop sources was undertaken to identify the ecological values of the Project Area, including Commonwealth, State and public information sources, as per Table 2-1. The desktop analysis further guided the development of the field survey techniques and effort best suited to the ecological matters identified within the Project Area. Desktop information was utilised to assess and document the likelihood of occurrence (LoO) for threatened bird and bat species within the Project Area .

TABLE 2-1 DATABASES REVIEWED FOR DESKTOP

Information Source	Name	Data Description
DCCEEW	PMST	The PMST provides predictive results of MNES based on mapping of known and potential species distribution, habitat, ecological communities and wetlands. The outputs are based on modelling results and do not necessarily reflect known records of species or communities. The features highlighted by the search are considered further through a LoO assessment. The PMST is available in Appendix A. Search area: Project Area boundary shp. with a 10 km buffer area Search date: 19 March 2024, 30 October 2024, 31 July 2025, 5 December 2025 and 13 February 2026.
DCCEEW	Species Profile and Threats Database (SPRAT)	The SPRAT profiles and conservation advice documents provide detailed, peer reviewed, information on species and ecological communities listed under the <i>EPBC</i> Act, including information regarding population and distributions, habitat, movements, feeding, reproduction and taxonomic comments.

Information Source	Name	Data Description
Department of Resources (DoR)	Regional Ecosystem (RE) Version 13.1 mapping	This product maps remnant and regrowth vegetation communities across Queensland and identifies communities listed as Endangered, Of Concern or Least Concern status as defined by the <i>Vegetation Management Act 1999 (VM Act)</i> .
DoR	Property Maps of Assessable Vegetation (PMAV) mapping (published 13 December 2024)	This product provides certified property scale maps indicating where landholders can clear regrowth in 'Category X' areas without further approval.
Queensland Government	MSES version 4.1 mapping	This product maps areas of MSES as defined under the Qld State Planning Policy.
DoR	Queensland Globe	This is a Google Earth based product that allows viewing of spatial data and imagery covering Queensland.
Department of the Environment, Tourism, Science and Innovation (DETSI)	WildNet records – through the Environmental Reports	A database that contains records of wildlife sightings including threatened flora and fauna species (protected under the <i>Nature Conservation Act 1992 (NC Act)</i> that have been provided to the agency by Government departments and external organisations. Search area: Project Area boundary shp. with a 10 km buffer area. Search date: 19 March 2024, 30 October 2024, 31 July 2025 and 5 December 2025.
Ala.org.au	Atlas of Living Australia (ALA)	The national biodiversity database of Australia which is supported by the National Collaborative Research Infrastructure Strategy (NCRIS) and is hosted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The database contains records accessed through an interactive spatial portal. Threatened species are searched to identify known records in proximity to the Project Area. Search area: Project Area boundary shp. with a 10 km buffer area. Search date: 19 March 2024, 30 October 2024, 31 July 2025 and 5 December 2025.

2.1.2 LIKELIHOOD OF OCCURRENCE

Consistent with the accepted approach for ecological assessment, a preliminary bird and bat LoO assessment was undertaken informed by desktop sources and database searches which was further refined from field observations, resulting in a final LoO of which is available in Appendix B. The LoO criteria is presented in Table 2-2.

TABLE 2-2 LIKELIHOOD OF OCCURRENCE CRITERIA

	Preferred habitat exists	Suitable habitat exists ¹	Habitat does not exist ²
Records within Project Area (based on site surveys and recent (last 20 years) records)	Known	Known	Known
Records in the locality ³	Likely	Potential	Unlikely
No records in the locality, but Project Area is within known distribution	Potential	Potential	Unlikely
No records in the locality, and Project Area is outside of distribution	Unlikely	Unlikely	Unlikely

¹Habitat may be considered suitable but not preferred because: some preferred habitat features may be present but not all; habitat may have poor connectivity; or habitat may be known to be disturbed; or preferred habitat requires confirmation.

²Based on sources reviewed and/or field survey results.

³'Locality' refers to the Project Area and a 10 km buffer.

2.1.3 FIELD SURVEY TECHNIQUES AND EFFORT

Eight BBUS events have been undertaken between December 2023 and July 2025 to assess bird and bat utilisation of the Project Area. The locations of surveys undertaken are presented in Figure 2-1 along with the Project Area. A description of techniques and objectives presented in Table 2-3. Note that Table 2-3 only refers to bird and bat survey methods, when most survey events also incorporated a range of additional techniques (i.e. vegetation and habitat assessments, targeted fauna surveys etc.).

The field investigations focused on conducting BBUS and also targeting listed threatened and migratory species which were identified as potentially occurring during the desktop investigation. Bird and bat surveys were conducted in accordance with the following survey guidelines:

- *Survey guidelines for Australia's threatened birds* (DEWHA, 2017);
- *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* (DoE, 2015);
- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre, et al., 2022);
- *Survey Guidelines for Australia's Threatened Bats* (DEWHA, 2010); and
- *Onshore Wind Farm Guidance - Best practice approaches when seeking approval under Australia's national environment law* (DCCEEW, 2024).

TABLE 2-3 BIRD AND BAT SURVEYS UNDERTAKEN WITHIN THE PROJECT AREA

Timing	Target	Techniques	Survey Effort
4 - 8 December 2023 Summer - Wet	Bat utilisation surveys	Deployment of Anabats to detect high-frequency bat-calls.	- Four Anabats deployed for four consecutive nights; and - One Anabat deployed for three consecutive nights.
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Survey locations also included opportunistic searches for conservation significant flora and fauna.	22 BUS.
12 - 16 February 2024 Summer - Wet	Bat utilisation surveys	Deployment of Anabats to detect high-frequency bat-calls.	- One Anabat deployed for four consecutive nights; and - One Anabat deployed for 88 nights (collected in May 2024 survey period).
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	28 BUS.
6 - 10 May 2024 Autumn - Dry	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	44 BUS.
29 July - 2 August 2024 Winter - Dry	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	33 BUS.

Timing	Target	Techniques	Survey Effort
2 – 7 December 2024	Bat utilisation surveys	Deployment of Anabats to detect high-frequency bat-calls.	10 Anabats deployed for 17 consecutive nights.
Summer - Wet	Targeted fauna surveys	Harp trapping	Four harp traps deployed over five nights.
	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	28 BUS.
24 February – 1 March 2025	Targeted fauna surveys	Harp trapping.	Four harp traps deployed over five nights.
Summer - Wet	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	27 BUS.
26 – 30 May 2025	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	33 BUS.
Autumn – Dry			
14 – 18 July 2025	BUS	20-minute fix point BUS to provide data based on the species present and their height, speed and direction of flight; - Roaming bird surveys between survey areas; and - Opportunistic searches for flora and fauna of conservational significance.	32 BUS.
Winter - Dry			

2.1.3.1 SURVEY CONDITIONS

Survey conditions across the eight BBUS periods were largely consistent with expected averages for rainfall and temperature within the Toowoomba region. However, it is noted that increased rainfall in adjacent areas resulted in flash flooding events during the May 2024 surveys, resulting in a decrease in access to some portions of site and extended survey timing for the acoustic recorders that were placed. The following tables outline the weather for the survey events:

TABLE 2-4 DAILY WEATHER OBSERVATIONS AT DALBY FOR DECEMBER 2023

Date	Temp (°C)		Rain	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
4/12/2023	17.7	34.5	0	28.1	54	W	7	33.9	22	WSW	15
5/12/2023	19.7	32.7	0	26.7	58	NW	6	31.8	38	SE	7
6/12/2023	19.6	35.7	0	26.6	61	NW	9	34.9	35	SE	15
7/12/2023	18.2	36.6	0	30.0	35	E	17	35.8	24	ENE	26
8/12/2023	16.8	35.0	0	27.7	42	ESE	17	34.3	29	E	26

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-5 DAILY WEATHER OBSERVATIONS AT DALBY FOR FEBRUARY 2024

Date	Temp (°C)		Rain	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
12/02/2024	18.1	31.3	0	26.3	59	E	24	30.1	45	E	24
13/02/2024	17.0	28.5	0	24.7	71	ENE	20	27.7	62	ENE	26
14/02/2024	19.0	31.8	0	25.2	70	CALM		27.4	66	NW	19
15/02/2024	20.6	29.6	23.0	23.8	87	ESE	13	29.2	55	E	17
16/02/2024	20.7	28.8	0	24.1	77	E	24	25.2	69	E	31

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-6 DAILY WEATHER OBSERVATIONS AT DALBY FOR MAY 2024

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
06/05/2024	11.3	24.5	0	19.8	80	ENE	13	22.5	65	ENE	20
07/05/2024	7.2	23.5	3.6	18.1	81	ESE	22	20.5	70	E	24
08/05/2024	10.0	22.4	0.4	18.5	69	ESE	24	21.0	62	ESE	28
09/05/2024	10.1	22.9	0	18.7	75	ESE	28	20.6	60	ESE	26
10/05/2024	9.5	23.0	0	18.6	70	ENE	28	21.0	48	ESE	26

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-7 DAILY WEATHER OBSERVATIONS AT DALBY FOR JULY/AUGUST 2024

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
29/07/2024	-4.0	16.2	0	6.5	74	SW	13	16.0	29	SW	28
30/07/2024	-4.4	17.2	0	6.2	77	CALM		16.6	25	S	19
31/07/2024	-2.5	19.0	0	9.1	60	SSE	4	18.7	27	SSW	15
01/08/2024	-2.5	19.1	0	10.2	64	SSE	6	18.3	29	SSE	13
02/08/2024	-2.0	20.0	0	9.4	69	SSE	2	19.4	24	SSW	11

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-8 DAILY WEATHER OBSERVATIONS AT DALBY FOR DECEMBER 2024

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
02/12/2024	20.3	32.4	0.2	26.9	67	N	13	30.7	49	NNE	22
03/12/2024	19.7	28.5	0	24.6	80	N	24	28.2	58	N	17
04/12/2024	21.0	31.3	0	25.4	67	NNW	7	30.5	51	ENE	13
05/12/2024	20.8	32.5	0	26.9	67	Calm		31.5	51	ESE	24
06/12/2024	18.6	31.9	0	26.2	59	NE	19	31.6	44	ESE	22

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
07/12/2024	18.7	33.8	0	25.0	68	N	7	32.6	35	WNW	11

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-9 DAILY WEATHER OBSERVATIONS AT DALBY FOR FEBRUARY/MARCH 2025

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
24/02/2025	18.0	33.4	0	26.2	63	ENE	22	32.7	34	ENE	19
25/02/2025	17.6	32.5	0	25.2	63	ESE	22	31.7	32	ESE	28
26/02/2025	17.6	32.3	0	25.7	61	ESE	28	31.9	34	E	20
27/02/2025	14.3	32.4	0	25.3	59	E	28	31.5	30	ESE	24
28/02/2025	14.7	32.7	0	25.8	56	E	20	31.9	34	ESE	28
01/03/2025	15.7	33.3	0	26.7	52	E	30	32.4	32	ESE	30

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-10 DAILY WEATHER OBSERVATIONS AT DALBY FOR MAY 2025

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
26/05/2025	14.8	31.3	0	19.9	75	ESE	6	31.0	28	NNW	20
27/05/2025	16.4	26.8	0	21.1	83	NW	28	23.3	60	WSW	35
28/05/2025	7.6	20.4	0	13.1	57	SSW	13	19.6	34	SW	20
29/05/2025	10.9	17.8	0	13.2	67	SW	9	17.3	51	SW	9
30/05/2025	12.0	16.0	0.8	12.2	93	S	9	15.8	80	SE	13

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

TABLE 2-11 DAILY WEATHER OBSERVATIONS AT DALBY FOR JULY 2025

Date	Temp (°C)		Rain mm	9:00 AM				3:00 PM			
	Min	Max		Temp (°C)	RH (%)	Dir	Spd (km/hr)	Temp (°C)	RH (%)	Dir	Spd (km/hr)
14/07/2025	-1.5	21.7	0	11.7	51	NW	11	21.1	22	W	20
15/07/2025	-0.3	22.8	0	10.8	52	NW	6	21.5	25	WSW	15
16/07/2025	1.8	24.5	0	12.7	57	E	9	22.5	26	SSW	4
17/07/2025	5.5	23.5	0	16.2	77	E	9	23.0	44	N	17
18/07/2025	12.6	20.8	1.4	16.0	92	NW	17	17.0	74	WSW	30

Dir = wind direction; Spd = wind speed; RH = relative humidity

Blue denotes the lowest daily temperature; Red denotes the highest daily temperature.

Source: Australian Government Bureau of Meteorology, www.bom.gov.au

2.1.4 SITE SPECIFIC ASSESSMENTS

2.1.4.1 BIRD SURVEY METHODS

As surveys commenced in December 2023, the BUS design was implemented with reference to the *Onshore Wind Farms – Interim guidance on bird and bat management* (DAWE, 2022). This has now been superseded by the draft *Onshore Wind Farm Guidance – Best practice approaches when seeking approval under Australia’s national environment law* (DCCEEW, 2024).

State Code 23 also requires BUS for wind farm developments (DSDILGP, 2025). It states that such surveys identify avian species, numbers present, height flown and site utilisation.

The survey design for BUS surveys has also been implemented with reference to the *Onshore Wind Farm Guidance* (DCCEEW, 2024) which requires BUS to be completed over relevant seasons within a 24 month period prior to commissioning of a wind farm. BUS was completed from December 2023 to July 2025 and included four BUS each in both the wet and dry seasons within a 24-month period, therefore meeting this requirement despite only occurring only 17 months.

The Project Area lies within the Brigalow Belt Bioregion, where there is a delineation of seasonality within two distinct seasons. As per *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre, et al., 2022), survey timing for vertebrates for optimal survey times coincides with Spring to early Summer (Sept – mid Nov) and Autumn (March – mid May). The Project Area experiences a higher mean rainfall and higher mean temperatures between November and February (often extending into March), which aligns with Eyre et al. (2022). The eight BUS included four BUS in each the wet and dry season, meaning that the BUS seasonality requirement has been met. Additionally, four of the BUS coincided with the season for migratory birds, including wetland birds, thus achieving targeted survey recommendations.

BUS involve 20-minute fix point surveys to provide data based on the species present and their height, speed and direction of flight as stipulated as a required input for the Band Collision Risk Model (Band W. , 2000). The survey approach remains in accordance with the current Onshore Wind Farm Guidance on the management of birds and bats for onshore wind farms (DCCEEW, 2024).

Each BUS location (26 total) was located to provide a search radius of at least 100 m for small, woodland-dependent birds and up to 800 m for large birds, or further for specific 'vantage' surveys (see below). Searches primarily focused on birds most likely to be affected by the development, such as raptors (birds of prey) and large flocks of birds. This technical requirement for BUS is also outlined in AusWind's Report, *Wind Farms and Birds: Interim Standards for Risk Assessment* (Brett Lane & Associates, 2005), *Onshore Wind Farm Guidance* (DCCEEW, 2024) and Appendix 1 – *Ecological assessment report methodology of the Planning guidance State Code 23: Wind farm development* (DHLGPPW, 2024).

The survey guidelines for diurnal bird surveys and their requirements are as follows:

- *Survey guidelines for Australia's threatened birds* (DEWHA, 2017):
 - Point surveys involve recording the presence, and usually number of individuals, of each taxon detected at a series of specified locations. The sampling points are usually pre-determined and selected either randomly or systematically within the Project Area; and
 - Point surveys typically involve an allocated survey time of 20-minutes.

BUS locations were dispersed across the Project Area and along Cecil Plains - Moonie Road during the first two sampling events in December 2023 and February 2024 with the same locations subject to repeat visits in both the morning and afternoon period during most subsequent sampling events. Some established BUS locations were not always repeated due to adverse weather conditions and accessibility constraints particularly in December 2024 and February 2025 (further detailed in Section 2.1.5).

DCCEEW (2024) details the need to undertake a risk assessment for birds and bats following BBUS for the Project Area. This risk assessment must take into account the likelihood and consequences of events including collision with WTGs and the impact of construction and operation on the Proposed Development causing changes in site utilisation by bird and bat species (DCCEEW, 2024).

DCCEEW (2024) and *State Code 23* also recommend the establishment of a Before-After-Control-Impact (BACI) framework to monitor the wind farms impact to bird and bat species. The aim of the BACI framework is to compare environmental variables before and after a human activity and between the area affected by the development (impact) and an unaffected area (control) (Stewart-Oaten, Murdoch, & Parker, 1986). In this instance, this would compare control and impact areas, before and after the construction of the Proposed Development, to determine if there are any avian impacts as a result of the Proposed Development. BUS locations within 500 m of the Disturbance Footprint are identified as impact locations. BUS locations beyond 500 m of the Disturbance Footprint are considered control locations. These areas will be revisited and resurveyed during operational phase BBUS (see Section 4.1.1). This 500 m threshold between impact and control locations is derived from the *Wind Farms and Birds: Interim Standards for Risk Assessment* (Brett Lane & Associates, 2005), which states that:

'Reference sites are also an important component of any further pre-operational and operational phase impact monitoring. They should be between 500m and 1500m from the nearest wind turbine site, and located in similar habitats and landscape settings to the wind farm (impact) sites.'

Based on the current Disturbance Footprint, there are 9 control locations and 17 impact locations. BACI impact and control locations will be finalised prior to operational BBUS.

The following Sections detail the specific BUS location types undertaken throughout the Project Area. All bird survey locations can be found on Figure 2-1.

Woodland Surveys

Of the 26 unique fixed-point BUS locations, 10 were woodland surveys. These surveys were conducted in woodland or riparian habitats and were relevant for listed threatened species such as diamond firetail (*Stagonopleura guttata*), glossy black cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*) and southern whiteface (*Aphelocephala leucopsis*) as well as diurnal woodland and riparian bird species. These locations were of higher habitat quality than the highly disturbed paddocks in the Project Area and are thus useful in identifying a diversity of bird species, both threatened and non-threatened. These woodland surveys were conducted within areas that maintained a wide range of view, with woodland areas having an open canopy structure allowing for detection of higher-flying raptors, wetland birds and migratory birds.

Waterbody Surveys

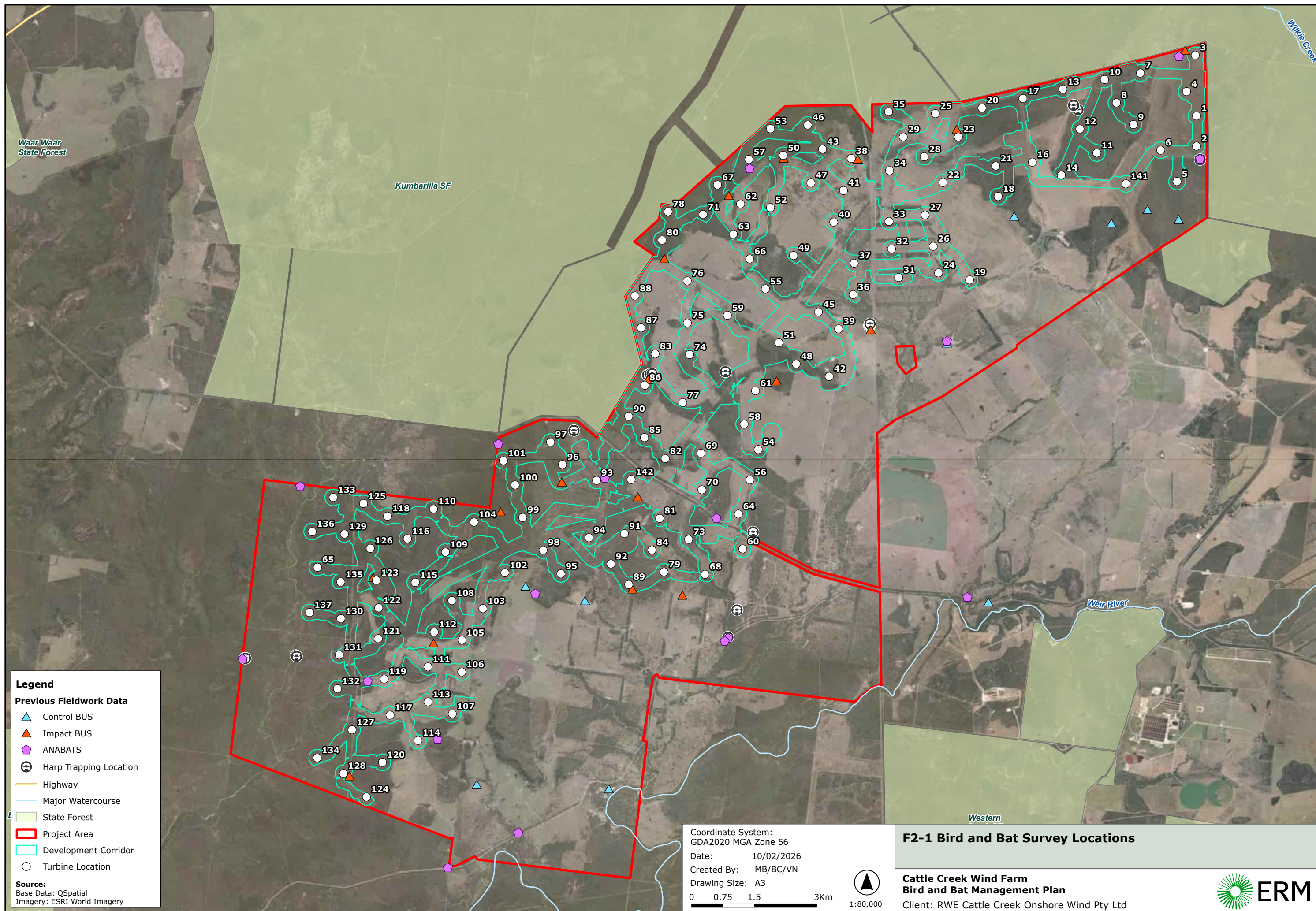
Of the 26 unique fixed-point BUS locations, six were waterbody surveys. Waterbody surveys were relevant for the listed threatened species such as Latham's snipe (*Gallinago hardwickii*) and squatter pigeon (southern) (*Geophaps scripta scripta*) as well as aquatic species and woodland species utilising the waterbody. Observations were made from a stationary position, and birds were identified by call detection and visual observations. The Project Area contained several artificial waterbodies, likely to act as important water sources in the landscape, particularly during dry conditions. These waterbody surveys provided a similar field of view and range as the vantage point surveys as they were completed adjacent to farm dams which occurred in open, pastoral locations of the Project Area.

Vantage Surveys

Of the 26 unique fixed-point BUS locations, 10 were vantage surveys. Vantage surveys were relevant for the listed threatened species such as white-throated needletail (*Hirundapus caudacutus*) and fork-tailed swift (*Apus pacificus*) as well as other birds of prey with potential to be impacted by the Proposed Development. Vantage surveys were undertaken at vantage points (i.e. large plateaus and extensively cleared areas), where birds of prey are known to soar and circle over open areas utilising thermals and orographic currents. These locations generally give a vista of several kilometres (due to an absence of tree and canopy cover) depending on weather conditions, so that raptor species may be observed within an approximate 2 km buffer of the BUS location.

Broadcast Surveys

Broadcast surveys were undertaken to target the listed threatened species such as the diamond firetail (*Stagonopleura guttata*). Broadcast surveys for diamond firetail were conducted during regular diurnal survey activities.



2.1.4.2 BAT SURVEY METHODS

Microbat surveys were conducted to determine the presence/absence of bats within and surrounding the Project Area. Surveys included the deployment of ultrasonic bat detectors (Anabats) during the December 2023, February 2024 and December 2024 survey efforts and harp trapping during the December 2024 and February 2025 survey effort. The BACI design has also been implemented for bat surveys to identify any impacts on bats as a result of the Proposed Development. Due to this, Anabats were deployed in both areas expected to be impacted and areas not expected to be impacted by the Proposed Development. Anabat survey locations are shown on Figure 2-1.

In total, 27 Anabats were placed throughout the relevant areas within and in proximity to the Project Area to collect data on bat calls. They resulted in the collection of 281 survey nights of data. Anabats were placed across representative vegetation and habitat types and included riparian woodlands, buloke (*Allocasuarina luehmannii*) and cypress-pine dominated woodlands, ironbark woodlands on rocky escapements and farm dams. The detectors were specifically positioned to be facing potential flight paths and/or were located in proximity to roosting habitats (i.e. hollows or rocky overhangs) and/or water sources (i.e. farm dams). The survey locations were selected to give the greatest likelihood of detecting an abundance and diversity of bat species.

The detectors were secured onto trees at approximately 1.8 m above the ground. They were collected and the information recorded on the Anabats was then analysed by a specialist to determine the species recorded.

In addition to non-targeted bat surveys via Anabat deployment, harp traps were deployed to target the listed threatened Corben's long eared bat (*Nyctophilus corbeni*) as it was initially assessed as having the potential to occur (based on the preliminary desktop LoO), and ambiguous calls for *Nyctophilus* spp. were detected on Anabats (see Section 2.3.2 for more detail). In December 2024, four harp traps were deployed over five nights, yielding 14 trap nights. Inclement weather during this period prevented access to some traps, limiting the number of consecutive trap nights to 14. In February 2025, a second survey was conducted, with four harp traps deployed over five nights for a total of 20 trap nights, resulting in a cumulative effort across two survey events of 34 trap nights. Trapping was used to determine the potential presence of threatened bat species that cannot be accurately determined through ultrasonic detection.

Harp traps were placed across representative vegetation and habitat types, including riparian woodlands, buloke and cypress-pine woodlands, ironbark woodlands and farm dams. Harp traps were constructed to be facing potential flight paths or in proximity to roosting habitats and/or water sources.. The survey locations were selected to target Corben's long-eared bat. Harp traps were erected in the late afternoon and opened at dusk. Bats were then collected and identified in the early morning before being released.

The survey requirements and recommended survey effort and methods for bats is identified in the *Survey guidelines for Australia's threatened bats* (DEWHA, 2010):

- A variety of trapping and call detection methods are used together, where possible;
- Echolocation call detection to be carried out for a recommended 30-60 minutes per night for four to five survey nights; and

- Trapping methods such as harp trapping. Effort for this method is not precisely stated, but studies have found that the use of 20 or more traps a night for increasing successful detection of bat species (Schulz, 1999). Harp trapping has been utilised in circumstances where a potentially threatened bat species cannot be accurately determined as present through ultrasonic detection (e.g. *Nyctophilus* spp.).

State Code 23 identifies that methods must be carried out to determine which bat species occur on the site. It recommends the use of survey techniques including mist nets and/or bat detection systems that record and analyse echolocation calls of bats. The survey efforts involved the use of Anabats, spotlighting, and harp trapping thus meeting the *State Code 23* requirement.

2.1.5 SURVEY ADEQUACY

A survey adequacy assessment was completed for specific listed bird and bat species identified during the desktop assessment as potentially occurring in comparison with their survey guidelines and recommended survey effort. This survey adequacy assessment is provided in Appendix C.

The surveys completed in the Project Area are also adequate to meet the requirements of the BACI framework and requirements in *State Code 23* and the Onshore Wind Farm Guidance (DCCEE, 2024). It is noted that not each BUS survey period completed repeat BUS at each of the 26 survey locations, but the allocation of 26 BUS locations is excessive for what is recommended for BUS. As can be seen in Table 2-12, the BUS completed in the Project Area offers a robust collection of data, as 13 BUS locations (six currently considered control locations, seven currently considered impact locations) had BUS in at least six out of eight survey periods. Every other BUS location had at least one BUS in four out of eight of the survey periods. Ultimately, the pre-operational BUS data collected is adequate for use in assessing and describing bird utilisation in the Project Area. This data has been used for CRM for relevant species (see Section 3) and will be used for comparison against the operational BUS data that will be collected during operation of the Proposed Development.

As discussed in Section 2.1.4.1, the eight BUS periods were also spread evenly across the wet and dry season, thus meeting seasonality requirements. BUS were also split practically evenly between 'AM' and 'PM' (times of day), thereby meeting the requirement for BUS at different times of day.

Bat surveys also meet the requirements of the BACI framework, as there was representative sampling of bat presence within and in close proximity to the Disturbance Footprint, and also in prospective 'control' areas greater than 500 m from the current Disturbance Footprint. This is shown on Figure 2-1. Anabat data was also collected during three separate periods – December 2023, February 2024 and December 2024 to capture yearly variations in bat utilisation.

TABLE 2-12 PRE-OPERATIONAL BUS COMPLETED IN THE PROJECT AREA IN EACH SURVEY PERIOD

BUS Location	Type	Dec-23	Feb-24	May-24	Jul-24	Dec-24	Feb-25	May-25	Jul-25	Total
Control	Control	-	-	-	1	2	2	2	-	7
1	Control	1	2	2	-	2	2	2	2	13
2	Control	1	2	2	-	2	-	-	-	7
3	Impact	1	2	2	-	-	-	-	1	6
4	Impact	1	1	2	1	-	-	-	-	5
5	Impact	1	1	2	2	2	-	-	-	8
6	Control	1	2	2	2	1	3	2	2	15
7	Impact	1	2	2	2	-	1	2	2	12
8	Impact	1	2	2	-	-	1	-	2	8
9	Impact	1	2	2	1	2	1	2	2	13
10	Control	3	2	1	-	2	-	-	2	10
12	Control	-	1	2	2	-	-	2	-	7
13	Control	1	1	2	2	-	2	1	2	11
14	Impact	1	1	1	-	2	2	2	2	11
15	Impact	1	-	1	2	2	2	2	2	12
16	Impact	1	-	1	2	2	-	-	-	6
17	Impact	1	-	1	2	1	2	2	2	11
18	Impact	1	-	2	2	1	2	2	2	12
19	Impact	1	-	1	-	-	1	2	-	5

BUS Location	Type	Dec-23	Feb-24	May-24	Jul-24	Dec-24	Feb-25	May-25	Jul-25	Total
20	Impact	1	-	2	2	-	-	-	2	7
21	Impact	1	2	2	2	-	2	2	2	13
22	Control	1	2	2	1	-	2	2	2	12
23	Impact	-	1	2	2	1	-	2	1	9
24	Impact	-	1	2	1	2	-	-	-	6
25	Impact	-	1	2	2	2	-	2	-	9
26	Control	-	-	2	2	2	2	2	2	12
Total		22	28	44	33	28	27	33	32	247

Bolding indicates BUS in at least 6/8 of BUS periods.

- = no BUS completed at that location in that survey period.

2.2 BIRD SITE UTILISATION

A total of 5,261 individual birds have been recorded during the field surveys (aurally or visually), totalling 162 bird species within the Project Area. These species make up 21 orders, 54 families and 111 genera, with Passeriformes showing the highest diversity (85 taxa or 52.8% of the recorded avifauna), followed by Psittaciformes (12 taxa or 7.4% of the recorded avifauna) and Pelecaniformes (nine taxa or 5.6% of the recorded avifauna).

One *EPBC Act* and *NC Act* listed species, glossy black cockatoo (south-eastern) was identified within the Project Area during field surveys (full species list can be found in Appendix D).

Birds were recorded in a variety of habitats including non-native grasslands, eucalypt woodlands, riparian corridors and waterbodies. Additionally, field investigations confirmed the presence of numerous active and abandoned small and medium-sized nests. One inactive large bird of prey nest was observed, and one wedge-tailed eagle nest was confirmed as active at the time of the field investigations within the Proposed Development.

The following sections provide information on the listed threatened/and or migratory bird species considered known, likely and potential to occur.

Evidence of threatened, migratory or raptor species in the Project Area will be incorporated into future risk assessments and CRM within the BBMP. Therefore, the principle of adaptive management will be applied to ensure that any future risks identified are adequately reported, analysed, and subsequently managed as per the framework in the BBMP.

2.2.1 THREATENED BIRD SPECIES KNOWN OR LIKELY TO OCCUR

2.2.1.1 DIAMOND FIRETAIL

The diamond firetail is listed as Vulnerable, under the *EPBC Act* and *NC Act*. This species has been concluded as known to occur within the Project Area, based on the LoO, with four historical records in the locality from the Atlas of Living Australia (ALA) database. Survey effort for the diamond firetail included eight field surveys, 72 habitat assessments and a total of 247 BUS. While field surveys did not confirm presence of the species, there are recent records of the species in the Project Area from 2021.

The diamond firetail occurs across south-east mainland Australia from south-east Queensland to Eyre Peninsula, South Australia, with distribution stretching far inland (up to 300 km). The species occurs in flocks of 5-40 birds and may be sedentary to locally nomadic. The species utilises a range of habitat types, from eucalypt, acacia and casuarina woodlands and open forests to lightly timbered habitats such as farmland and grassland with scattered trees, but the species is more likely to persist in areas with remnant vegetation, as a diversity of native grasses with different maturity patterns supports the species year-round. However, invasive flora (particularly exotic annual grasses) are a key threat to the species, as they lower the availability of suitable native grass species that provide food. The species is also more likely to persist in agricultural land affected by sheep, rather than cattle or crop (DCCEEW, 2023b). Studies have shown that they prefer areas with low tree densities, few large logs and little leaf litter cover but high grass cover.

The diamond firetail builds its nests in areas where they can somewhat safeguard their eggs and nestlings (i.e. in the base of raptor bird nests or in foliage of prickly shrubs. They roost in dense shrubs or small roosting nests (DCCEEW, 2023b).

Based on the above discussion, habitat for the species may be delineated as either breeding habitat, or foraging and dispersal habitat. Breeding habitat are areas of remnant vegetation that the species prefers, and is more likely to contain raptor stick nests which the species constructs nests in. Foraging and dispersal habitat on the other hand lacks a remnant condition and shelter for breeding, but occurs within proximity to breeding habitat.

Breeding habitat for the diamond firetail in the Project Area has been mapped to include the following broad habitat types (BHTs):

- Riparian open forests to woodland;
- Ironbark and smooth-barked apple woodland;
- Poplar box grassy woodland;
- Gum-topped box open forests to woodland; and
- Belah with or without brigalow open forest to woodland.

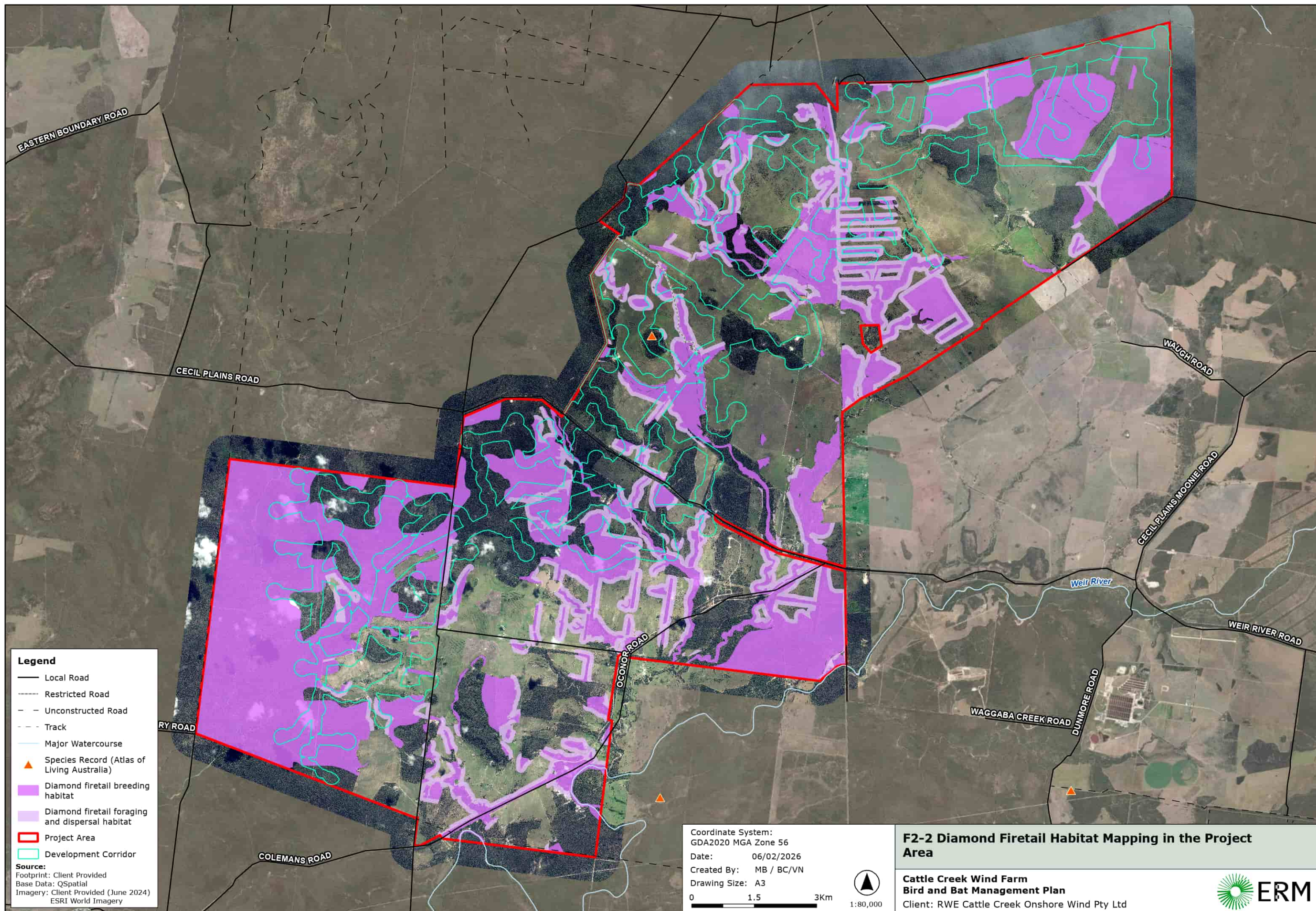
Foraging and dispersal habitat for the diamond firetail has been mapped to include the agricultural land BHT within 100 m of breeding habitat. A 100 m buffer has been applied as non-native grasses (which are a threat to the species) become more prevalent in areas with higher degrees of agricultural impact, which reduces the likelihood of the species using the large expanses of agricultural land in the Project Area.

Although containing some suitable habitat features for the species, the other BHTs are not mapped as habitat for the species for the following reasons:

- Cleared land – absence of any trees;
- Ironbark open forests to woodland on hilly terrain – these areas generally have lots of large logs and less grass cover than the other habitat types;
- Buloke and poplar box open forests to woodland – this species prefers low tree densities, and this BHT has a high tree density; and
- Permanent waterbodies – while the diamond firetail may drink from farm dams, they are not considered a foraging resource.

There is 6,601.0 ha of breeding habitat mapped in the Project Area and 1,983.3 ha of foraging and dispersal habitat in the Project Area which is mapped on Figure 2-2 and impacts to this habitat addressed in the PER for the Proposed Development.

The collision risk assessment completed in Section 3 of this BBMP concludes that the diamond firetail has a negligible likelihood of interacting with operating turbines. This is primarily due to the species' characteristic low flight heights, which typically occur within a few metres of the ground when moving between foraging sites, water sources and understory cover. Diamond firetails are also strongly associated with structurally complex woodland and grassy understorey habitats, where their movements are largely confined to sheltered, near-ground airspace rather than the open, elevated flight zones intersected by turbine RSAs. The species does not exhibit long, high-altitude commuting flights or broad aerial foraging behaviours that would elevate its exposure to turbine blades. Taken together, these behavioural and ecological attributes indicate that diamond firetail is highly unlikely to occupy collision-risk airspace, resulting in a negligible overall risk of turbine strike, so specific measures for this species are not included in this BBMP.



2.2.1.2 GLOSSY BLACK COCKATOO (SOUTH-EASTERN)

The glossy black cockatoo (south-eastern) is listed as Vulnerable, under the *EPBC Act* and *NC Act*. This species has been concluded as known to occur within the Project Area, based on the LoO, presence of suitable foraging habitat and a direct observation during field surveys. Survey effort for the glossy black cockatoo included eight field surveys, 72 habitat assessments and a total of 247 BUS. Observations of the species occurred on multiple occasions:

- During a BUS in February 2024, two were observed flying at 25 m;
- Incidental observation in February 2025 of four individuals were observed perched in a tree adjacent to a dam;
- Incidental observation in July 2025 of four individuals perched in a belah (*Casuarina cristata*) tree;
- During a BUS in July 2025, two individuals were heard but not observed;
- Incidental observation in September 2025 of three individuals flying out of a clump of belah;
- Incidental observation in October 2025 of three individuals flying out of a clump of belah; and
- Numerous observations of chewed belah orts.

The glossy black cockatoo is a smaller cockatoo species found from Mitchell, QLD south to East Gippsland, Victoria. They occur from coastal areas to the west of the Great Dividing Range, though their populations become more scattered inland. They are a specialist species, notably in their breeding and foraging requirements. In terms of breeding, this species requires large hollows (of dead or alive eucalypt trees) for nesting. *Eucalyptus crebra* (narrow-leaved ironbark) is the most used tree for hollows by the glossy black cockatoo, but other trees are commonly used, such as *E. nubila*, *E. blakelyi* and *E. camaldulensis* (DCCEEW, 2022). Potential hollows generally include the following traits:

- >8 m above ground;
- Located in branches >30 centimetres (cm) in diameter;
- Branch or stem no more than 45° from vertical; and
- Minimum entrance diameter of >15 cm.

The species is specialist in its foraging requirements, by feeding on only nine species of she-oaks. Of those nine species, two occur in the Project Area, which are belah and buloke. Belah is considered to be an important tree species for the glossy black cockatoo in inland NSW, which is comparable to the Project Area which is south Queensland and inland of the Great Dividing Range. Black sheoak (*A. littoralis*) and forest sheoak (*A. torulosa*) are the preferred trees in south-east Queensland. Buloke specifically is not considered an important food tree (DCCEEW, 2022).

Based on the above discussion, habitat for the glossy black cockatoo can be delineated into nesting and breeding habitat or foraging habitat. From field surveys there is no evidence of suitable trees providing nesting and breeding habitat in the Project Area, but there is suitable foraging habitat. Belah is considered to be the only feed tree in the Project Area, which is evidenced by the observation of chewed orts in one of the areas the species was observed. Buloke is not considered to be a feed tree in the Project Area, as they are not an important

food tree, and are not used every year (DCCEE, 2022). Foraging habitat in the Project Area has been mapped to include areas that contain suitable foraging trees, specifically *belah*. This includes the *belah* with or without brigalow open forest to woodland BHT.

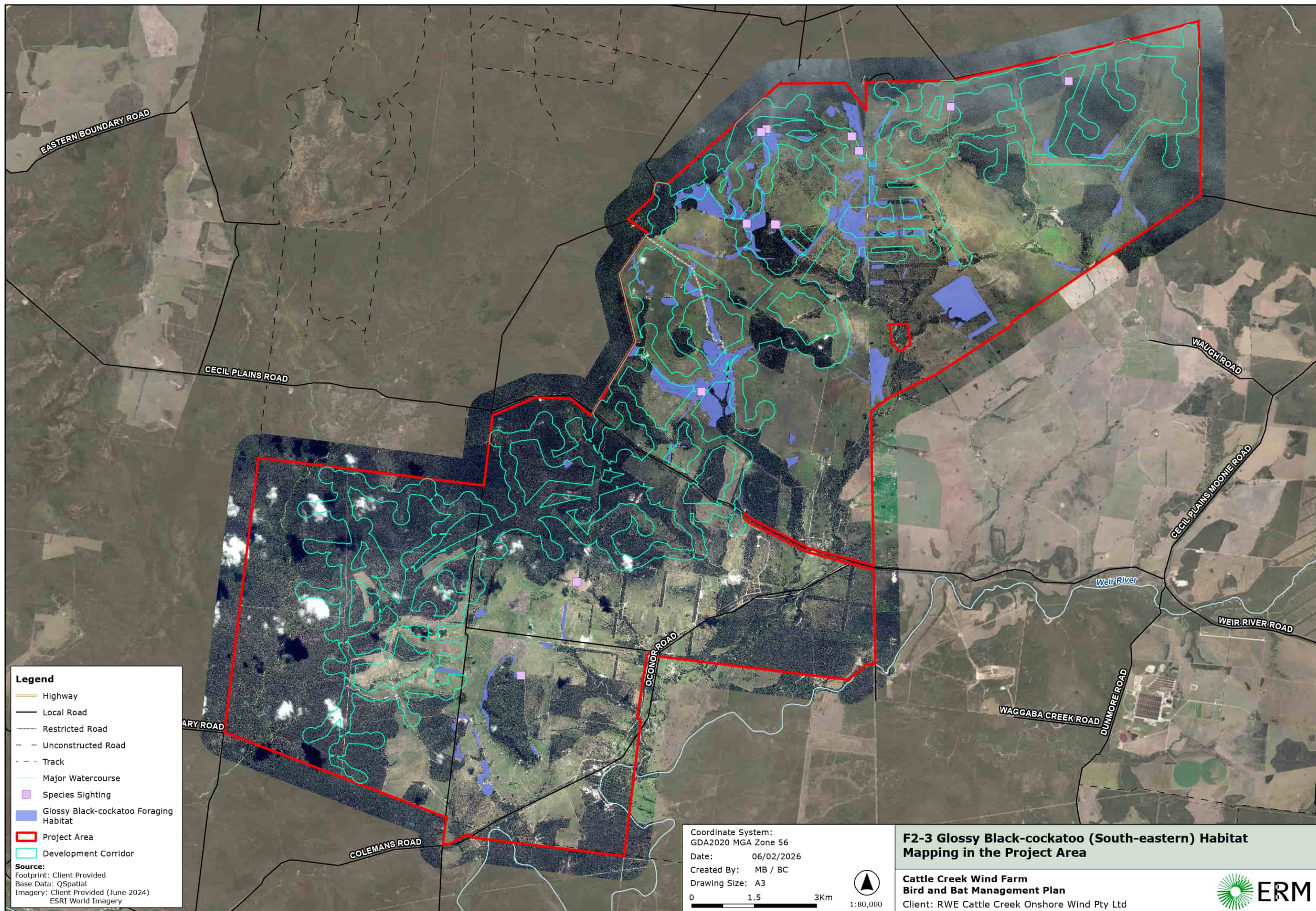
Belah was also rarely recorded in the riparian open forests to woodland BHT, but this BHT has not been mapped as foraging habitat, as *belah* was only observed in two of the 10 quaternary vegetation assessments in this BHT.

Some small, isolated patches of *belah* trees are also likely to occur in the agricultural land BHT and have the potential to be used for foraging by the species. These have not been mapped however, as BHT mapping has not been prepared to this scale. As detailed in Chapter 7 of the PER, these trees will be avoided through the micro-siting phase of the Proposed Development to ensure that these feed trees are not disturbed.

There has been a total of 828.8 ha of foraging habitat mapped in the Project Area. Habitat is mapped on Figure 2-3, with direct impacts to this habitat addressed in the PER for the Proposed Development.

The collision risk assessment presented in Section 3 of this BBMP identifies the glossy black-cockatoo as having an unlikely risk of interaction with operating turbines. Although the species typically undertakes deliberate, purposeful flights between feeding and roosting sites, these movements generally occur at moderate heights and often within or just above the canopy, reducing the frequency with which individuals have the potential to enter the RSA. Further, all direct observations of flying glossy black cockatoos in the Project Area were below RSA height. The species' foraging ecology, centred on she-oak (specifically *belah*-dominant) woodlands, and its relatively slow, direct flight style further limit exposure to higher-altitude airspace within the RSA.

However, the glossy black-cockatoo is a long-lived species with a slow generation time and low reproductive output, meaning that even infrequent collision events could have disproportionate consequences for local population viability. For this reason, the species was considered to have a moderate consequence of collision. This resulted in the species having a low risk as per the collision risk assessment.



2.2.1.3 WHITE-THROATED NEEDLETAIL

The white-throated needletail is listed as Vulnerable and Migratory under the *EPBC Act* and as Vulnerable under the *NC Act*. This species has been concluded as likely to occur within the Project Area, based on the LoO. Survey effort for the white-throated needletail included eight field surveys, 72 habitat assessments and a total of 106 BUS. These BUS were completed in the Project Area within the December to February period, demonstrating that the surveys completed for the species were at the optimal time of year to detect the species should it occur. Some of the BUS locations were atop ridgelines and in open areas where long-range vistas were achieved, which aid in detecting the species when it is present. While field surveys did not confirm presence of the species, there are recent records of it in the locality, from as recent as 2021. Additionally, the species' distribution overlaps with the Project Area, and there is plentiful suitable foraging habitat.

The white-throated needletail is a swift that breeds in north Asia and migrates to Australia during the non-breeding season where it is widespread due to its strictly aerial lifecycle. In eastern Australia, the species has been observed at various altitudes (1 – 1000 m) in all coastal regions of Queensland and New South Wales, and also occurs inland to the western slopes of the Great Dividing Range (TSSC, 2019).

Australian habitat for the species is broad, as they have been sighted over various habitat types such as rainforest, open forest and clearings. However, the observations of the species are usually associated with wooded areas, and observations over farmlands are often above partly cleared pastureland or near remnant stands. More preferably, the species is forages in areas where updrafts prevail, such as ridges, coastal cliffs and sand dunes. The species may roost among dense foliage in the canopy of wooded areas, or in hollows (TSSC, 2019).

The Project Area is considered to not provide habitat suitable for roosting. This is due to the lack of areas, with large and distinct elevational change as well as dense canopy foliage and tall hollow-bearing trees. Consequently, no roosting habitat mapping has been completed for the white-throated needletail within the Project Area.

The species is therefore considered to only utilise the aerial space across the Project Area for foraging. The species is likely to occur in the Project Area as a transient aerial visitor on wind fronts only. Due to this, the entire Project Area is considered foraging and dispersal habitat and habitat has not been mapped.

The collision risk assessment presented in Section 3 of this BBMP identifies the white-throated needletail as having a likely risk of collision with operating turbines. This species is a highly aerial swift with a life history centred almost entirely on sustained, fast, high-altitude flight, often soaring and foraging within open airspace well above the canopy. These behaviours frequently intersect with the rotor-swept zone, particularly during periods of dynamic aerial foraging, thermal riding or weather-related movements, increasing the likelihood of turbine interaction relative to more ground-associated bird species. Although the species is agile and capable of rapid manoeuvring, its reliance on open, elevated flight strata places it within collision-risk airspace more regularly than many other listed taxa. Should collision occur, the species consequence of collision is considered to be moderate, thus resulting in an overall risk assessment rating of moderate. Given this, mitigation of impact to this species is a particular priority of this BBMP.

2.2.2 THREATENED BIRD SPECIES WITH THE POTENTIAL TO OCCUR

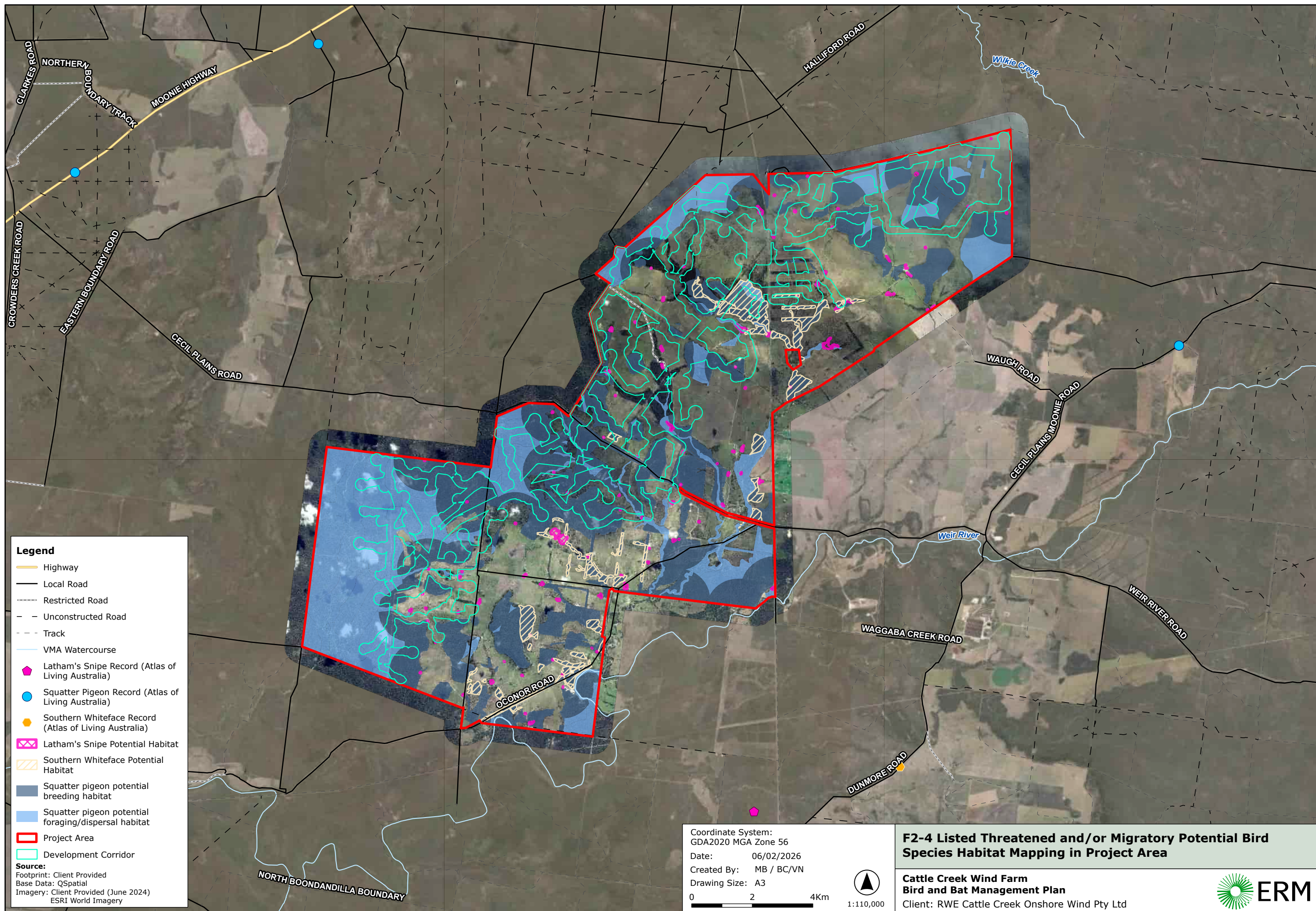
The LoO assessment identified three *EPBC Act* or *NC Act* listed threatened bird species as having the potential to occur. Potential habitat for these species within the Project Area is discussed in Table 2-13 below and mapped on the ensuing Figures.

All of the species described in Table 2-13 have been assessed as having a negligible risk of impacts from turbine collisions and do not require specific mitigation measures presented in this BBMP. Assessment of direct impacts from habitat loss, and indirect impacts from construction and operation phases for these species are provided in the PER for the Proposed Development.

TABLE 2-13 LISTED THREATENED SPECIES WITH POTENTIAL TO OCCUR HABITAT IN THE PROJECT AREA

Species	EPBC Act, NC Act Status	Habitat Description	Potential Habitat in Project Area
Threatened birds			
Latham's snipe (<i>Gallinago hardwickii</i>)	V & Mi, V	The species does not breed in Australia but is a summer migrant. In Australia the species 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). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Foraging habitat for the species is characterised by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation) (DCCEEW, 2024b).	Potential habitat includes permanent waterbodies. This makes up 65.7 ha of potential habitat within the Project Area, which is mapped on Figure 2-4.
Southern whiteface (<i>Aphelocephala leucopsis</i>)	V, V	This species inhabits open woodlands (containing eucalyptus and acacias) with a moderate understory of shrubs and grasses, as this species forages on the ground amongst leaf litter. The species is largely confined to the south-west of the Mitchell Grass Downs. This species builds large bulky domed nest of grass, bark and roots, usually in a hollow or crevice, although sometimes in low bushes. For foraging, this species favours habitat with low tree densities and an herbaceous understory litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter (DCCEEW, 2023b).	Potential habitat includes the following BHT: • Poplar box grassy woodland. This makes up 653.5 ha of potential habitat within the Project Area, which is mapped on Figure 2-4.

Species	EPBC Act, NC Act Status	Habitat Description	Potential Habitat in Project Area
Squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)	V, V	Habitat for this species is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by <i>Eucalyptus</i> spp., <i>Corymbia</i> spp. or <i>Callitris</i> spp. Additionally, they favour remnant regrowth or partly modified vegetation communities that are within 3 km of water bodies. Breeding activities occur on stony rises on sandy, gravelly soils, within 1 km of a suitable, permanent waterbody (including farm dams and watercourses). Natural foraging habitat for the species is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i> , <i>Corymbia</i> , <i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3 km of a suitable, permanent, or seasonal waterbody. Dispersal habitat is suitable habitat which connects patches of breeding and/or foraging habitat (TSSC, 2015).	Potential breeding habitat includes the following BHTs when they are within 1km of a permanent waterbody: • Ironbark open forests to woodland on hilly terrain; • Ironbark and smooth-barked apple woodland; • Poplar box grassy woodland; • Gum-topped box open forests to woodland; and • Buloke and poplar box open forests to woodland. Potential foraging and dispersal habitat includes the same BHTs when within 1 – 3 km of a permanent waterbody or creek, as well as the riparian open forests to woodlands BHT within 3 km of a permanent waterbody or creek. This makes up 5,690.7 ha of potential breeding habitat and 3,971.0 ha of potential foraging/dispersal habitat in the Project Area. This is mapped on Figure 2-4.



2.2.3 MIGRATORY SPECIES

As per the final LoO assessment, one *EPBC Act* listed migratory species is considered likely to occur, the white-throated needletail. The white-throated needletail is discussed in Section 2.2.1 as it is also listed as vulnerable under both the *EPBC Act* and *NC Act*. A further two *EPBC Act* listed migratory bird species are considered as potentially occurring within the Project Area, one of which is also listed as Special Least Concern (SLC) under the *NC Act*, thereby constituting and MSES. These include:

- Fork-tailed swift (*Apus pacificus*) – SLC under the *NC Act*; and
- Latham's snipe (*Gallinago hardwickii*) (also Vulnerable under the *EPBC Act* and *NC Act* and thus addressed in Section 2.2.2).

Though 247 BUS have been completed through the current survey effort and there have been no observations of any migratory bird species, their presence cannot be discounted due to their highly mobile nature, the presence of suitable habitat in the Project Area, and the existence of nearby records of the species. Resource availability for migratory species is limited to large man-made dams and grazing land, with no suitable wetlands present in the Project Area. Further BUS will continue progressing the survey effort for these species and their potential habitat within the Project Area. Potential habitat for the fork-tailed swift is discussed in Table 2-14.

TABLE 2-14 FORK-TAILED SWIFT HABITAT SUMMARY IN THE PROJECT AREA

Species	<i>EPBC Act</i> , <i>NC Act</i>	Habitat Description	Potential Habitat in Project Area
Fork-tailed swift (<i>Apus pacificus</i>)	Mi, SLC	Inland plains are preferred habitat for the species; however, they are known to utilise a wide range of habitats for foraging such as rainforest, wet sclerophyll forest and dry wooded areas. Species is considered exclusively aerial in Australia (DCCEEW, 2024).	It is likely this species would only occur as an aerial flyover visitor to the Project Area, so habitat has not been mapped for this species in the Project Area.

2.2.4 MIGRATORY FLYWAYS

The East Asia/Australasia Flyway is the most common and frequented flyway travelled by migratory shorebirds enroute to, and within, Australia (Birdlife International, 2020). This flyway occurs over a total of 84,765,020 km² and occurs through 37 countries, including Australia (Birdlife International, 2020). This flyway extends from Arctic Russia and North America to the southern extents of Australia and New Zealand predominately traversing the coastal extents of Australia, occasionally travelling inward through parts of South Australia and Western Australia (Birdlife International, 2020). When examining the records of the listed migratory shorebirds species from desktop searches, the vast majority of incidental records are consistent with the coastal routes of the East Asia/Australasia Flyway. Additionally, when examining the records of non-shorebird migratory birds, these species also generally traverse coastal areas.

Migratory flyways are known to correspond with the vast majority of Important Bird and Biodiversity Areas (IBAs). Such IBAs are globally known for their importance in bird conservation, particularly due to the number of migratory and/or threatened species that are found there. The East Asia/Australasia Flyway triggers a total of 1,184 migratory IBAs (Birdlife International, 2020), none of which occur within, or in close proximity to, the Project Area. Therefore, it is concluded that the Project Area does not fall within an important flyway or IBA for migratory birds.

2.2.5 RAPTORS

A total of eight raptor species were observed during the field surveys, of which, none are listed under the *EPBC Act* or the *NC Act*, including:

- Australian hobby (*Falco longipennis*);
- Black kite (*Milvus migrans*);
- Black-shouldered kite (*Elanus axillaris*);
- Brown falcon (*Falco berigora*);
- Nankeen kestrel (*Falco cenchroides*);
- Spotted harrier (*Circus assimilis*);
- Wedge-tailed eagle (*Aquila audax*); and
- Whistling kite (*Haliastur sphenurus*).

Of the eight raptors observed only five species were observed flying within the RSA of 75 m – 260 m.

2.3 BAT SITE UTILISATION

Microbat species have been identified throughout the Project Area through the use of Anabats and harp trapping. A total of 20 microbat species were either deemed 'definite', 'probable' or 'possible' within the Project Area based on data collected from Anabat detectors during field surveys (see results in Table 2-15). A total of nine (with one species being unique to harp trapping not observed via acoustic devices) species were captured during harp trapping efforts (see Table 2-16). All bats identified on the site were expected to be present within the region. Overall, there are 17 bat species confirmed to occur in the Project Area, which make up eight families, and 22 genera within the order Chiroptera.

No threatened species have been confirmed to occur within the Project Area, though there were an abundance of 'potential' calls for the *Nyctophilus* genus, one species of which is listed under the *EPBC Act* and *NC Act*, Corben's long-eared pied bat (*Nyctophilus corbeni*). It is not possible to differentiate between *Nyctophilus* species using call recordings. As mentioned, harp trapping was carried out to further evaluate the likelihood of this species occurrence and to determine the *Nyctophilus* species utilising the potential habitat in the Project Area.

2.3.1 ANABAT SURVEYS

A total of 12,846 records were detected as bat calls throughout the Anabat surveys. The full echolocation analyses for the 17 Anabats deployed during the December 2023, February 2024 and December 2024 field surveys can be found in Appendix E. Call identification for this dataset was based on call keys and descriptions published for Queensland (Reinhold, Law,

Ford, & Pennay, 2001) and New South Wales (Pennay, Law, & Reinhold, 2004). Species' identification was further refined using the probability of occurrence of each species based on their geographic distribution. The reliability of identification is as follows:

- **Definite** – one or more calls where there is no doubt about the identification of the species;
- **Probable** – most likely to be the species named, low probability of confusion with species that use similar calls; and
- **Possible** – call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

As outlined in the analysis of echolocation calls in Appendix E, where ambiguity occurs between species/families calls, further justification of species identification is provided. For example, probable *Nyctophilus* species were identified during all field survey periods, and subsequent assessment indicated that of the three species that might occur within the Project Area. *Nyctophilus sp.* cannot be distinguished on call alone, and there are potentially three species that could be found on site, the following species are:

- Corben's long-eared bat (*Nyctophilus corbeni*);
- Lesser long-eared bat (*Nyctophilus geoffroyi*); and
- Gould's long-eared bat (*Nyctophilus gouldii*).

As one of these species is threatened under the *EPBC Act* and *NC Act*, harp trapping was carried out to target the species.

Bat activity levels in the Project Area are quite high compared to other surveys within similar areas in the surrounding region. Particularly, one Anabat, located in the north-east of the Project Area had an exceedingly high abundance and diversity of calls recorded.

2.3.2 HARP TRAPPING

With the objective of targeting Corben's long-eared bat (due to ambiguous calls via Anabat surveys), two harp trapping field surveys were conducted in December 2024 and February 2025. In December 2024, four harp traps were deployed over five nights for a total of 14 trap nights during the December 2024 survey effort and in February 2025, four harp traps were deployed over five nights for a total of 20 trap nights (total of 34 trapping nights). 105 individual bats were captured and belonged to nine different species (see Table 2-16). The capture of 12 *Nyctophilus sp.* individuals and not *N. corbeni* reduces the likelihood that *N. corbeni* occurs in the Project Area. Therefore, *N. Corbeni* is considered unlikely to occur in the Project Area based on the results of survey effort which is deemed adequate against the recommended survey effort of four traps for five consecutive nights (20 nights total) (DEWHA, 2010).

TABLE 2-15 SUMMARY OF RESULTS OF DECEMBER 2023, FEBRUARY 2024, MAY 2024 ECHOLOCATION ANALYSIS

Scientific Name	Common Name	EPBC Act Status	NC Act Status	December 2023 Likelihood	February 2024 Likelihood	December 2024 Likelihood
<i>Austronomus australis</i>	White-striped free-tail bat	-	LC	Definite	Definite	Definite
<i>Chalinolobus gouldii</i>	Gould's wattled bat	-	LC	Definite	Definite	Definite
<i>Chalinolobus morio</i>	Chocolate wattled bat	-	LC	Definite	Definite	Definite
<i>Chalinolobus nigrogriseus</i>	Hoary wattled bat	-	LC	Definite	Definite	Definite
<i>Chalinolobus picatus</i>	Little pied bat	-	LC	Definite	Probable	Definite
<i>Miniopterus orianae oceanensis</i>	Large bent-wing bat	-	LC	Definite	Definite	Definite
<i>Nyctophilus corbeni</i>	Corben's long-eared bat	V	VU	Possible	Possible	Possible
<i>Nyctophilus geoffroyi</i>	Lesser long-eared bat	-	LC	Possible	Possible	Possible
<i>Nyctophilus gouldi</i>	Greater long-eared bat	-	LC	Possible	Possible	Possible
<i>Ozimops lumsdenae</i>	Northern free-tailed bat	-	LC	Definite	Probable	Definite
<i>Ozimops petersi</i>	Inland free-tailed bat	-	LC			Definite
<i>Ozimops ridei</i>	Eastern free-tailed bat	-	LC	Possible	Probable	Definite
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath tail bat	-	LC	Definite	Definite	Definite
<i>Scoteanax rueppellii</i>	Greater-broad nosed bat	-	LC			Definite
<i>Scotorepens balstoni</i>	Inland broad-nosed bat	-	LC	Probable	Probable	Probable
<i>Scotorepens greyii</i>	Little broad-nosed bat	-	LC	Definite	Definite	Probable

Scientific Name	Common Name	EPBC Act Status	NC Act Status	December 2023 Likelihood	February 2024 Likelihood	December 2024 Likelihood
<i>Scotorepens sp. (Parnaby)</i>	Central-eastern broad-nosed bat	-	LC	Probable	Probable	Possible
<i>Vespadelus regulus</i>	Southern forest bat	-	LC			Probable
<i>Vespadelus troughtoni</i>	Large forest bat	-	LC	Probable	Possible	Probable
<i>Vespadelus vulturnus</i>	Little forest bat	-	LC	Definite	Definite	Possible

Note: V = Vulnerable; LC = Least Concern;; VU = Vulnerable

TABLE 2-16 SUMMARY OF RESULTS OF DECEMBER 2024/2025 HARP TRAPPING

Scientific Name	Common Name	EPBC Act Status	NC Act Status	Number of Individuals Captured 2024	Number of Individuals Captured 2025
<i>Nyctophilus gouldi</i>	Greater long-eared bat	-	LC	8	5
<i>Nyctophilus geoffroyi</i>	Lesser long-eared bat	-	LC	4	8
<i>Chalinolobus gouldii</i>	Gould's wattled bat	-	LC		12
<i>Chalinolobus picatus</i>	Little pied bat	-	LC		7
<i>Ozimops ridei</i>	Eastern free-tailed bat	-	LC		10
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tailed bat	-	LC		21
<i>Scotorepens greyii</i>	Little broad-nosed bat	-	LC	1	20
<i>Vespadelus baverstocki</i>	Inland forest bat	-	LC		3
<i>Vespadelus vulturnus</i>	Little forest bat	-	LC	4	
<i>Unidentified species (not Nyctophilus sp.)</i>	N/A	-	N/A	1	1

Wattled bats such as those recorded (Gould's wattled bat, hoary wattled bat, little pied bat and chocolate wattled bat) can generally be found in a wide range of habitats, including forests and woodlands and typically roost in tree hollows. These species prefer a diet of moths and beetles but will eat other insects if available (Churchill, 2008).

Bent-winged bats, such as that recorded (large bent-wing bat) occupy well-timbered habitats, often in wetter areas or in close proximity to water features. These species typically roost in caves or other man-made structures and show a dietary preference for moths (Churchill, 2008).

Free-tailed bats, such as those recorded (northern free-tailed bat and eastern free-tailed bats) are high-and-fast flying insectivorous species that roost in large tree hollows or houses. Their habitat selection is primarily based on food abundance. Specifically, the species recorded in the Project Area habitat includes open forests, woodlands and agricultural lands (Hall, 2009).

Broad nosed bat species, such as those recorded (inland broad nosed bat and little broad-nosed bat) are found in arid grasslands, woodlands, swamps and a diverse range of other habitats. These species are quite adaptable and may roost in fence post hollows in arid zones to walls of buildings in wetter areas. Their only requirement is access to water as it usually inhabits warmer environments. These species are insectivorous (Hall, 2009).

The yellow-bellied sheath-tail bat has a diet preference for beetles, and is found in nearly all habitats, utilising large tree hollows for roosting (Armstrong & Lumsden, 2017).

The white-striped free-tail bat occupies urban areas, woodland shrubland, open agricultural landscapes with scattered stands of trees, grassland and deserts. They are insectivores (Churchill, 2008).

The forest bats recorded are considered insectivorous. The large forest bat occurs near sandstone or volcanic escarpments, inhabiting tropical mixed woodland, wet and dry sclerophyll forest. Forests that do not provide natural roosting sites (i.e. caves or large rock overhangs) do not provide habitat for this species. The other forest bat recorded, the little forest bat, prefers tall and open riparian forests. The species roosts in tree hollows in this habitat, or buildings (Hall, 2009).

3. COLLISION RISK ASSESSMENT AND MODELLING

3.1 HIGH-RISK TURBINE ANALYSIS

The following methodology has been used to allocate a risk rating to each WTG based on their position within the Project Area (informed by the current WTG layout) and in relation to the surrounding landscape. Out of the variables identified as influencing the collision risk of the WTGs, three have been considered within the WTG risk-rating. These variables include:

- Distance from wooded vegetation;
- Distance from a suitable water source; and
- Distance from topographic features.

Table 3-1 outlines the turbines risk criteria and Table 3-2 demonstrates the turbine risk rating scale. The results of the turbine risk rating process are depicted in Figure 3-1, and include zero turbines with a very high risk rating, zero turbines with a high risk rating, 23 turbines with a moderate risk rating, 49 turbines with a low risk rating and all remaining 71 turbines with a negligible risk rating.

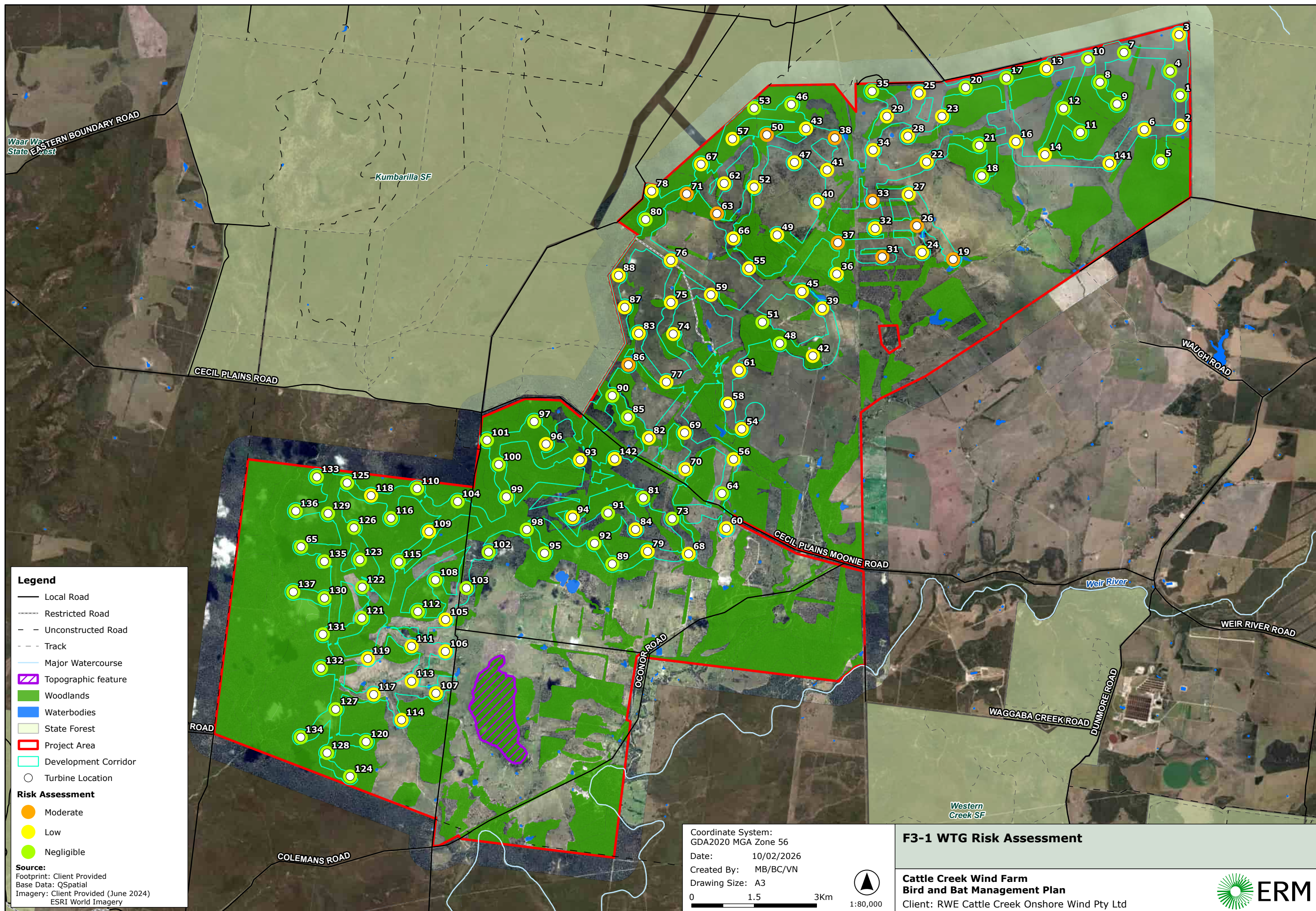
TABLE 3-1 TURBINE RISK CRITERIA

Variable	Description	Score Triggered
Distance from wooded vegetation that provides habitat for MNES species that have the potential to fly within the RSA. For the Proposed Development, this habitat includes: • Glossy black cockatoo habitat.*	Is the turbine located within the identified wooded area, or within the following buffer distances: • Over 500 m; • Within 300-500 m; • Within 100-300 m; • Within 50-100 m; and • Less than 50 m.	Scores triggered are as follows: • Over 500 m: 0; • Within 300-500 m: 1; • Within 100-300 m: 2; • Within 50-100 m: 3; and • Within 0- 50 m: 4.
Distance from permanent water source (inclusive of permanent wetlands and farm dams)	Is the turbine located within the following buffer distances of a permanent water source: • Over 500 m; • Within 300-500 m; • Within 100-300 m; • Within 50-100 m; and • Less than 50 m.	Scores triggered are as follows: • Over 500 m: 0; • Within 300-500 m: 1; • Within 100-300 m: 2; • Within 50-100 m: 3; and • Within 0- 50 m: 4.
Distance from topographic features (caves and escarpment)	Is the turbine located within 200 m of topographic features.	Scores triggered are as follows: • Within 200 m: 2.
Total Score		Between 0 - 10

**White-throated needletail and fork-tailed swift are known to fly within the RSA, however as the species are expected to utilise the site aerially, wooded vegetation areas associated with the species have not been mapped, and therefore only glossy black cockatoo habitat has been used for the assessment.*

TABLE 3-2 TURBINE RISK RATING SCALE

Total Score	Risk Rating
10	Very High
7-9	High
4-6	Moderate
1-3	Low
0	Negligible



3.2 BIRD AND BAT RISK ASSESSMENT

The Onshore Wind Farm Guidance details how CRM needs to be undertaken for listed threatened species (MNES) where risks from the Proposed Development, particularly collision risks, have been identified (DCCEEW, 2024). *State Code 23* has listed that CRM be undertaken for listed threatened and migratory species, or species of interest such as raptors, that occur within the RSA and that are identified as at risk from the Proposed Development. Therefore, the bird and bat risk assessment has identified species at risk of collision with turbines, and those which occur within the RSA have been included in the CRM if data for species is present from field observations.

The potential impacts to listed threatened and/or migratory species as a result of the Proposed Development are:

- Direct mortality through WTG collision, and barotrauma (bats only);
- Habitat impacts such as clearing and fragmentation; and
- Changes in how relevant bird and bat species utilise the Project Area.

The introduction of turbines and associated infrastructure has the potential to lead to changes in how relevant bird species utilise the Project Area. Habitat mapping has been conducted for each listed threatened species that has been assessed as known, likely, or with the potential to occur in the Project Area, and shown on Figure 2-2 through to Figure 2-4.

This Section of the BBMP will demonstrate how the potential impacts to each relevant species, including their risk of impact and site utilisation, have been analysed as part of the bird and bat risk assessment. The species covered in this risk assessment have been informed by the current iteration of the LoO results from desktop and field results conducted through pre-operational BBUS.

3.2.1 COLLISION RISK ASSESSMENT APPROACH AND ASSUMPTIONS

Wind farms are known to impact birds and bats through collision with operating turbines. This section provides a detailed risk assessment for listed threatened and migratory birds and bats, using field data from surveys, desktop sources of historical records and literature on the ecology and characteristics of the species, to assess collision risk during the operational phase of the Proposed Development. This risk assessment has considered the likelihood of impact, and potential consequences of events including collision with wind turbines, as well as the impact of construction and operation on the Proposed Development causing changes in site utilisation by bird and bat species.

The risk assessment was based on the Risk Evaluation Matrix Model which complies within the *AS/NZS ISO 31000 Risk Assessment Standard: 2018*. This risk assessment considers the likelihood of an event (collision with WTGs and impact to site utilisation) (Table 3-3), and the consequences should the event occur (Table 3-4). Through calculating the likelihood and the consequence, an overall risk rating is assigned to each species and the risk of potential impact to a species because of the operation of the Proposed Development (Table 3-5). Such impacts include the direct collisions with WTGs as well as indirect impacts such as the deterrence of migratory flightpaths.

The risk assessment is being applied to the following:

- *EPBC Act* and *NC Act* listed species with the either potential, likely or known LoO assessment;
- Microbat species recorded utilising acoustic recorders or captured in harp trapping;
- Raptors confirmed during field survey effort; and
- Non-listed bird species that are recorded during the field survey effort flying at a minimum of 75 m (beginning of RSA).

The CRA rating for each species is listed in Table 3-6, with detailed CRA provided in Appendix F. This risk assessment took a conservative approach to determine the risk level for each species by considering hypothetical risks to the species if they were to occur.

This approach considered profiling species based on information obtained from the published literature and the following factors when considering the risk level:

- Whether species were, based on the LoO criteria, known, likely, potential or unlikely to occur within the Project Area;
- Whether species were known or potential from the bat analysis results from the acoustic devices;
- Existence of records in the Project Area;
- Existence of records in a Broader Locality (with this Broader Locality being a 150 km radius search area of the Project Area);
- Flight path analysis, including flight heights and flight speeds inside or outside of RSA and, based on literature and field observations for the Locality; and
- Amount of known or potential habitat in the Project Area.

Noting that for records in the Broader Locality, historically relevant records were applied for the bird species as they are more readily observed and easier to identify resulting in a higher abundance of records. Whereas for microbats, as these often require specific survey methodologies and equipment (acoustic recorders and harp trapping) further requiring specialist analysis. Records for microbats will generally be lower, therefore all records have been including when looking at the Broader Locality.

The results of this approach are considered to provide a risk result as a 'worst-case' scenario, based on the use of literature and on-ground field observations during the field surveys.

TABLE 3-3 LIKELIHOOD OF EVENT CRITERIA

Likelihood	Description
Certain	It is expected to occur in most circumstances. The risk event could occur in any year (>95%).
Almost Certain	It will probably occur in most circumstances. The risk event could occur in any year (>50%).
Likely	It may occur at some time. It is equally probable that the risk event could or could not occur in any year (50%).

Likelihood	Description
Unlikely	It could occur at some time. It is probable than not that the risk event could occur in any year (<50%).
Rare	It may occur in exceptional circumstances. It is improbable that the risk event could occur in any year (<5%).

TABLE 3-4 CONSEQUENCE OF EVENT CRITERIA

Negligible	Low	Moderate	High	Severe
Occasional individuals lost but no reduction in local or regional population viability.	Repeated loss of small numbers of individuals but no reduction in local or regional population viability.	Moderate loss in numbers of individuals, leading to minor reduction in localised or regional population viability for between one and five years.	Major loss in numbers of individuals, leading to reduction in regional or state population viability for between five and 10 years.	Extreme loss in numbers of individuals, leading to reduction in regional or state population viability for a period of at least 10 years.

TABLE 3-5 RISK MATRIX LEVEL BASED ON THE LIKELIHOOD AND CONSEQUENCE

Likelihood	Consequence				
	Negligible	Low	Moderate	High	Severe
Certain	Negligible	Low	High	Severe	Severe
Almost Certain	Negligible	Low	Moderate	High	Severe
Likely	Negligible	Low	Moderate	High	High
Unlikely	Negligible	Negligible	Low	Moderate	High
Rare	Negligible	Negligible	Negligible	Low	Low

3.2.2 COLLISION RISK ASSESSMENT RESULTS

As a result of the risk assessment, three listed threatened species, three raptor species and four bat species were assessed as having a low or moderate risk of collision (Table 3-6). All other listed bird and bat species were considered to have negligible risk of impact from collision with WTGs and any indirect impacts associated with the Proposed Development (e.g. barrier effects from WTGs). It is emphasised that this risk assessment assumes a worst-case scenario for most of the species, based upon literature and realistic observational expectations. Therefore, the final risk ratings assigned to species that have the potential to occur within the Project Area are conservative and enable this worst-case scenario to be considered.

A full detailed risk assessment with conclusions can be found in Appendix F.

TABLE 3-6 BIRD AND BAT RISK ASSESSMENT

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating
Threatened or Migratory Bird Species				
Southern whiteface	V, V	Rare	Low	Negligible
Fork-tailed swift	Mi, SLC	Likely	Low	Low
Latham's snipe	V & Mi, SLC	Unlikely	Low	Negligible
Glossy black cockatoo	V, V	Unlikely	Moderate	Low
Squatter pigeon	V, V	Rare	Low	Negligible
White-throated needletail	V & Mi, VU	Likely	Moderate	Moderate
Diamond firetail	V, V	Rare	Low	Negligible
Raptors				
Australian hobby	-, LC	Unlikely	Low	Negligible
Black kite	-, LC	Likely	Low	Low
Black-shouldered kite	-, LC	Likely	Low	Low
Brown falcon	-, LC	Likely	Low	Low
Nankeen kestrel	-, LC	Unlikely	Negligible	Negligible
Spotted harrier	-, LC	Rare	Low	Negligible
Wedge-tailed eagle	-, LC	Almost certain	Low	Low
Whistling kite	-, LC	Unlikely	Negligible	Negligible
Least concern listed birds				
Fairy martin	-, LC	Likely	Negligible	Negligible
Grey teal	-, LC	Likely	Negligible	Negligible
Hardhead	-, LC	Unlikely	Negligible	Negligible
Sulphur-crested cockatoo	-, LC	Likely	Negligible	Negligible
Torresian crow	-, LC	Rare	Negligible	Negligible
White-faced heron	-, LC	Unlikely	Negligible	Negligible
Bats recorded in Project Area				
Central-eastern broad-nosed bat	-, LC	Rare	Low	Negligible
Chocolate wattled bat	-, LC	Rare	Low	Negligible
Eastern cave bat	-, LC	Rare	Moderate	Negligible
Gould's wattled bat	-, LC	Rare	Negligible	Negligible
Gould's long-eared bat	-, LC	Rare	Negligible	Negligible

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating
Greater broad-nosed bat	-, LC	Rare	Low	Negligible
Hoary wattled bat	-, LC	Rare	Moderate	Negligible
Inland broad-nosed bat	-, LC	Rare	Low	Negligible
Large bent-wing bat	-, LC	Likely	Moderate	Moderate
Lesser long-eared bat	-, LC	Rare	Negligible	Negligible
Little broad-nosed bat	-, LC	Rare	Negligible	Negligible
Little forest bat	-, LC	Rare	Negligible	Negligible
Little pied bat	-, LC	Rare	Negligible	Negligible
Northern free-tailed bat	-, LC	Likely	Moderate	Moderate
Ride's free-tailed bat	-, LC	Rare	Low	Negligible
White-striped free-tailed bat	-, LC	Likely	Low	Low
Yellow-bellied sheath-tailed bat	-, LC	Likely	Low	Low

Status listing per EPBC Act, NC Act: CE, CR = Critically Endangered; E, EN = Endangered; V, VU = Vulnerable; Mi = Migratory, - = no listing, SLC = Special Least Concern and LC = Least Concern

Historically relevant = records from ALA within 20 years

Broader locality = 150 km buffer applied to the Project Area boundary

RSA used = 75 m - 260 m

3.2.3 CUMULATIVE COLLISION RISK

The cumulative collision risk assessment (CCRA) method presented in this BBMP has been prepared so that additional future wind farms that may contribute to bird and bat collision risk will be further considered in the impact assessment process.

To identify bird populations at high risk of cumulative impacts of wind farm Projects within and adjacent to Proposed Development, a CCRA framework has been developed to identify the processes to be applied to identify and quantify collision impacts. The framework follows five steps:

1. Identify a preliminary list of potentially at-risk species based on publicly available records of bird observations and BUS completed across component Projects;
2. Assess the sensitivities of populations to identify priority at-risk species that may be subject to potential cumulative impacts. Sensitivity refers to the conservation status, the likelihood of presence based on suitable habitat, and likelihood of occurring within the RSA based on known flight heights, potential flight paths and flyways and bird flight behaviours;
3. Estimate the CCRA for species based on Proposed Development specific annual likelihood of collision estimates derived from CRM and monitoring for each component Proposed Development;
4. Determine thresholds of fatalities for each species that constitutes a significant ecological loss to the population when assessed cumulatively; and
5. Identify management and mitigation measures to be employed across all Projects.

The application of a cumulative approach to collision risk for the Proposed Development provides an accurate way of assessing the collision risk of species likely to encounter more than a single wind farm within or adjacent to Proposed Development. The proposed CCRA framework is comprised of five steps and builds on previous international research and cumulative risk assessments.

Most sensitive species towards cumulative impacts are expected to be resident raptors those species with low population numbers, and species known to occur in large flocks within inland Australia. White-throated needletails have also been identified as having the potential to be negatively affected by this Proposed Development. Other migratory species occurrences have been rare, suggested that these species will not be as sensitive to the development of the Proposed Development, however further consideration across multiple Projects must continue to assess significance of potential collision impacts.

3.3 MATHEMATICAL COLLISION RISK MODELLING

3.3.1 COLLISION RISK MODELLING, DATA AND MORTALITY ESTIMATES

The Onshore Wind Farm Guidance (DCCEEW, 2024) and *State Code 23* (SDAP version 3.0, February 2022) have listed that CRM be undertaken for listed threatened and/or migratory species, or raptors, that occur within the RSA and that are identified as at risk from the Proposed Development.

The Band Collision Risk Model (Band Model) (Band, 2024) has been used to predict the total number of bird and bat collisions that may result from the development of the wind farm. The Band Model is routinely used in wind farm assessment studies across the world. This method of CRM requires the input of parameters that describe species-specific biometrics, flight speeds and characteristics and the expected amount of flight activity in the Project Area. Furthermore, the model requires the input of wind turbine specific information such as the turbine blade size and pitch, turbine height and rotor rotation period as well as the proportion of time the turbines will be operational. The Band (2024) approach builds on previous models developed by Band et al. (2007) and Band (2000). The approach is intended to provide collision risk estimates that are comparable across different wind farms.

The CRM estimates the number of collisions through the following stages (Band, 2024):

- **Stage A:** Flight activity - using BUS data to establish the density of flying birds in the vicinity of the WTGs, and the proportion flying at a risk height, between the lowest and highest points of the rotors;
- **Stage B:** Number of flights through rotors – makes an estimate, based on the bird density and proportion at risk height, of the potential number of bird passages through rotors in the period in question. The initial assumption is that birds will continue to make flights within the area at the same intensity as before;
- **Stage C:** Probability of collision for a single transit - calculates the probability of collision during a single bird rotor transit;
- **Stage D:** Expected collisions per year - multiplies the outputs of stage B and C to yield the potential collision rate for the bird species in question, assuming current levels of bird use of the site but allowing for the proportion of time that turbines are not operational; and

- **Stage E:** Allowing for avoidance and attraction - takes account of the proportion of birds likely to avoid the wind farm or its turbines, either because they have been displaced from the site or because they take evasive action or are attracted to the wind farm, e.g. in response to changing habitats.

Each of these five stages, and additional information about the model, is described within *Using a collision risk model to assess bird collision risks for onshore wind farms* (Band, 2024).

3.3.1.1 WINDFARM AND WTG PARAMETERS

The Proposed Development is a utility-scale wind farm of up to 135 WTGs with specifications outlined in Table 3-7. The Proposed Development will include ancillary infrastructure including, but not limited to, access tracks, collector stations, Battery Energy Storage System (BESS), overhead and underground electrical cabling, hardstands, and an operation and maintenance compound.

TABLE 3-7 TURBINE PARAMETERS FOR THE PROPOSED DEVELOPMENT

Turbine Parameters	Proposed Development Parameters
Estimated wind farm generation capacity*	Up to 972 MW
Turbine electrical output	Up to 7.2 MW
Number of WTGs	Up to 135 WTGs
Hub height**	Up to 169 m
Tip height**	Up to 260 m
Rotor diameter**	Up to 175 m
RSA* (minimum tip height and maximum tip height)	75 m - 260 m
Number of blades	3
Chord width of blade	Up to 4.9 m
Blade length	Up to 87.5 m
Turbine rotor diameter	Up to 175 m
Average pitch angle of the blade	14.5°
Max rotation period of turbine	Approximately 6.5 seconds (modelled utilised rpm converted to 9.23)
Total Area of Project Area	20,404.5 ha
Total Area of Disturbance Footprint	2,221.2 ha

* The actual output of the wind farm will depend on the size and type of turbine chosen during the detailed design phase. Regardless of the size of the wind farm generation capacity, the Proposed Development will still need to comply with the Queensland Wind Farm State Code and supporting Planning Guidelines, particularly in relation to acoustic amenity and setback criteria. This estimated generation capacity excludes the BESS.

** The specifications contained within the table are based on current, projected turbine size. Whilst they are an estimated maximum, changes in technology and constructability may result in larger turbines being installed.

3.3.1.2 FLIGHT PATH ANALYSIS OF AT RISK SPECIES

Table 3-8 details the flight path data of at-risk species, or species assessed as having a 'low' or higher CRA in Section 3.2.2. The BUS program data, in combination with desktop research, has provided the bases of the flight path data analysis for the identified at risk species where possible.

This data has been considered within both the CRA in Section 3.2.2 and Appendix F, and the CRM.

TABLE 3-8 FLIGHT PATH DATA OF AT RISK SPECIES

Species Name	Wingspan	Length	Flight Speed	Range of Flight Heights	Flock Size	Flight Behaviour	Number of observations in RSA during BBUS	Main direction of flight observed within the Project Area
Fork-tailed swift	41 cm	20 cm	~36 m/s	Within RSA (1-300 m)	Large flocks of 1000s of individuals	Aerial foraging, highly manoeuvrable	0 sightings*	-
White-throated needletail	50 cm	20 cm	36 m/s	Within RSA (1-300 m)	Large flocks of 1000s of individuals	Aerial foraging, highly manoeuvrable	0 sightings*	-
Glossy black cockatoo	90 cm	48 cm	No data available	Below RSA* (25m)	2-4*	Low manoeuvrability	0 sightings*	-
Black kite	38-41 cm	18-23 cm	15.2 m/s	Within RSA (15-200 m)*	1-30*	Soaring, opportunistic forager	30 sightings *	Circling
Black-shouldered kite	90 cm	35 cm	17.3 m/s	Within RSA (10-100 m)*	1-2*	Hovering, gliding, hunts from perches	4 sightings*	060° / Circling
Brown falcon	115 cm	45 cm	13.6 m/s	Within RSA (10-80 m)*	1-2*	Soaring, fast pursuit, high manoeuvrability	1 sighting*	Various
Wedge-tailed eagle	95-110 cm	203 cm	16.7 m/s	Within RSA (25-400 m)*	1-2*	Soaring, gliding, territorial	45 sightings*	Circling

Species Name	Wingspan	Length	Flight Speed	Range of Flight Heights	Flock Size	Flight Behaviour	Number of observations in RSA during BBUS	Main direction of flight observed within the Project Area
Large bent-wing bat	30-35 cm	6 cm	~12-14 m/s	Within RSA (~10-300 m)	Variable (often large groups)	Fast, direct flight, cave-roosting	'Definite' acoustic record*	N/A
Northern free-tailed bat	~40 cm	~10 cm	~12-14 m/s	Within RSA (~10-300 m)	Variable (small to moderate groups)	Fast, high-altitude flyer	'Definite' acoustic record*	N/A
White-striped free-tailed bat	~40 cm	~10 cm	~12-14 m/s	Within RSA (~10-300 m)	Variable (often solitary or small groups)	Fast, high flyers, open air foragers	'Definite' acoustic record*	N/A
Yellow-bellied sheath-tailed bat	~40 cm	~10 cm	~12-14 m/s	Within RSA (~10-300 m)	Solitary or pairs	Strong flyer, forages in open areas	'Definite' acoustic record*	N/A

*Data collected during field surveys within the Project Area, all other data collected from desktop assessment.

~ Indicates approximate or inferred value from related species.

-Species not recorded during field surveys and therefore no data is available.

N/A: Survey methods do not collect data.

3.3.1.3 COLLISION RISK MODEL INCLUSION CRITERIA

The following inclusion criteria has been used for the CRM:

1. The species has been assessed as having a low or moderate risk of impact from the Proposed Development (at risk species) (as determined by the CRA within Section 3.2.2 and Appendix F); and
2. The species was recorded within the RSA during BUS's.

With this inclusion criteria, the following four species were included within the CRM:

- Black kite;
- Black-shouldered kite;
- Brown falcon;
- Wedge-tailed eagle.

No listed species have been included within the CRM as BUS failed to identify any listed species in the RSA. Species not included within the CRM may still be at risk of collision throughout the life of the Proposed Development and will be monitored as per operational bird and bat surveys discussed in Section 4. Additionally, such species will be considered for any potential impacts in the future if they are to occur within the RSA for the Proposed Development.

3.3.1.4 COLLISION RISK MODEL ASSUMPTIONS

The Band Model requires bird flight times to be recorded, however data collection at the time of the surveys did not record flight times for individual birds instead utilising an assumption that each recording of an individual was for the entire survey time (20-minutes). This assumption resulted in an inflated flight time not grounded in real world results. Recent updates in methodologies have observed that raptors are predominately not observed for the entire duration of the survey time; an excerpt from field collected data on another wind farm project using an updated methodology for three of the four raptor species is presented within Appendix H. A summary of this example as shown:

- Of the six flight observations of black kites only one was recorded for a 15-20 minute window;
- Of the seven flight observations of nankeen kestrel (a supplement for black-shouldered kite) only three were recorded for a 15-20 minute window; and
- Of the 11 flight observations of wedge-tail eagles only four were recorded for a 15-20 minute window.

To account for this, the use of bird flight speeds from literature (as outlined within Table 3-8), to calculate how long the species observed would be within the area of visibility during the length of the survey time (20-minutes). This resulted in all three species approximately being within the area of visibility for only 10% of the total 20 minutes (two minutes in total). This percentage was then applied to the bird species time in flight.

It is also noted that the black kite density may be overestimated due to the species only being recorded twice within the Project Area (one occurrence of a flock of 30 individuals and a single individual).

3.3.1.5 COLLISION RISK MODELLING RESULTS

For the four species included in the model, collision risk has been calculated as the number of flights within the RSA per annum as shown in the following table. It is expected that birds in practice show a high level of avoidance of wind turbines (Band, 2024) (Band, Madders, & Whitfield, 2007). However, avoidance rates have not been calculated for all species and research is necessary to determine each species-specific avoidance rates. For this CRM, 98% and 99% avoidance rates have been used to calculate annual collision risk for the given species. These avoidance rates are what is typically used in CRM exercises (Scottish National Heritage (Smales & Muir, Modelled cumulative impacts on the Tasmanian Wedge-tailed Eagle of wind farms across the species' range, 2005) (SNH, 2018). Indeed, 98% is the recommended default avoidance rate when supporting evidence for other avoidance rates is absent (NatureScot, 2025).

The results of the CRM, based on an RSA of 75-260 m, is presented in Table 3-9. In total, the CRM indicates <10 birds at risk of collision with WTGs per year. It is important to note that the CRM represents a worst-case scenario, and is based on the largest feasible WTG specifications. However, the final project design is expected to consider a more defined range through detailed design. As a result, actual collision risks are expected to be lower than those predicted by this conservative model.

TABLE 3-9 CRM RESULTS PER ANNUM

Turbine avoidance rate	98%	99%
Black kite	0.0	0.0
Black-shouldered kite	0.2	0.1
Brown falcon	0.0	0.0
Wedge-tailed eagle	7.1	3.6
Total	7.3	3.7

3.3.2 COLLISION RISK MODEL LITERATURE REVIEW

Australia has been increasingly adopting renewable energy projects, with 94 operational wind farms present in the country as of October 2022, and that number predicted to grow exponentially in the coming years (Australian Renewable Energy Agency, 2024).

Collision risk is a factor that needs to be considered from an environmental impact perspective which looks to the collision risk to avian species if they were to fly within the RSA of a wind farm. Increase in WTGs has resulted in adverse effects on many avian species, through both direct fatalities as a result of the collision with WTG rotor blades as well as secondary impacts such as the result of habitat alteration and loss and the changes in normal flight paths as a result of WTG presence/habitat loss (Drewitt & Langston, 2006) (Madders & Whitfield, 2006).

Collision risk is particularly important to determine and account for in proposed wind farm areas where bird species present are at a higher risk of decline, such as those of conservation significance. This is such that even a few fatalities can grossly alter the maturing and reproductive rates of a species, thus potentially result in regional and national declines (Drewitt & Langston, 2006) (Loss, Will, & Marra, 2013). Other species that are vulnerable to collision with WTGs include high-flying, soaring birds of prey, such as raptors (Estellés-Domingo & López-López, 2024). Collision-related mortality is spread unevenly among species

where few species often account for a large proportion of collisions (Estellés-Domingo & López-López, 2024) (Madders & Whitfield, 2006) (De Lucas, Janss, Whitfield, & Ferrer, 2008) (Watson, et al., 2018). Collision risk will also vary dependent on each species, based on factors such as foraging behaviour, flight height, flock sizes, morphology and flight speed (Drewitt & Langston, 2006) (De Lucas, Janss, Whitfield, & Ferrer, 2008) (Barrios & Rodriguez, 2004). WTG collision rates will vary based on variables such as time of day and time of year, based on the number of birds present in an RSA (Murgatroyd, Photopoulou, Underhill, Bouten, & Amar, 2018) (May, et al., 2010).

Raptors are known to utilise thermal soaring (slow circle-soaring flight on thermals) which is highly dependent on weather conditions. Under less favourable conditions for the species to gain altitude, WTG collision risk may be increased with the birds not tending to engage in active flight (Barrios & Rodriguez, 2004) (Johnston, Cook, Wright, Humphreys, & Burton, 2014) (Marcques, et al., 2014). This is such that the bird is soaring and not actively flapping through an airspace. This may prolong the amount of time it is present within the risk window of a WTG. It has been studied in a wind farm that most raptors will spend little time in a defined collision risk zone but will often intersect in and out of the risk window (Linder, Lyhne, Laubek, Bruhn, & Pertoldi, 2022).

Important predictors of collision risk for raptors have been studied and some of the main findings include that active flight can lead to a higher risk of collision with the tendency for a bird to dissect the path of multiple WTGs in an area (Linder, Lyhne, Laubek, Bruhn, & Pertoldi, 2022). Furthermore, track tortuosity can also impact collision risk, such that less tortuosity increases collision risk. This is important as tortuous tracks can be a result of raptors utilising thermal soaring, and thus, thermal soaring may actually reduce collision risk, which is consistent with other studies having been conducted on the topic (Janss, 2000) (Péron, et al., 2017).

CRM have been developed to assess the risk of impact to species as a result of wind farms. It is noted that such models are only able to assess the risk as a result of direct mortality from WTG hits, and not as a result of other impacts like habitat loss and flight redirection. A study by Masden and Cook (2016) reviewed 10 models that have been used broadly to assess the probability of bird species colliding with WTGs during passage through a Proposed Development dependent RSA. The methods that were assessed were divided into those based on observational flight data, where flight behaviour, habitat use and flux of birds are analysed, as well as those that focus primarily on collisions based on theoretical parameters in the absence of bird data. The study by Masden and Cook (2016) explained that all CRMs involve the following:

- To calculate the probability of a collision occurring assuming no evasive action – which requires information on bird morphometrics, flight speed and WTG rotor speed and size; and
- To measure the of the number of birds within a risk window in a given year – which is formulated based on actual observational data, or theoretical behavioural flight data for species in a given wind farm Project Area.

Table 3-10 shows a summary review of four of the main models mentioned in Masden and Cook (2016), including the Band Model, which was used for the Proposed Development. For each model, this table presents the objective of the model, inputs required as well as the limitations or main assumptions of the model.

TABLE 3-10 COMPARISON OF COLLISION RISK MODELS AS PER MASDEN AND COOK (2016)

Collision Risk Model	Objective and Benefits of the Model	Limitations and Assumptions of the Model
Tucker Model (Tucker, Mathematical Model of Bird Collisions with Wind Turbine Rotors., 1996a) (Tucker, 1996b)	- The model analyses the motions and dimensions of both birds and propeller-type rotor blades and predicts the probability of a collision when the bird flies through the RSA (Tucker, 1999a); and - This model can account for upwind and downwind flights of birds.	- Does not measure a likely number of collisions as a measure of bird density; - Blades are 1 or 3 dimensional which consist of length, chord and twist; - Bird always considered to be gliding, and never flapping in flight behaviour; - Bird dimensions are always rectangular with a wingspan that always exceeds length; - Does not consider the collision with the WTG tower; and - Avoidance behaviour is mainly left out of this model.
Band Model (Band W. , 2004) (Band, Madders, & Whitfield, 2007).	- The model was developed to take into considered the probability of a WTG blade that occupies the same space as a bird, and the time taken for the bird to pass through the rotor swept volume (RSV) of the area occupied by this WTG; - It has two stages for estimating collisions per year: 1) number of birds flying through the rotor and 2) the probability of collision from a single transit of a rotor; - This model accounts for avoidance or evasive behaviour by implementing an avoidance rate often between 95-99%; - Bird specific parameters are included into this model such as bird length, wingspan, height and flight activity (diurnal/ nocturnal/ migratory); - WTG parameters considered such as diameter, length, operational time, rotor speed, hub height; - Considers bird both when flapping and gliding; and - Updates as part of 2012 were made to consider offshore wind farms (not applicable to the Proposed Development).	- In this model the bird is assumed to be a cruciform shape; - The thickness of the WTG blade still not included into this model; - This model only assumes the bird is flying parallel to the wind, such that it is flying perpendicular to the rotation of the WTG; - Assumes effects of approaching WTG at oblique angles will cancel out, although this may underestimate collision risk; - Does not consider the collision with the WTG tower; and - Can be observational data heavy, when normally in Projects the data can be quite limited.

Collision Risk Model	Objective and Benefits of the Model	Limitations and Assumptions of the Model
Monte Carlo Model (McAdam, 2005)	- This model is based upon the original Band Model however includes stochastic modifications to account for variation in flight height and the effects of wind; - This model calculates the probability of bird being struck given it has passed through the plane of the WTG at a given height and distance less than the rotor length from the centre; and - This model considers the effect of wind variation on collision variation through the variance of bird speed as well as changes in the direction of the WTG.	- Includes same limitations of Band Model; and - This model includes oblique angles but not bird orientation relative to WTG.
Biosis Collision Risk Model (Smales, Muir, Meredith, & Baird, 2013).	- This model has been developed to provide a prediction of the number of collisions between WTGs and a local or migratory group of birds; - This model acknowledges that birds won't only approach WTG at a perpendicular angle, but flights can occur from any direction; - Considers the moving and stationary parts of the WTG – including the WTG tower that may be a factor to consider for bird collisions; - Considers bird parameters and WTG parameters considered as in the Band Model; and - Considers avoidance rates of birds.	- This model does not consider when the collisions will occur; - Due to statistically minor numbers of collisions that are concluded from the model – it is unlikely that they will be evenly distributed in time; and - Can be observational data heavy, when normally in Projects the data can be quite limited.

Section 3 is formulated based on the Collision Risk Model literature review undertaken by (Masden & Cook, 2016). It is noted that not all models reviewed in Masden and Cook (2016) are included in Section 3.1. However, the main ones that are most commonly adopted in current CRM have been considered.

In addition to the above limitations, the following are considered limitations for all of the models:

- Most models assume that avoidance behaviour is constant across all individuals within a species, and this is unlikely;
- Can overestimate bird collisions;
- Data incorporated is often count data of number of individuals in the species – the same individual may be counted more than once, however it can only be used in the model once, assuming collision equates to mortality – distinguishing individuals of a species is difficult (Eichhorn, Johst, Seppelt, & Drechsler, 2012) circumvents above limitation by using an agent-based model to describe movements of individuals through a landscape and applying collision risk to each individual but this is specific to a single species, the red kite; and

- Species-specific behaviours, topography and wind parameters not considered for majority of the models.

Whilst there are other models available (refer to Table 3-10), the CRM that was chosen for this Proposed Development was the Band Model, also known as the Scottish Natural Heritage (SNH) Model. The Band Model was chosen based on its ability to calculate an estimate of collisions per year for a bird species which is a pre-construction assessment of collision impacts on local and national populations (SNH, 2018). It considers bird species sighted and WTG model parameters, that ensure that it is project specific and situation dependent.

Further to those discussed in Table 3-10, the limitations of the Band Model as discussed in Band et al. (Band, Madders, & Whitfield, 2007) include the following:

- Birds may be more evident and prominent in some habitats;
- Birds may be easier to identify when flying at different elevations;
- Detection rate may differ for different species;
- Plotting routes of flying birds is difficult due to parallax and can be a skill that takes time to develop; and
- For gliding species such as eagles, it can be hard to tell their correspondence to landscape, however this can be circumvented by having knowledge of the species expected to be seen and knowledge of terrain.

One limitation of the Band Model is that it does not necessarily consider the direction flying of the bird within the Project Area. Such information is important to identify higher risk areas. Nonetheless, this information is accounted for within the risk assessment and identifies areas of high bird activity that will require further surveying in future. Such limitations are all relevant to the Proposed Development and the CRM undertaken for the species relevant to the Project Area. All species identification parameters and detection rates are going to be the same across all CRM types as this comes down to survey effort rather than the model itself. It is noted that the 95% avoidance rate is dealt with within the Proposed Development Model through accounting for 98 and 99% avoidance rates as a result of research done by SNH (2018).

There is constant research going into collision risk, especially with the expansion of renewable energy into new countries and areas, including offshore windfarms. Due to the limited records of listed threatened species that occur within the RSA, as well as the limited raptors within the RSA, the use of the Band Model is considered an adequate model to assess the collision risk associated impacts of the Proposed Development on bird and bat species. Furthermore, the parameters entered into the model are based on field observations as well as information from literature, and therefore considers a conservative estimate of the collision risk to species which does not limit the data or the outcomes.

3.4 POLICIES AND GUIDELINES

WTGs are preferentially located in areas for best wind resources, however based on the field surveys that have been conducted, and further pre-clearance micro-siting surveys that will be conducted prior to commissioning, final layout will consider at risk species habitat presence and addressed so far as reasonably practicable. With respect to individual species, the following documents were considered:

- Consultation of SPRAT profiles to identify species distribution, behavioural characteristics and habitat information, which was then mapped for all potential, likely and known to occur species within the Project Area;
- Scientific literature to understand further parameters of bird and bat species of interest, including size, flight speed, average flock sizes; and
- Survey guidelines which determined relevant methodology for BUS and BACI monitoring principles.

The consultation of these policies and guidelines were then able to inform the bird and bat studies, which were:

- A risk assessment based on species characteristics and behaviours; and
- A CRM which considers such species characteristics and factors these into how they would be impacted by the WTG parameters relevant to the Proposed Development.

The Proposed Development emphasises the importance of ongoing monitoring and as such, the BBMP has considered all relevant principles of BACI survey monitoring, and Adaptive Management to ensure that if any threatened species are to be found in future surveys, they are adequately considered, and impacts mitigated.

4. BIRD AND BAT MONITORING

The bird and bat monitoring program proposed in this BBMP has been based on information compiled during the desktop and field investigations conducted as part of the referral process for the Proposed Development. To align with the environmental outcomes of this BBMP, this program will aim to:

- Estimate mortality of bird and bat species attributable to operation of the Proposed Development;
- Improve understanding of the risk of turbine collision, barotrauma impacts and ongoing site utilisation on listed and non-listed bird and bat species;
- Improve monitoring approaches for the timely identification of turbine collisions and the timely collection and analysis of data; and
- Provide timely and regular validation and updates to the collision risk assessment using monitoring data, to support a robust adaptive management approach.

The BBMP bird and bat monitoring program will include two monitoring approaches:

- Operational phase BBUS to assess changes in bird and bat utilisation of the Project Area; and
- Operational phase 'mortality monitoring' to detect and quantify bird and bat mortalities attributable to operation of turbines, which is inclusive of:
 - Carcass searches;
 - Scavenger (carcass persistence) trials; and
 - Detectability (searcher efficiency) trials.

The mortality monitoring program has been developed with reference to the components included within 'Investigation of existing post- construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates' (Moloney, Lumsden, & Smales, 2019).

4.1 OPERATIONAL PHASE BIRD AND BAT UTILISATION MONITORING

Operational phase BBUS will occur during the first two years of operation, with two wet season and two dry season surveys being undertaken in those years. The monitoring methods used in these surveys will be consistent with techniques used during the BBUS completed prior to construction of the Proposed Development. More detail on operational phase BBUS methods can be found in Appendix G. Survey locations will be the same as the pre-operational BBUS locations, but dependent on the final WTG layout. BBUS will be conducted by a SQE.

The BBUS have been designed to support a BACI assessment framework, enabling changes in bird and bat site utilisation to be detected and attributed to the commencement of the Proposed Developments operations. By applying survey methods that are directly comparable to those used during pre-operational monitoring, the dataset will allow for statistical comparison of pre-operational (Before) and operational (After) periods with control locations unaffected by the Proposed Developments activities helping to distinguish between natural fluctuations in species presence and behaviour from the Proposed Development's impacts.

Mortality monitoring may be viewed as comprising three survey types, with an overall objective of assessing mortality impacts to birds and bats as a result of WTG collision or barotrauma:

- Carcass searches;
- Scavenger trials – which informs ‘carcass persistence bias’, which can affect the results of carcass searches; and
- Detectability trials – which informs ‘searcher efficiency bias’, which can affect the results of carcass searches.

4.1.1 CARCASS SEARCHES

As part of the monitoring program, carcass searches will be performed to determine the actual impact of the Proposed Development on birds and bats. The results of the monitoring will be used to review the risk assessment if necessary and to identify and determine if any further monitoring of bird and bat species is required and to update mitigation measures or adaptive management approaches. Carcass search methodology has been developed in line with ‘Investigation of existing post- construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates’ (Moloney, Lumsden, & Smales, 2019), the ‘Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries’ (IFC, 2023), as well as the accompanying ‘Post-construction Bird and Bat Fatality Monitoring (PCFM) Decision Support Tool’ (IFC, 2023). All carcass searches will be undertaken by suitably qualified personnel with appropriate skills in both bird and bat identification, as well as the handling of deceased species.

4.1.1.1 SURVEY TYPE AND AREA

Based on the PCFM Decision Support Tool (IFC, 2023), the recommended first year monitoring program will involve:

- Road and Plot searches (searching within access tracks and hard-stand areas only) at all WTGs, with road searches ranging up to 270 m from the WTG; and
- Full plot searches at 50% (approximately 67) randomly selected WTGs, with a search radius of 135 m from the base of the WTG.

Search transect spacing for both Road and Plot and full plot searches will start at 6 m. If visibility is high at the WTG and surrounding area, considering there is existing knowledge of the bird and bat species at risk, transect spacing of 10 m will be considered as an alternative to 6 m. It should be noted that in search areas of WTG that are difficult to access for safety reasons, due to dense vegetation or slope considerations, exceptions may be made as to where transects will be conducted. This will include searching within access tracks and hard-stand areas only. Such exceptions will be noted for reporting purposes.

Once the first year of surveys is completed, the collected data will be incorporated into the PCFM Decision Support Tool (IFC, 2023) to determine an appropriate search radius and search transect width specific to the Project in subsequent years.

4.1.1.2 WTG SELECTION

Based on the PCFM Decision Support Tool (IFC, 2023), 50% (approximately 67) WTGs will be randomly selected from two strata (forests/woodlands and open areas), ensuring the selection is representative of the Disturbance Footprint (i.e. if 70% of WTGs are located within open areas and 30% are located within forest/woodlands, then 70% of monitored WTGs will be within open areas and 30% will be in forest/woodland). Some WTG may be excluded from random selection due to accessibility issues. The order of selected WTGs searched will be random during each monitoring event.

4.1.1.3 DURATION AND FREQUENCY

Over the first three years of operation, randomly selected WTGs will be searched at 6 weekly intervals from late Autumn to early Spring, and 3 weekly intervals from early Spring to late Autumn, with increased monitoring in warmer months to align with increased potential for migratory species to occur within the Project Area. Three years of carcass searches is in line with the minimum recommended period of three years by the 'Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries' (IFC, 2023) and exceeds the two year average period in the 'Investigation of existing post-construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates' (Moloney, Lumsden, & Smales, 2019). These visits will ensure that carcass searches are able to gain high accuracy on data regarding the mortality associated with WTG strike.

After the first three years of carcass searches, selected WTG will be revisited four times a year (two wet season and two dry season) until year 10 of operation. If within this period, Impact Trigger 2 is met for any species (see Section 7.1.1), or if adaptive management warrants (e.g. accounting for scavenger rates), then monitoring frequency will be adjusted. Mortality monitoring duration and frequency for the remainder of the life of the Proposed Development will be reviewed after 10 years of operation, adjusted based on the results on both operational BBUS and mortality monitoring.

4.1.2 SOURCES OF BIAS IN MORTALITY MONITORING

Producing scientifically reliable estimates of mortality rates requires identifying and correcting the sources of bias that naturally occur in carcass counts obtained through carcass search surveys. In this context, "bias" refers to situations where the number of carcasses detected is lower than the actual number of mortalities. Causes of this bias include:

- **Carcass persistence bias:** some carcasses are removed or decompose before surveys occur. To help ascertain at what rate naturally occurring scavengers remove carcasses from the search area, scavenger trials will be completed (as discussed within Section 4.1.2.1);
- **Searcher efficiency bias:** not all carcasses are detected by searchers. To account for this bias, detectability trials will be performed (discussed in Section 4.1.2.2); and
- **Unsearched/unsearchable area bias:** some carcasses land outside areas that can be effectively searched. This includes 'Crippling bias', where birds and bats are not detected during searches, despite colliding with the WTGs, because they are able to move away from the search plot before dying (IFC, 2023). This bias is impractical to quantify at the project scale due to requiring real-time monitoring of non-fatal collisions, which are likely to be rare and unpredictable (IFC, 2023).

4.1.2.1 SCAVENGER TRIALS

The scavenger trial is adopted to ascertain at what rate naturally occurring scavengers remove carcasses from the Project Area. These trials will be completed twice within the first year; once each in the wet and dry season following operation commencement. Each scavenger trial will occur over 30 days. Conducting the scavenger trials in different seasons will ensure that seasonal differences in vegetation conditions are accounted for within the trials (ie. wet season generally has longer grass making it harder higher fauna activity levels). Also, different rates of scavenging have been observed across seasons (Catling, 1988); (Molsher, Gifford, & McIlroy, 2000). Different seasons are also going to be associated with different stocking levels.

Three size categories of carcasses will be used for the scavenger trials to help ascertain the different scavenger rates in the search area:

- Micro-bats and small birds (<30 cm body length);
- Medium sized birds (30-55 cm body length); and
- Large sized birds (>55 cm body length).

A total of 36 carcasses (12 of each size category) will be randomly placed under the same 50% (approximately 67) of WTGs randomly selected for carcass searches with no more than two carcasses being placed under any one WTG. This is to avoid undue attention from scavengers. If carcasses are not found underneath WTG for use in scavenger trials, then small mice may be used in place of micro-bats small birds and pigeon, and farm-raised ducks or geese may be used in place of medium and large sized birds respectively. Scavenger trials will be undertaken within the full plot search area of the WTG (135 m radius).

Once all carcasses have been placed, all carcasses will be checked following the following schedule:

- Each day for the first five days;
- Every two days from day six to day 10;
- Every three days from day 11 to day 19; and
- Every four days from day 20 until they disappear or until the end of the 30-day trial period.

The Proposed Development operation staff will be trained over a five-day period to undertake the scavenger trials following trial establishment by a SQE.

Additional procedures to follow for scavenger trials are listed below:

- Timing of searches has been based on the detailed experience and regulatory approval of other wind farms where scavenger trials have been undertaken that show almost all carcasses have been scavenged within a period of 5 – 10 days. Additionally, GPS coordinates will be taken for all carcasses placed during the scavenger trials, so as not to confuse these with any naturally occurring carcasses in the search areas;
- Carcass obtained from the Project Area (i.e. due to WTG collision) will be preferentially used in scavenger trials;
- Thick latex gloves must be worn at all times when handling the bird and bat carcasses. This will ensure that both the safety of the personnel but also that human scent will not replace the scent of the carcass which will alter scavenger behaviour and find rates;

- Carcasses will be placed by being thrown in the air to better mimic the natural landing of a carcass from impact with a WTG. Landing impact may dislodge or ruffle feathers or fur;
- Detailed observations will be taken at the search areas where carcasses have been scavenged, including the composition of the carcass and any evidence of scavenging behaviour (i.e. dislodgement of feathers or bones, pecking, tearing, partial removal of carcasses, potential scavenger scats and tracks); and
- The final state of the carcass will be recorded at the end of the survey period.

An alternative to the method described above is to use motion sensor cameras that could monitor scavenger activity. In this case a star picket with a camera mounted at approximately 1 m high will be placed in the ground approximately 4 m away from the carcass. This camera will record any scavenging activity over the course of 30 days from placement. This method gathers the exact time and method of scavenging and thus eliminates any uncertainties in the results analysis.

4.1.2.2 DETECTABILITY TRIALS

Detectability trials will be conducted to test the efficiency of searchers in finding bird and bat carcasses under WTG. Detectability trials will be conducted during the first day of scavenger trials, so as to use the same carcasses for both trials. As with scavenger trials, detectability trials will be conducted twice in the first year of operation, once each in the wet and dry seasons to account for seasonal variation in vegetation cover, which can affect detectability. Detectability trials will also be conducted for dogs and handlers, if they are to be used for mortality monitoring for the Proposed Development. The detectability trials will be conducted by personnel who have been involved in carcass searches.

After the SQE randomly places carcasses under the 50% of randomly selected WTG as per the scavenger trials, they will record the GPS location of each carcass. Immediately thereafter, the individuals that have been/will be carrying out carcass searches will try and locate as many of the carcasses as they can (without being told the GPS locations or which of the 50% of randomly selected WTG there are carcasses under) using the same methodology described in Section 4.1.1. Detection efficiency will be measured as the proportion of carcasses missed by searchers and will be incorporated into mortality rates and analyses to account for detection efficiency bias. An analysis of detection efficiency will be documented in the first-year monitoring report in accordance with this BBMP.

4.1.3 CARCASS HANDLING PROTOCOL AND TRAINING

Operational personnel involved in the search for wildlife will be appropriately trained in handling and assisting with injured or deceased wildlife. All injured or deceased wildlife found during the first two years of operation will be reported to the Proposed Development's responsible officer.

Bats can carry many forms of diseases including Hendra virus and Australian Bat Lyssavirus. Extra precaution and care will need to be taken when handling bat species (Queensland Government, 2022). In this circumstance, professionals should be called to handle injured bat species. Information sources to contact in case of an injured bat include the RSPCA (1300 264 625) and the Department of Environment, Science and Innovation (1300 130 372).

Appropriate and contemporary advice on the best practice for movement of individuals will be provided by these organisations.

The following information is to be recorded if a carcass is detected during the carcass searches:

- Position of the carcass in relation to the WTG;
- Comments on the vegetation type and area where the carcass was located, including if the species was found on an access path or on the WTG hard-stand area;
- Details on the individual found such as species, age, sex, number of individuals, the injury description as well as the estimate time of death if found deceased. If the carcass is unable to be identified, this will be taken to appropriate facilities for DNA testing to be undertaken;
- Photos must be taken of the area and of the individual found. Such photos will need to be sent to a SQE within two business days so they can adequately undertake identification; and
- Weather details on the find date, as well as details taken of the weather conditions in the time preceding the find date of the carcass, including wind speeds, temperature and rainfall amounts.

The carcass found will need to be handled in accordance with the following procedure:

1. Carcass is to be immediately reported to the Proposed Development's Responsible Officer;
2. Once reported, it will be the responsibility of the Responsible Officer to organise for the retrieval and/or treatment of the individual. This will involve safe removal from the site with appropriate personal safety equipment to be worn by personnel. This personal safety equipment includes thick rubber gloves and a long-sleeved shirt, a face mask if possible and appropriate eye wear. The carcass should be placed in a plastic bag, then wrapped in newspaper and placed into a second plastic bag. The removal of the carcass from the area ensures that recounting of the same carcass does not occur at a later date. Labelling of the carcass plastic bag to ensure the species is easily identifiable later and all information is correct. This includes placing a completed datasheet with the above listed information into the outer plastic bag; and
3. The carcass bag will then be placed into an appropriate freezer compartment, likely within the Proposed Development's site office. This will keep the carcass for future examination if required by a SQE if the original retrieval was made by an unqualified operation staff member. Frozen specimens will also be able to be used for detectability trials at a later date.

It is noted that an *NC Act* authority, a Scientific Purposes Permit must be obtained in order to remove the carcasses from the Project Area. This will need to be obtained for the monitoring program and can be referred to in order to get more detail on the disposal methods of the carcasses.

4.2 BBMP PERSONNEL AND ASSOCIATED TRAINING REQUIREMENTS

All personnel involved in the implementation of the BBMP will be familiar with this BBMP, as well as with the relevant Proposed Development policies and procedures, and other important administrative matters (e.g., health and safety documents). The Proponent will be responsible for ensuring that suitably qualified and trained people are engaged to supervise and implement the formal monitoring program as defined in this BBMP. Beyond the formal period of monitoring, the Proponent will be additionally responsible for ensuring ongoing reporting of incidental finds and the engagement of relevant specialists where triggered by this BBMP.

Training will be provided to all personnel that will be undertaking carcass searches, scavenger trials, and detectability trials. Such training will be delivered by SQEs who are specialists in the field of bird and bat carcass retrievals. The training will include trial establishment, transect search techniques, selection of specific WTGs for monitoring, species identification, carcass handling practices and PPE management. The qualified ecologist will be involved in the initial search program of the WTGs to oversee and assist with the carcass search, handling and identification. So that the BBMP is being implemented and monitoring routinely performed to standard, the SQE will undertake an audit after the first 6 months of the commencement of the implementation of this BBMP.

The SQE will be available to identify any carcasses that Proposed Development personnel are unable to identify, either from frozen specimens or from photographs taken at the search area.

Training will be provided to assigned operational personnel which on how to properly prepare and handle carcasses and how to randomise the placement of carcasses in trial areas.

Scavenger trials will be developed by the SQE, who will supervise the searches undertaken by trained operational personnel.

The SQE will undertake data analysis and prepare the one year, three year and operational life monitoring reports.

5. BIRD AND BAT MONITORING REPORTING

It is proposed that a one-year monitoring report, a three-year monitoring report and a final monitoring report (end of operational life) will be prepared. Data that will be analysed and documented in the reports will align with the survey data requirements set out in Appendix 2 of the technical report Investigation of existing post-construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates (Moloney, Lumsden, & Smales, 2019). Further, other aspects will be reported on that are essential for adaptively managing and mitigating impacts to birds and bats. Ultimately, monitoring reports will document:

- Turbine details – details of the location, size and proximity to wildlife habitat for each turbine within a wind farm development;
- Results and interpretation of pre-operational and operational BBUS;
- Results of mortality monitoring, including scavenger trials and detectability trials;
- Incidental finds of carcasses outside of the mortality surveys;
- Records of any species occurrences, in accordance with the DoEE Guidelines for biological survey and mapped data (DoEE, 2018) using the species observation data template on the DCCEE website;
- Discussion of how the results of the report should impact management and mitigation measures;
- Descriptions of the search areas including the presence of any introduced flora and fauna (specifically feral cats and foxes) that may impact the carcasses or species; and
- Actualisation of any impact triggers or significant impact thresholds (see Section 6) and the implemented measures arising from this.

Data analysis will estimate mortality rates of birds and bats within the Project Area, considering standard error and variation. Appropriate software packages will be used to inform variables needed to be determined during the carcass, detectability and scavenger trials which will subsequently inform the survey design. At this stage, prior to construction and knowledge of precise turbines to be constructed, the following software packages and statistical principles are proposed for the Proposed Development, with specific variables to be measured and data input requirements (and associated assumptions) considered in the final monitoring design:

- Logistical regression (general liner modelling) to be used to determine searcher efficiency. This will account for significance;
- The proportion of the area searched to be estimated using the Monte-Carlo Simulation method as described in (Hull & Muir, 2010);
- Mortality will be estimated using the Hortvitz-Thompson style estimator from Huso (2011);
- Survival analysis (survival regression to account for interval censoring) to be calculated using Generalised Estimator (GenEst) (or similar). GenEst is used to estimate the total number of individuals that are present within an area in a given time period, when their detection probability may not be known. This program is used as counts of carcasses alone is not an accurate way to measure the true number of fatalities in an area due to those that may be missed in the process. This method also allows for comparisons across locations and years taking into account the rate of detection:

- GenEst includes tools for estimating searcher efficiency, carcass persistence, and other detection probability parameters from experimental field trials. GenEst is not an evidence of absence-type estimator and is not going to be used in circumstances where few carcasses are found. This is where the Evidence of Absence program will be adopted;
- Evidence of Absence – This program can be used in order to help determine potential fatalities which may have occurred, with respect to the survey effort, even in the absence of a carcass being located.

Statistical analyses will assist in determining potential significant differences across size categories of species, vegetation composition or across seasons.

6. MITIGATION MEASURES AND ENVIRONMENTAL OUTCOMES

This Section details the mitigation measures that will be implemented to reduce the likelihood and severity of impacts from the Proposed Development to birds and bats. Impact triggers, the decision-making framework and adaptive management, which are described in Section 7, provide a framework through which excessive impacts to birds and bats can be detected, so that additional mitigation measures can be implemented to reduce impacts. As such, mitigation measures will be reviewed throughout the operational phase of the Proposed Development.

If proposed changes to the mitigation measures are likely to result in a new or increased impact to any *EPBC Act* OR *NC Act* listed species (i.e. beyond minor variations or updates to the BBMP), impacts will need to be referred to the Minister in accordance with Section 143A of the *EPBC Act*, following a self-assessment.

The main causes of impact to listed species for the Proposed Development are considered as:

- Collision of birds and bats with blades of operating WTGs is likely to occur, with non-listed species most at risk. The avifauna species within the combined group of assessed listed birds, raptors and microbats with a risk level higher than 'negligible' are the following:
 - Listed threatened and/or migratory birds:
 - Fork-tailed swift (Moderate);
 - Glossy black cockatoo (south-eastern) (Low); and
 - White-throated needletail (Moderate);
 - Raptors:
 - Black kite (Low);
 - Black-shouldered kite (Low);
 - Brown falcon (Low); and
 - Wedge-tailed eagle (Low);
 - Bats:
 - Large-bent-wing bat (Moderate);
 - Northern free-tailed bat (Moderate);
 - White-striped free-tailed bat (Low); and
 - Yellow-bellied sheath-tailed bat (Low);
- Promotion of water and foraging resources that result in attracting birds and bats into the vicinity of the WTGs. This could result in higher rates of collision and injury/death. Nesting may occur close to WTGs;
- Lighting on WTGs and buildings causing an increase in bird and bat prey. This may result in increased bird and bat abundance in the vicinity of the WTGs and increase collision risk;
- Barotrauma on listed bat species associated with bats flying near WTGs;
- Direct habitat loss via construction of wind farm infrastructure; and
- Displacement (indirect habitat loss), avoidance of pre-occupied areas for bats and birds via construction and operation of the wind farm.

The management objectives, mitigation measures and controls to be used to reduce the likelihood and severity of these impacts are listed in Table 6-1. It also details the timing, measures of success for these controls, as well as corrective actions that will be implemented if the controls do not meet the defined criteria. Specifically, the management objectives aim to minimise the impact of mortality associated with collisions with WTGs. Despite these measures, residual risk remains in some circumstances.

Should operational bird and bat monitoring identify that additional measures are required, the example adaptive management mitigation measures discussed in Section 7 may be implemented.

TABLE 6-1 PROPOSED MITIGATION MEASURES, TIMINGS, PERFORMANCE CRITERIA AND CORRECTIVE ACTIONS

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
Mitigation measures to reduce risk – Foraging resources that result in attracting birds and bats into the vicinity of WTGs.	Birds of prey	Control of feral pests to reduce diet species for birds of prey, in particular wedge-tailed eagles.	Construction and operational phase	- Carcasses/carrion to be removed when found and this is to be reported in an incident report. All measures taken to reduce risk are to be recorded on the date they are implemented – in the same incident report; - No increase or continuation of bird/bat mortality due to grain or carcass and rabbit presence under WTGs; and - Bird and bat mortality to be low at unlit WTGs/infrastructure.	- Where mortality of birds due to presence of carcasses, rabbits or grain occurs, options will be undertaken to immediately rectify the problem, including increasing methods to reduce grain and/or carcass and rabbit occurrences around WTGs; - Increased consultation with landholders on grain-feeding location; and - Type and placement of lights will be reviewed in response to bird/bat mortality rates.
		- Carrion removal program to be considered as an option. Applies to carcasses found within 100 m either side of a WTG. Removal must be conducted by adequately trained personnel, including operations and construction staff, carcass searchers, and landholders (if trained). If a large number of pests are recognised as a problem near WTGs, integrated pest management will be required after consultation and cooperation of landholders; - Searches will be undertaken for the first two years of operation to define the extent (spatial and temporal)	Operational phase, to be reassessed after 3 years of operation.		

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
		and feasibility, of the carrion removal program. Searches will be for stock or introduced species and bird carcasses that may attract larger raptor species; - GPS locations and photographs must be taken of carcasses found within the Project Area. The safe disposal and handling options of cattle carcasses should be investigated before this program is considered a feasible option. This is to reduce site utilisation by predatory carnivorous bird species that feed on vertebrates such as kites, falcons, eagles and all potentially occurring birds of prey; and - Reporting on carcass removal based on Project's carcass removal register/data sheets.			

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
	Low-flying, high flying and canopy dwelling birds (herbivores and generalist species)	Subject to agreement with landholders, a system will be determined which will allow for grain feeders to be placed outside of a 200 m radius of the WTGs where possible. These grain feeders must be placed as practicable to avoid creating a collision risk for parrots and cockatoos.	Operational phase		
	Insectivorous birds and bats	- Where possible, and in accordance with Civil Aviation Safety Authority and Airservices safety requirements, the number of WTGs requiring lighting will be kept to a minimum; - Where WTGs are to be lit, consideration should be given to using radar activated steady red low intensity aviation hazard lighting; - Portable and temporary lighting is required to ensure the safety of workers;			

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
		- WTG blades will have low reflectivity finish/treatment; - Monitoring masts will have lighting aligned with State DA requirements; - Unnecessary lights will be switched off when not needed (building lights turned off when not in use); and - Where possible, and in accordance with Civil Aviation Safety Authority and Airservices safety requirements light flashing will be synchronised.			
Mitigation measures to reduce risk – Avoiding collision with WTGs	All bird and bat species	Lighting and deterrents – artificial lights on tall, man-made structures such as communication towers. Red strobe, red flashing and white strobe lights (to be used if lighting is required).	Operational phase	Avoidance of WTGs due to lighting and deterrents for birds and bats.	- Evaluate effectiveness of deterrents and upgrade or modify where applicable; and - Engage with ecologists and species experts to reassess risk levels and identify potential new technologies.
	Birds of prey	WTG design, where structurally feasible, will minimise the availability for raptor perches	Design phase	No observation of raptor perches on WTGs.	Consultation with DEECCW on further design to prevent perching.

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
		through use of smooth and rounded surfaces where possible.			
	All bird and bat species	- Hours and amount of artificial light and noisy machine operation will be minimised where safe and practical; and - Light meters investigated to monitor light pollution and ensure it stays at/below acceptable levels during works.	Construction and operational phase	Avoidance of WTGs due to lighting and deterrents for birds and bats.	- Cessation of unauthorised activity will occur and incidents reported; and - Corrective vegetation management will be undertaken if evidence of birds being attracted to foraging resources occurs.
	Generalist bird and bat species	Maintain slashed grass transitioning into low shrub cover surrounding WTG pad to minimise bird and bat foraging and to facilitate carcass counts/removal.	Operational phase		
	All bird and bat species	For WTG external lighting, use of red lights as opposed to white or yellow will be considered preferentially. Area lights are to be directed towards the ground, where safe to do so.			

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
Mitigation measures to reduce risk - Potential changes in species behaviour, flight patterns or site usage as a result of wind farm construction and operation.	High flying birds and birds of prey	- Areas identified as MNES habitat will be avoided as much as possible at the design and micro-siting stages; - Micro-siting of infrastructure will utilise existing clearance areas and avoid habitat fragmentation and patch isolation, with consideration of whether avoidance areas would still be connected to habitat in the broader landscape; - Development and implementation of management plans to reduce the potential impact of construction and operation phase activities; and - Development and implementation of monitoring, mitigation and adaptive management measures outlined in this BBMP.	During the design, construction and operational phases	No observed changes to bird/bat species presence in and utilisation of the Project Area as a result of the Proposed Development, identified following BACI monitoring principles.	Where changes to bird/bat species presence in and utilisation of the Project Area are observed during the first two years of commencement of operation (following BACI monitoring principles), adaptive management will be applied to identify potential causes of the changes and propose additional mitigation measures to limit impacts. Adaptive management is further outlined in Section 7.
Operational phase mortality monitoring	All bird and bat species	Mortality estimates to be made for each searched WTG for birds and bats. Such mortality estimates	Operational phase - for at least the first 10 years of	Mortality surveys to be undertaken at 50% (approximately 67) of the WTGs within areas identified	Where mortality monitoring results in impact triggers being

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
		to be made upon considering factors like detector efficiency trials and scavenger trials. These mortality estimates will be continually updated based on the information provided through WTG searches to identify trends and identify where impact triggers may eventually be exceeded; and Operational phase monitoring in response to any impact triggers and consultation with DCCEEW.	operation. Ongoing frequency assessed after 10 years (see Section 4.1 for more information).	as habitat for listed species, within the Project Area. WTGs that have been determined as high-risk WTGs will be prioritised. Reviews on locations will be undertaken after the first year of operation and updated if appropriate; - Scavenger and carcass detectability trials to be undertaken in accordance with the methods described in this BBMP; - Mortality estimates to be undertaken and analysed per the methods described in this BBMP. Such estimates will be included in monitoring reports; and - Responses to impact triggers will be reported and analysed by a SQE as described in this BBMP.	exceeded, corrective actions may include: - Undertaking an updated PVA to determine any trends in species impacts; and - Implementation of acoustic and visual deterrents as part of adaptive management (e.g. ultrasound acoustic devices) and detection systems (e.g. IdentiFlight®, Robin Radar Systems) measures on high-risk WTGs; - Low wind speed curtailment will be considered as part of adaptive management where high-risk WTGs are identified and other mitigation measures are not suitable or have not decreased the risk to MNES in an appropriate manner through the adaptive management process.
Monitoring reporting	All bird and bat species	Preparation and submission of monitoring	After the first year and three years of	Monitoring reports to be completed at allocated times, within three months	Where monitoring reports are not prepared, or lack information necessary,

Management Objective	Species and Species Group	Management Activities and Controls	Timing	Performance Criteria Management Success	Corrective Action
		reports to DETSI and DCCEEW; and If impact triggers are met, an extension to monitoring is considered as per the decision-making framework, and further reports will be prepared for each additional year of monitoring. Further details are outlined under Section 7.	operation, at the end of the operational lifespan. Further reports will be prepared for each additional year of monitoring if ongoing monitoring occurs.	of the years monitoring program completion; - Such monitoring reports will include: mortality estimates and carcass findings/locations, mitigation measure effectiveness or inefficiencies, incident reporting, any impact triggers and recommendations for ongoing monitoring activities etc; and - Ongoing monitoring reporting to occur based on an outcome of the two-year monitoring program included in this BBMP and by agreement between the landholder, Proponent and DETSI/DCCEEW.	this report/information is to be prepared and presented to DCCEEW as soon as reasonably practicable.

7. SPECIES IMPACT TRIGGERS AND ADAPTIVE MANAGEMENT

This section outlines the adaptive management decision making framework with respect to species-specific impact triggers associated with interactions with WTGs. How these tools are implemented will differ for listed (Section 7.2) and non-listed species (Section 7.2). Impact triggers have been prepared following the approach implemented by multiple BBMPs across Queensland, New South Wales and Victoria.

The Proponent will be responsible for ensuring implementation of this BBMP and the adaptive management approach. A SQE will support decision-making elements and provide advice where Regulator consultation (State and Commonwealth) is required.

7.1 LISTED THREATENED AND MIGRATORY SPECIES

7.1.1 IMPACT TRIGGERS

Impact triggers for listed threatened and migratory species have been defined with reference to previously approved BBMPs in Queensland, New South Wales and Victoria and the technical report Impacts on Birds and Bats from Onshore Wind Farms in Australia (Reid & Baker, 2025). The method to be implemented to monitor for birds and bat mortalities attributable to WTG will be the carcass search methodology described in Section 4.2. As such, the carcass search methodology will be used to identify if impact triggers are met.

The impact triggers defined below will apply for listed threatened and migratory species considered known, likely or as having the potential to occur in the Project Area with risk rating 'low' or above as per Section 3.2.2 (and threatened or migratory species later identified within the Project Area with a risk rating 'low' or above):

- **Trigger 1 (annual threshold):** indicates that mortality rates are progressing towards Trigger 2. The approval holder will undertake a review to determine why the threshold was reached, including re-assessment of the species site utilisation and determining which WTG/s contributed to the impacts on the species. Importantly, the approval holder will identify adaptive management measures, corrective actions and additional monitoring efforts that are likely to prevent or reduce deaths of the species to avoid meeting Trigger 1. These additional measures will be presented to DCCEEW for approval for any relevant MNES species, and to DETSI for any listed threatened species under the NC Act only;
- **Trigger 2 (0.05% of the population):** is a cumulative trigger based on generational time, that is met, indicates that the Proposed Development is progressing towards the Significant Impact Threshold. The approval holder must commence the adaptive management measures, corrective actions and additional monitoring efforts identified after meeting Trigger 1; and
- **Significant Impact Threshold (0.1% of the population):** is a cumulative trigger based on generational time, that if met, indicates that a significant impact has been reached. The approval holder must immediately cease operation of WTGs potentially attributable to reaching the Significant Impact Threshold during the ecologically relevant periods (e.g. diurnal shutdown during migratory period). The approval holder must not recommence operation during the ecologically relevant period of those WTGs unless approval is given from DCCEEW or DETSI.

The Significant Impact Threshold of mortality to 0.1% of a species population is derived from the *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* (DoE, 2015) which state that 0.1% of a species population is an 'ecologically significant proportion'. Where the Significant Impact Threshold is met, a significant impact is considered to have occurred. A SQE will be engaged to confirm species identification and conduct a Significant Impact Assessment against the EPBC Act Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (DoE, 2013).

A high-level review of each relevant species population has been used to identify the current, most accurate estimate of species population size to estimate this ecologically significant proportions of the species population.

Trigger 2 is utilised as an indicator that the Significant Impact Threshold may be actualised, so that adaptive management, corrective actions, and additional monitoring programs can be implemented to prevent the Significant Impact Threshold being met. Section 7.1.2 includes a discussion on the potential adaptive management, corrective actions, and additional monitoring programs that may be implemented should Trigger 2 be met.

Trigger 1 (Annual threshold) provides a metric by which mortality monitoring can be compared against, to determine if there is a chance that Trigger 2 may be actualised. If the Trigger 1 is met, then the decision-making framework discussed in Section 7.1.2 will be implemented to identify corrective actions that must be implemented if Trigger 2 is met. Trigger 1 is based on that species specific generation time, as per the *Impacts on Birds and Bats from Onshore Wind Farms in Australia* (Reid & Baker, 2025), so that Trigger 1 is species-specific and scientifically supported. Generational time is defined as the average interval between the birth of an individual and the birth of its offspring. Generational time can be used as an indication of the time required for a population to replace individuals lost to turbine collisions and have been used to identify the time frames for residual impact. Generational time is scored in the *Impacts on Birds and Bats from Onshore Wind Farms in Australia* (Reid & Baker, 2025), and upon review of this resource, the threatened and migratory birds and bats requiring impact triggers have been split into two generational timeframe categories:

- **10-year generation species:** cumulative mortalities over 10 years; and
- **5-year generation species:** cumulative mortalities over 5 years.

For 10-year generation species, Trigger 1 is Trigger 2 divided by 10. For 5-year generation species, their Trigger 1 is Trigger 2 divided by five. This means that species with a longer generation time have a lower Annual Threshold to account for their reproductive vulnerability.

Importantly, the 10-year or 5-year generational timeframe category also acts as the timeframe in which cumulative mortalities for that species are counted. For example, for a 5-year generation species, if two mortalities occur by the end of the five-year period (and does not otherwise meet Trigger 2 or the Significant Impact Threshold), then this mortality count will reset to zero for the next five year period. Similarly, 10-year generation species have a longer (10 years) cumulative mortality period

Table 7-1 presents the estimated generational time score for relevant species (Reid & Baker, 2025), and the associated generational timeframe category for each target species.

Table 7-2 compiles the impact triggers and Significant Impact Threshold for each relevant species based on the above discussion. It is important to note that triggers/thresholds may exhibit fluctuations through time as updated species population estimates become available. It is expected that contemporary information be used during an investigation, as required throughout the life of this BBMP.

TABLE 7-1 GENERATIONAL TIMEFRAMES FOR RELEVANT LISTED SPECIES

Target Species	Generational Time	Generational Timeframe Category
Glossy black cockatoo	8.5 – 15.4 years	10-year generation species
White-throated needletail	2.6 – 4.7 years	5-year generation species
Fork-tailed swift	2.6 – 4.7 years	5-year generation species

TABLE 7-2 IMPACT TRIGGERS AND SIGNIFICANT IMPACT THRESHOLDS FOR RELEVANT LISTED SPECIES

Species	Australian Population Estimate	Trigger 1 (annual threshold)	Trigger 2 (0.05% population)	Significant Impact Threshold
Short-lived species (cumulative over 5 years)				
Fork-tailed swift	100,000 ¹	25 mortalities	50 mortalities	100 mortalities
White-throated needletail	41,000 ²	4 mortalities	20 mortalities	41 mortalities
Long-lived species (cumulative over 10 years)				
Glossy black cockatoo	7,500 ³	4 individuals observed in RSA in Project Area	4 mortalities	8 mortalities

Population estimates derived from:

¹Referral guideline for 14 birds listed as migratory species under the EPBC Act (2015)

²The Action Plan for Australian Birds (2020)

³Conservation Advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo) (2022)

7.1.2 DECISION-MAKING FRAMEWORK AND ADAPTIVE MANAGEMENT

A decision-making framework has been developed to have a systematic workflow when implementing management measures and corrective actions. This decision-making framework aims to help achieve the environmental outcomes of the BBMP to promote a long-term reduction in the risk of turbine collision and barotrauma impacts on listed bird and bat species. This decision-making framework has been developed with consideration for Impacts on birds and bats from onshore wind farms in Australia (Reid & Baker, 2025).

If a carcass of a listed bird or bat species is detected, the following decision-making framework will be followed:

1. The bird or bat carcass must be immediately reported to the Proposed Development's Responsible Officer, including information such as the species type, the area where the species was found and any other contributing factors that appear appropriate. Photos must be taken of the carcass or injured species so that correct identification can be carried out. All deceased listed threatened and migratory birds and bats found in the Project Area will be reported to DETSI and/or DCCEEW (regardless of cause of death);
2. The following assessments will be immediately completed after the carcass is detected:
 - a. A SQE will undertake an analysis either in person or through analysis of the carcass and/or photographic evidence. The ecologist will assess whether the death/injury can be directly attributed to a WTG strike. Where there is conclusive evidence the death/injury is not related to WTG strike, no further action is required; and
 - b. Simultaneously to this, an assessment will be completed against the impact triggers and Significant Impact Threshold identified within Table 7-2. If a trigger or threshold has been met, the Proposed Development's Responsible Officer will report the trigger to DETSI or DCCEEW within five business days and the following actions will be immediately implemented. If a threshold has not been met, no further action is required;
3. If Trigger 1 is met, a SQE will:
 - a. Undertake a detailed investigation in order to determine the event and the location of the WTGs that caused the death or injury of the listed species. Further monitoring (fortnightly for six-weeks) will be completed to determine re-occurrences/extent of the impact;
 - b. Re-assess the species site utilisation using data collected from pre-operational and operational BBUS; and
 - c. Identify species-specific corrective actions that are likely to prevent or reduce deaths of the species to avoid meeting a significant impact. As part of the adaptive management strategy, a number of corrective actions may be considered, as detailed in Section 7.3:
 - i. Acoustics to discourage foraging birds at particular locations;
 - ii. Encourage species into alternative low-risk areas using social attraction techniques (decoys and audio playback systems);
 - iii. Encourage species into alternative low-risk areas by decreasing habitat quality surrounding WTGs (this will not involve any direct or indirect impact on existing habitat but rather is likely to be implemented by reducing excessive lighting or designing the Proposed Development with lighting features that are less likely to attract bird and bat prey species (insects), therefore lowering the quality of the aerial foraging habitat around the WTGs);
 - iv. Investigation of alternative stocking arrangements;
 - v. Installation of ultrasound acoustic devices;
 - vi. Installation of detection systems (e.g. IdentiFlight®, Robin Radar Systems);
 - vii. Increased mortality monitoring frequency;
 - viii. Moving grain and water sources away from identified WTGs (subject to agreement with landholder);

- ix. Reduce/alter lighting around WTGs;
 - x. Relocating/altering infrastructure providing roosting/nesting resources; and
 - xi. Low wind speed curtailment (cut-in speeds);
- d. Update the BBMP to incorporate the information obtained from the above assessments and present to DCCEEW for approval;
4. If Trigger 2 is met:
- a. Corrective actions identified within the updated BBMP will be implemented in order to ensure timely mitigation of the impact to the species;
 - b. Further monitoring of the effect of these additional corrective actions and their impact will be undertaken by a SQE to determine and report on their effectiveness. Outcomes of this monitoring will be reported in the monitoring reports that are prepared by the ecologist to the Proponent; and
 - c. As part of the adaptive management strategy, the BBMP will be updated to include any additional or adjusted corrective actions were required;
5. If the Significant Impact Threshold is met:
- a. A significant impact to the species has occurred. The Proponent must cease operation of WTGs identified as contributing to the death of the MNES (all WTGs with identified carcasses of the species and the five closest neighbours of these WTGs), during the ecologically relevant period for the species (e.g. diurnal shutdown during migratory period);
 - b. The Proponent must not recommence operation during the ecologically relevant period of those WTGs unless approval is given from DCCEEW or DETSI; and
 - c. Offsets may be required where the significant impact to the species cannot be effectively mitigated by other measures. Offsets may be in form of financial offsets or research-based offsets where an appropriate institution can undertake species specific research. Offsets will need to be considered and developed in accordance with EPBC Act Environmental Offsets Policy (DSEWPC, 2012). Any offset consultations will need to be undertaken with the relevant authority.

TABLE 7-3 POTENTIAL CORRECTIVE ACTION MITIGATION MEASURES UPON REACHING A LISTED SPECIES TRIGGER 2 OR SIGNIFICANT IMPACT THRESHOLD

Mitigation Measure	Potential Circumstance for Implementation	Timing for Implementation
Temporary species-specific diurnal shutdown procedures until re-operation approved	Species-specific shutdown procedures will be considered, for example: - Where Trigger 2 for the white-throated needletail is met, consideration and research into the shutdown of specific high impact WTGs during diurnal periods of the migratory species will occur. A shutdown period for the white-throated needletail is anticipated to be for a maximum period of eight weeks (in line with the migratory period that the species is present for in the area); and - For glossy black cockatoo, if a specific WTG or group of WTGs have been identified through collision monitoring as high-risk to glossy black cockatoo consider shutdown procedures to be implemented	In the event that the impact threshold or limit is reached for the species. Implemented as part of reaching Trigger 2 or the Significant Impact Threshold for relevant species.

Mitigation Measure	Potential Circumstance for Implementation	Timing for Implementation
	when activity is higher. This would involve identifying presence of foraging trees and breeding areas for the species (e.g. belah) and implement shutdown procedures during peak seasonal foraging (abundant belah seeds).	
Curtailment of individual high-risk WTGs to 4.5 m/s	A specific WTG or group of WTGs has been identified through collision monitoring as contributing to the loss of listed bird or bat species, with established impact triggers having been met or exceeded. In response, may be implemented under particular meteorological conditions or based on the ecological requirements of the affected species (e.g. time of day, migratory periods, or breeding seasons). It is noted that WTG curtailment as a mitigation measure will be considered by the Proponent only in the unlikely event that all other corrective actions prove ineffective. Utilising minimum turbine cut-in speeds of 4.5 m/s between dawn and dusk was shown to significantly reduce bat fatalities at an Australian windfarm (Bennett, et al., 2022), though it should be noted this project consisted of WTGs with a substantially lower hub height (80 m) when compared to the Proposed Development (WTG hub height up to 200 m). Where other mitigation measures are not suitable or have not decreased the risk to MNES in an appropriate manner, a wind speed of at least 4.5 m/s will be the initial curtailment speed adopted. Further to this, species-specific reviews of appropriate curtailment speeds will be undertaken, and alternative threshold wind speeds may be concluded to be more appropriate upon review of the determined curtailment approach. The species-specific elements to be considered will be the risk-level of impact to the species, species use of the area near the WTGs, behavioural characteristics as well as seasonality.	At appropriate times, following strikes to a threatened or migratory species (refer to triggers in Section 7.1). Potential implementation as part of reaching Trigger 2 or the Significant Impact Threshold where impacts identified for relevant species are likely to be mitigated with the use of temporary spatial WTG curtailment of relevant WTGs.
Implementation of acoustic and visual deterrents as part of adaptive management (e.g. ultrasound acoustic devices) and/or detection systems (e.g. IdentiFlight®, Robin Radar Systems)	Acoustic deterrents to help microbat avoidance of WTGs. Ultrasonic deterrent devices have been implemented and studied internationally, however the results and outcomes of such studies have varied and showed a general reduction of mortality associated with WTG strike with respect to microbats. However it is noted that such studies have varying success rate outputs. IdentiFlight®, Robin Radar Systems is another deterrent device that has been studied and shown to potentially reduce the WTG strike rates associated with bird and bat species. The system is known to identify and track birds, particularly sensitive species to impacts such a wedge-tailed eagle and work to prevent collisions with WTGs. It is noted that these acoustic deterrents will be further studied and investigated as to their effectiveness as potential measures for the Proposed Development. They	Potential implementation upon reaching Trigger 2 or the Significant Impact Threshold for relevant species are likely to be mitigated with the use of acoustic deterrents and/or IdentiFlight®, Robin Radar Systems.

Mitigation Measure	Potential Circumstance for Implementation	Timing for Implementation
	will be analysed and potentially implemented where evidence from the investigations shows that they will likely have a impact to reduce the impacts to bird and bat species, as a result of the Proposed Development.	
Offsetting impacts	Offsets will be required where the significant impact to the species cannot be effectively mitigated by other measures. Offsets may be in the form of financial offsets or research-based offsets where an appropriate institution can undertake species specific research. Offsets will need to be considered and developed in accordance with EPBC Act Environmental Offsets Policy (DSEWPC, 2012). Any offset consultations will need to be undertaken with the relevant authority.	Where the SIG 1.1 (DEWHA, 2013) assessment has concluded that the impact to the species upon the Significant Impact Threshold is significant and cannot be suitably offset by other corrective actions.
Turbine-Integrated Mortality Reduction (TIMR)	TIMR is a technology that has been designed to reduce microbat mortality across wind farms. It involves the restriction and curtailment approach of certain WTGs, based on low wind speeds. This is performed in order to reduce the risk to microbat species which are more likely to be impacted at such lower wind speeds. The Proposed Development will investigate and analyse the research and available information on the TIMR, and undertake an assessment to the practicality and effectiveness that it may have to reduce any identified impacts to microbat species, as a result of low wind speed WTG collisions at certain WTGs across the Project Area.	Potential implementation upon reaching Trigger 2 or the Significant Impact Threshold for relevant species are likely to be mitigated with the use of TIMR.

7.2 NON-LISTED (PROTECTED AND LOCALITY ABUNDANT) SPECIES

7.2.1 IMPACT TRIGGER REQUIREMENTS

The impact trigger for the non-listed species in this BBMP will be a total of five or more bat or bird carcasses of the same species that are recorded at the same WTG during two or more consecutive searches.

The definition of a significant impact to a non-listed threatened species is an impact that is likely to reduce the viability of the population of the species within that bioregion. Sometimes the population numbers for a species are not known or reported. In the case where such information is not publicly available, a SQE will undertake an assessment of the potential impact to a species in the bioregion to determine whether the impact will reduce population viability.

7.2.2 DECISION-MAKING FRAMEWORK

If an impact trigger is met for a non-listed bird or bat species for the Proposed Development, the following decision-making framework will be followed:

1. DCCEEW will be notified of the trigger exceedance event (including species, time and area) within five business days of the trigger event;
2. A SQE will undertake an analysis to determine if the impact trigger exceedance event will cause a significant impact on the viability of the population of a species within the bioregion. This assessment will take into account factors like the distribution of the species, known population size and habitat requirements, as well as any literature on specific threats to the species within the bioregion;
3. A report on the findings of the analysis will be prepared by the SQE and presented to the Proposed Development's Responsible Officer and subsequently presented to DCCEEW within three weeks of the impact triggering event (timing will be subject to change upon consultation with DCCEEW);
4. If the evaluation undertaken by the SQE reveals the impact trigger exceedance may lead to a significant impact to the viability of a population in the bioregion, species-specific monitoring will likely be recommended and implemented. These monitoring events (fortnightly for six-weeks) will need to be observed and reported on by the SQE, who will then determine if any additional mitigation measures are necessary to manage or reduce the potential for a significant impact upon the species. Such measures will be decided upon through the adaptive management approach described below; and
5. The investigations and mitigation measures recommended in the case of a significant impact will need to be included in the monitoring reports, in accordance with this BBMP.

7.3 SPECIFIC MANAGEMENT OBJECTIVES, ACTIVITIES, TIMING AND PERFORMANCE CRITERIA

Table 7-4 summarises management objectives, activities, timing and responsible parties for the implementation of this BBMP. This table should be referred to for reporting and monitoring purposes throughout the Proposed Development's lifetime.

TABLE 7-4 SUMMARY OF MANAGEMENT OBJECTIVES, ACTIVITIES, RESPONSIBLE PARTIES AND TIMING

Stage	Management Actions	Responsibility	Timing
Pre-Development	The two-stage impact and disturbance mitigation process will be implemented. Areas of remnant and regrowth vegetation will be avoided at the design and micro-siting phases.	Proponent	Design
	Design of a turbine with a blade sweep area to provide a collision-free foraging zone within the canopy and within a reasonable zone above the canopy.	Proponent	Design
	Locating turbines away from key bird and bat habitats (waterways and drainage lines).	Proponent	Design
	Pre-operational BBUS has been undertaken. Impact and control locations to be selected as part of the BACI designed bird surveys. CRM to be undertaken.	Proponent	Design
Pre-Construction	Pre-clearing surveys shall be undertaken prior to clearing efforts within the marked boundaries. These pre-clearance surveys will form part of the micro-siting process, which will closely analyse potential infrastructure locations. If potential habitat for bats, such as riparian areas and dense woodlands, occur in such locations, development layout will be adjusted. Control areas to be selected as part of BACI designed bird surveys. Surveys will then be undertaken in the control and impact areas prior to construction beginning. These surveys will include BUS such as point, waterbody and bird of prey surveys, in order to determine species presence in the RSA and bat surveys will be conducted via the use of echolocation call detectors and harp trapping.	Principal Contractor	Prior to Construction
	Targeted surveys to identify important habitat features of value to birds and bats in the Project Area, in particular, identify raptor nesting sites so that turbine location can be adjusted as part of micro-siting requirements to minimise collision risk.	Principal Contractor	Prior to Construction
Construction	All clearing shall be within clearly marked boundaries and in accordance with the Development Permit.	Principal Contractor	At all times
	Where trenching and excavations are created which may entrap fauna, suitable escape measures are put in place, and excavation are checked for fauna before backfilling.	Principal Contractor	At all times
	Include toolbox talks for site specific bird and bat information during the Proposed Development.	Principal Contractor	Daily

Stage	Management Actions	Responsibility	Timing
	Ensure appropriate waste management (lidded bins), including food scraps, to reduce potential for feral species to become established on-site.	Principal Contractor	At all times
Monitoring	Daily inspections by spotter / catcher during clearing, specifically hollow trees and roosting sites for birds and bats	Principal Contractor	Daily
	Weekly site inspections to review flora and fauna control measures during clearing and construction	Principal Contractor	Weekly
	Operational BBUS will be undertaken to inform BACI monitoring.	Principal Contractor	Bi-annually to Quarterly
	Mortality monitoring: at approximately 50% of turbines (approximately 67 WTGs) monthly for three years. Any extension to monitoring is considered under Section 7 of this document.	Ecologist and trained personnel	Monthly
	Scavenger and detectability trials to help inform mortality monitoring.	Ecologist and trained personnel	Biannually in first year
	Adaptive management and inclusion of additional mitigation measures as a result of impact triggers as a result of recommendations from a SQE.	Proponent	As required
	Low wind speed curtailment required when wind speeds are below the manufacturer's cut in speed of 3 m/s (i.e. feathered to prevent turning or other mechanism).	Proponent	At all times
Reporting	Sightings and incidents reported in daily pre-starts	Principal Contractor	Daily
	Fauna spotter-catcher will keep an inventory of any bird and bat species encountered with details of species, capture and release condition and capture and release GPS co-ordinates during construction. This also includes carcass reporting and notification.	Spotter Catcher	Daily
	Injured native fauna to be reported to Health, Safety, Environment Quality (HSEQ) Manager.	Site Manager	Within 24 hours

Stage	Management Actions	Responsibility	Timing
	Preparation of monitoring BBMP monitoring reports: after year one, three and end of operational lifetime.	Ecologist	Year 1, 3 and end of operational life
	Monitoring report after two years: estimates of mortality for bird and bat species across the monitoring period, considering detectability and scavenger trial results.	Ecologist	As required
Corrective Action	All near misses and incidents will be investigated to establish root cause. Where necessary corrective actions will be developed to improve existing processes.	All Personnel	As required

7.4 BBMP MONITORING AND IMPLEMENTATION RISKS

There are certain factors that may impact the carcass searches and monitoring for the BBMP. Such factors include weather events that restrict access to search areas, including significant flooding and storms (electrical activity) as well as heatwaves and bushfires. Other incidents include risks to health and safety like the unlikely event of a WTG suffering a malfunction in weather events or due to mechanical failures. Access issues may also play a contributing factor to the hindering of search efforts, especially if vegetation becomes unmanageable to traverse.

There will also be stop work cues in which operational and construction personnel may cease their operations due to safety concerns. In this unlikely event, all BBMP monitoring will also cease.

If these factors arise and monitoring per the usual BBMP cannot proceed, limitations or changes to the original BBMP will be recorded during reporting periods.

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APPENDIX A PMST



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

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

Report created: 13-Feb-2026

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	46
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

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

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site	In feature area
Narran lake nature reserve	400 - 500km upstream from Ramsar site	In feature area
Riverland	1100 - 1200km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1300 - 1400km upstream from 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
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In feature area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species			[<u>Resource Information</u>]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Erythroriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In buffer area only
FISH			
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area	In feature area
Mogurnda adspersa (Murray-Darling Basin population) Southern Purple Spotted Gudgeon (Murray-Darling Basin population) [94623]	Endangered	Species or species habitat may occur within area	In feature area
INSECT			
Hypochrysops piceatus Bulloak Jewel Butterfly [77869]	Critically Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
PLANT			
Acacia lauta Tara Wattle [4165]	Vulnerable	Species or species habitat may occur within area	In feature area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat may occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplacoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Leuzea australis listed as Rhaponticum australe Austral Cornflower, Native Thistle [9363]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Picris evae Hawkweed [10839]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prostanthera sp. Dunmore (D.M.Gordon 8A) [84115]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area
Xerothamnella herbacea [4146]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area
SNAIL			
Adclarkia cameroni Brigalow Woodland Snail [83886]	Endangered	Species or species habitat may occur within area	In feature area
Adclarkia dulacca Dulacca Woodland Snail [83885]	Endangered	Species or species habitat may occur within area	In buffer area only
Listed Migratory Species [Resource Information]			
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat may 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
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area	In feature area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals [Resource Information]				
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Development of Existing Coal Seam Gas Fields	2008/4398		Post-Approval	In buffer area only
Controlled action				
Expansion of Coal Seam Gas Fields	2009/4974	Controlled Action	Post-Approval	In feature area
Expansion Of Coal Seam Gas Operations	2010/5344	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Upgraded sewerage infrastructure in the Helensvale/Coomababah catchment	2004/1427	Not Controlled Action	Completed	In buffer area only

Bioregional Assessments			[Resource Information]
SubRegion	BioRegion	Website	Buffer Status
Maranoa-Balonne-Condamine	Northern Inland Catchments	BA website	In feature area

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 is 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 on the contents of this report.

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 point locations and environmental data layers.

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 when time permits.

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 breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

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

Acknowledgements

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

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

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

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

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APPENDIX B LOO

MSES BIRD AND BAT LIKELIHOOD OF OCCURENCE

TABLE B - 1: THREATENED SPECIES KNOWN, LIKELY OR POTENTIAL TO OCCUR WITHIN THE PROJECT AREA SUMMARY

Scientific Name	Common name	NC Act
Known		
<i>Stagonopleura guttata</i>	Diamond firetail	V
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V
Likely		
<i>Hirundapus caudacutus</i>	White-throated needletail	V
Potential		
<i>Aphelocephala leucopsis</i>	Southern whiteface	V
<i>Gallinago hardwickii</i>	Latham's snipe	V
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V
<i>Apus pacificus</i>	Fork-tailed swift	SLC

TABLE B - 2: MSES SPECIES LIKELIHOOD OF OCCURRENCE

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
Threatened Birds						
<i>Anthochaera phrygia</i>	Regent honeyeater	CE	CR	0	Occurring in box-ironbark woodland and eucalypt woodlands (sometimes found along riparian zones). Breeding habitat: Preference to nest in large mature trees with rough bark, e.g. ironbarks, sheoaks (<i>Casuarina</i>) and rough-barked apple (<i>Angophora</i>). Foraging habitat: Nectivorous species, taking nectar from eucalypts and mistletoe. However, have a preference for larger trees (often linked to high water soils and riparian zones) as they have higher rates of nectar.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Project Area does not contain box-ironbark woodland preferred by the species. - No recent records in Project Area or Locality.
<i>Aphelocephala leucopsis</i>	Southern whiteface	V	V	1	This species inhabits open woodlands (containing <i>eucalyptus</i> and <i>acacias</i>) with a moderate understory of shrubs and grasses, as this species forages on the ground amongst leaf litter. The species is largely confined to the south-west of the Mitchell Grass Downs. Breeding habitat: This species builds large bulky domed nest of grass, bark and roots, usually in a hollow or crevice, although sometimes in low bushes. Foraging habitat: Favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter.	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Suitable habitat does occur in the Project Area. - Recent record in Locality from 2024 from a roadside.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V, Mi	V	0	Prefers habitat on muddy edges of freshwater wetlands or brackish wetlands. Can be found at dams inland. Will often occupy coastal mudflats when ephemeral terrestrial wetlands have dried out. Breeding habitat: Does not breed in Australia. Foraging habitat: Foraging habitat is at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. Also among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often in hypersaline environments. After rain, they may forage in paddocks of short grass, well away	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Potential for foraging associated with farm dams in the Project Area, but no roosting or breeding habitat present. - No recent records in Project Area or Locality.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					from water. They may forage on coastal mudflats at low tide, and move to freshwater wetlands near the coast to feed at high tide. Roosting habitat: Roosting occurs at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. Occasionally, they roost on sandy beaches, stony shores or on rocks in water.	
<i>Calidris ferruginea</i>	Curlew sandpiper	CE, Mi	CR	0	This species is 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. Occasionally they are recorded around floodwaters. Breeding habitat: This species does not breed in Australia. Foraging habitat: Forage at the edges of shallow pools and drains of intertidal mudflats and sandy shores. At high tide, they forage among low sparse emergent vegetation, such as saltmarsh, and sometimes forage in flooded paddocks or inundated salt flats. Occasionally they forage on wet mats of algae or waterweed, or on banks of beach-cast seagrass or seaweed. Roosting habitat: This species roost in open situations with damp substrate, especially on bare shingle, shell, or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh.	Unlikely to occur: • The Project Area coincides with the likely modelled SPRAT distribution. • Potential for foraging associated with farm dams in the Project Area. • No recent records in Project Area or Locality.
<i>Calyptrorhynchus lathamii lathamii</i>	Glossy black cockatoo (south-eastern)	V	V	6	They are uncommon but widespread. They can be found from Mitchell, Queensland, through New South Wales and onto Victoria. Their distribution is continuous through the forested parts of the Great Dividing Range but becomes more scattered inland.	Known to Occur: • The Project Area coincides with the likely modelled SPRAT distribution • Foraging habitat present in the Project Area.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Breeding habitat: They are hollow nesters, utilising large hollows in both living and dead eucalypt trees. 1) >8 m above ground; 2) located in branches >30 cm in diameter; 3) branch or stem no more than 45° from vertical; and 4) minimum entrance diameter of >15 cm. Foraging habitat: This species feed almost exclusively on the seeds of sheoaks (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>), usually relying on one or two species within a region. In south-east Queensland and north-east New South Wales, they show preference for black sheoak (<i>A. littoralis</i>) and forest sheoak (<i>A. torulosa</i>).	- Recent records in locality. - Observations of the species in the Project Area in February 2024, February 2025 and July 2025.
<i>Climacteris picumnus victoriae</i>	Brown treecreeper (south-eastern)	V	V	0	The subspecies mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. The subspecies is not usually found in woodlands with a dense shrub layer, and it is absent from heavily degraded woodlands and steep rocky hills. Breeding habitat: Hollows in standing dead or live trees and tree stumps are essential for nesting. Foraging habitat: The subspecies forages both on the ground and in mature live and dead trees, primarily eating invertebrates, small reptiles or on occasion sap form selective trees.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Habitat in the Project Area is generally too shrubby, or if not, fragmented. - No recent records in Project Area or Locality.
<i>Erythrotriorchis radiatus</i>	Red goshawk	E	E	0	Occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Riverine forests are also used frequently. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. Breeding habitat: The red goshawk 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.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Limited suitable habitat in the Project Area due to a lack of tall, in-tact riverine forests. - No recent records in Project Area or Locality.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Foraging habitat: Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the goshawk requires for prey.	
<i>Falco hypoleucos</i>	Grey falcon	V	V	0	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Foraging habitat: Occurs near wetlands where surface water attracts prey. Breeding habitat: 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; peak laying season is in late winter and early spring; two or three eggs are laid.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Project Area is not considered arid enough to be suitable for the species. - No recent records in Project Area or Locality.
<i>Gallinago hardwickii</i>	Latham's snipe	V, Mi	V	0	In Australia the species occurs in permanent and ephemeral wetlands up to 2000 m above sea-. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Breeding habitat: Does not breed in Australia. Foraging habitat: characterised by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation).	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Project Area contains potential habitat in the form of farm dams for foraging. - No recent records in Project Area or Locality.
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V	1	The squatter pigeon (southern) habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by <i>Eucalyptus spp.</i>, <i>Corymbia spp.</i> or <i>Callitris spp.</i> Additionally, they also favour remnant regrowth or partly modified vegetation communities that are within 3 km of water bodies. Breeding habitat: Breeding habitat occurs on stony rises on sandy, gravelly soils, within 1 km of a suitable, permanent waterbody (including farm dams and watercourses). Foraging habitat: Natural foraging habitat for the species is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i>, <i>Corymbia</i>,	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Project Area contains suitable habitat for both breeding and foraging. - Recent record in Locality from 2021 from a roadside - No observation of species in Project Area.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					<i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3 km of a suitable, permanent, or seasonal waterbody. Dispersal habitat: Dispersal habitat is any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies.	
<i>Grantiella picta</i>	Painted honeyeater	V	V	0	This species is sparsely distributed throughout its range. Notably, populations move alongside mistletoe flowering and fruiting events as this species is highly specialised in consuming mistletoe fruit (sometimes nectar) during breeding season. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips. Breeding habitat: The species appears to prefer mistletoe as a nest substrate and selects nest sites in habitats where mistletoe prevalence and parasitism rates are high. Foraging habitat: The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Mistletoe is present; however, the Project Area lacks large abundances suitable for the species. - No recent records in Project Area or Locality. - Based on lack of recent records, observations and quantity of mistletoe it is unlikely this species inhabits the Project Area.
<i>Hirundapus caudacutus</i>	White-throated needletail	V, Mi	V	2	According to Higgins (1999), this species occurs over most types of habitat, but 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 they are less commonly recorded flying above woodland (as cited in TSSC, 2019). Whilst rare, they have been recorded on wooded ends of ridges, roosting after dark high in the eucalypt tree canopies (Tarburton, 1993). Breeding habitat; this species does not breed in Australia. Roosting habitat: the species is noted to roost in tall mature forests and woodlands amongst dense foliage and in hollows often associated with ridgelines. Foraging habitat: the species almost always will fly aerially at 'cloud level' and forage over farmland, heathland and mudflats.	Likely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - Preferred foraging habitat is present in the form of wooded areas (remnant and regrowth) as well as open farmland. - Recent records in Locality from as recent as 2021. Records are mostly associated with State Forest.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Lathamus discolor</i>	Swift parrot	CE	E	0	Species over-winters in mainland Australia. On the mainland the swift parrot disperses widely to forage on flowers and psyllid lerps in Eucalyptus species, with the majority being found in Victoria and New South Wales (TSSC 2016).	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - No foraging habitat as the species is highly selective in its foraging areas. - No recent records in Project Area or Locality.
<i>Neophema chrysostoma</i>	Blue-winged parrot	V	V	0	Blue-winged Parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Limited suitable grassy woodlands and wetlands. - No recent records in Project Area or Locality.
<i>Rostratula australis</i>	Australian painted snipe	E	E	0	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Foraging and roosting habitat: Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter. Breeding habitat: Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Potential for foraging and roosting near farm dams present in the Project Area, but no breeding habitat present. - No recent records in Project Area or Locality.
<i>Stagonopleura guttata</i>	Diamond firetail	V	V	4	Occurs in eucalypt, acacia and casuarina woodlands, open forests and farmlands with scattered trees. Species prefers lower tree densities, high grass cover and low coarse woody debris. Species is largely sedentary but may also be locally nomadic.	Known to Occur: The Project Area coincides with the likely modelled SPRAT distribution.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
						- Preferred habitat of scattered woodlands with grass cover is present in the Project Area. - Multiple recent records within Project Area/locality from as recent as 2021 in remnant and non-remnant vegetation. High spatial uncertainty associated with these records.
<i>Turnix melanogaster</i>	Black-breasted button-quail	V	V	0	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. They may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes. Optimum habitat is located on highly fertile soils. It is believed that the highly fertile soils promote rapid leaf growth on plants. During dry periods, much of the foliage then drops to the ground thus maintaining the deep leaf litter layer which is crucial to the foraging requirements of the species. Known TECs it is associated with are the semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - No suitable habitat present. - No recent records in Project Area or Locality.
Threatened Bats						
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	E	E	0	This species is predominantly cave dwelling and requires the presence of foraging and roosting habitat in an environment to sustain a population. Foraging habitat includes large woodlands and fertile valleys however within Queensland this species has been observed foraging along ridge crests and upper slopes of escarpments. Foraging habitat: Foraging in highly fertile valleys and plains. As well as moderately tall woodlands along watercourses.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution - No preferred habitat of sandstone cliffs in proximity to woodland valley is present - No recent records in Project Area or Locality

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
					Breeding habitat: Little information is available on the breeding behaviour for the species (most studies focused in NSW). Roosting habitat: cliffs, escarpments and rocky outcrops are utilised for roosting (typically of sandstone composition or rhyolite) that contain caves, overhangs and cracks.	Species was not recorded on Anabats during field surveys
<i>Nyctophilus corbeni</i>	Corben's long-eared bat	V	V	0	This microbat species has a scattered distribution mostly within the Murray-Darling Basin, but with some records outside of this area. It is more common in box, ironbark and cypress pine woodland on the western slopes and plains. Its stronghold seems to be the Pilliga scrub. It roosts in tree hollows, crevices and under loose bark. Foraging habitat: Foraging tends to be located around patches of trees in the landscape. Breeding habitat: Little information is available on the breeding behaviour for the species. Roosting habitat: Roosting behaviour is located within dead trees including ironbark's, cypress and bulloke.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Suitable habitat does occur in the form of cypress-pine and buloke woodland to forest. - Targeted surveys for the species meeting survey guidelines were completed and failed to capture this species but did capture other <i>Nyctophilus</i> species. - No recent records in Project Area or locality.
Migratory Birds						
<i>Apus pacificus</i>	Fork-tailed swift	Mi	SLC	1	They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. Foraging habitat: They forage aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water. Breeding habitat: The fork-tailed swift does not breed in Australia.	Potential to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Suitable foraging habitat over ironbark woodlands or sparse to open woodlands where the species may aerially forage. - Recent record in Locality.

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Actitis hypoleucos</i>	Common sandpiper	Mi	SLC	0	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. Breeding habitat: Does not breed in Australia. Foraging habitat: this species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. Roosting habitat: Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Low-quality habitat present in the Project Area in the form of farm dams. - No recent records in Project Area or Locality.
<i>Calidris melanotos</i>	Pectoral sandpiper	Mi	SLC	0	In Australasia, the pectoral sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Breeding habitat: Does not breed in Australia. Foraging habitat: Forages in shallow water or soft mud at the edge of wetlands Roosting habitat: prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Low-quality habitat present in the Project Area in the form of farm dams. - No recent records in Project Area or Locality.
<i>Cuculus optatus</i>	Oriental cuckoo	Mi	SLC	0	It mainly inhabits forests, occurring in coniferous, deciduous and mixed forest. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground. It is usually secretive and hard to see.	Unlikely to occur: - The Project Area coincides with the likely modelled SPRAT distribution. - Suitable vegetation communities occur in the Project Area, but not considered potential habitat due to a lack of records in the broader region. - No recent records in Project Area or Locality

Scientific Name	Common Name	EPBC Act	NC Act	Recent Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Motacilla flava</i>	Yellow wagtail	Mi	SLC	0	Species is associated with water and inhabit well-watered open grasslands and wetland fringes (DoE, 2015). Breeding habitat: This species does not breed in Australia. Roosting habitat: Species forages among mangroves and other dense vegetations. Foraging habitat: Moist open grasslands and the edges of wetlands.	Unlikely to occur: • The Project Area coincides with the likely modelled SPRAT distribution. • Lack of well-watered grasslands or wetlands in the Project Area. • No recent records in Project Area or Locality.
<i>Pandion haliaetus</i>	Osprey	Mi		0	Species is a fish predator and therefore require extensive areas of open water. Inland wetland habtiats inhabited by the species include estuaries, brooad rivers, reservoirs and larke lakes and wetlands.	Unlikely to occur: • The Project Area coincides with the 'may occur' modelled SPRAT distribution • Lack of suitably open waterbodies in the Project Area • No recent records in Project Area or Locality



APPENDIX C SURVEY ADEQUACY

Target Species and EPBC Act listing	Recommended Survey Technique / Effort (Survey Guidelines)	Survey Technique / Effort	Comment on Survey Adequacy
Listed Threatened Birds			
Diamond firetail (<i>Stagonopleura guttata</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) - There are no targeted survey guidelines for this species; - Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended; and Active searches for microhabitat features is recommended.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 29 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records. May 2025: 33 BUS individual BUS; and - Opportunistic records. July 2025: 32 BUS individual BUS; and - Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including suitable habitat of grassy eucalyptus woodlands and grasslands. No observation of the species occurred during field surveys however suitable habitat was detected within the Study Area.

Target Species and EPBC Act listing	Recommended Survey Technique / Effort (Survey Guidelines)	Survey Technique / Effort	Comment on Survey Adequacy
Glossy black cockatoo (south-eastern) (<i>Calyptorhynchus lathami lathami</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) - Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended; and - Active searches for microhabitat features is recommended. Targeted species survey guidelines: glossy black cockatoo (<i>Calyptorhynchus lathami</i>) (Hourigan, Glossy black-cockatoo, <i>Calyptorhynchus lathami</i>. Targeted species survey guideline, 2012). - Diurnal bird surveys – conducted on foot by walking transects particularly in areas with <i>Allocasuarina</i> trees, waterbodies suitable for drinking sites and large hollow-bearing eucalypts (during the breeding season); and - Searching for foraging and nesting signs – walking transects searching for discarded, chewed she-oak seed cones ('orts') beneath <i>Allocasuarina</i> trees. The minimum survey effort for glossy black cockatoo (south-eastern) is: - Diurnal bird surveys – five hours for a minimum of one day; and Searching for foraging and nesting signs – 20 hours for a minimum of four days.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 29 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records. May 2025: 33 BUS individual BUS; and - Opportunistic records. July 2025: 32 BUS individual BUS; 30 hollow transects; and - Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including woodlands of <i>Allocasuarina</i> spp. and <i>Casuarina</i> spp., by suitably qualified ecologists. Survey effort was conducted during breeding season (March-August) and no evidence of hollow utilization was captured Numerous observations of the species.

Target Species and EPBC Act listing	Recommended Survey Technique / Effort (Survey Guidelines)	Survey Technique / Effort	Comment on Survey Adequacy
Latham's snipe (<i>Gallinago hardwickii</i>) Vulnerable and Migratory	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) • There are no targeted survey guidelines for this species however DEWHA have advice of surveying efforts for shorebirds; • Observation using telescope from vantage points overlooking suitable foraging or roosting habitat at the appropriate period of the tidal cycle; and • Diurnal area search in appropriate habitat in and around the Study Area, including flushing surveys in particular for snipe and painted snipe. Species Profile and Threats Database: Gallinago hardwickii — Latham's Snipe, Japanese Snipe (DCCEEW, 2024) • There are no targeted survey guidelines for this species however DCCEEW have advice of surveying efforts; • Latham's Snipe can be surveyed by performing area searches or line transects in suitable habitat; • Mist-netting can also be used to capture birds, and potentially to derive capture-recapture estimates to estimate population sizes; • In Australia, surveys should be conducted between October and February, which is the period between the species' arrival and departure in Australia; and Surveys are best conducted during the day, as the snipe appears to disperse from roosting areas at dusk and then return before or at dawn.	December 2023: • 77 quaternary vegetation assessments; • 46 habitat quality assessments; • 22 individual BUS; and • Opportunistic records. February 2024: • 35 quaternary vegetation assessments; • 24 habitat quality assessments; • 28 individual BUS; and • Opportunistic records. December 2024: • 3 quaternary vegetation assessments; • 2 habitat quality assessments; • 29 individual BUS; and • Opportunistic records. February/March 2025: • 27 individual BUS; and • Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including waterbodies. Surveys were conducted during the appropriate species migration periods to Australia (DCCEEW, 2024). No observation of the species occurred during field surveys however potential habitat was detected within the Study Area.

Target Species and EPBC Act listing	Recommended Survey Technique / Effort (Survey Guidelines)	Survey Technique / Effort	Comment on Survey Adequacy
Southern whiteface (<i>Aphelocephala leucopsis</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) • There are no targeted survey guidelines for this species; • Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended; and Active searches for microhabitat features is recommended.	December 2023: • 77 quaternary vegetation assessments; • 46 habitat quality assessments; • 22 individual BUS; and • Opportunistic records. February 2024: • 35 quaternary vegetation assessments; • 24 habitat quality assessments; • 28 individual BUS; and • Opportunistic records. May 2024: • 44 individual BUS; and • Opportunistic records. July/August 2024: • 33 individual BUS; and • Opportunistic records. December 2024: • 3 quaternary vegetation assessments; • 2 habitat quality assessments; • 29 individual BUS; and • Opportunistic records. February/March 2025: • 27 individual BUS; and • Opportunistic records. May 2025: • 33 BUS individual BUS; and • Opportunistic records. July 2025: • 32 BUS individual BUS; and • Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including open woodlands (containing eucalypts). No observation of the species occurred during field surveys however potential habitat was detected within the Study Area.

Target Species and EPBC Act listing	Recommended Survey Technique / Effort (Survey Guidelines)	Survey Technique / Effort	Comment on Survey Adequacy
Squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) Vulnerable	Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017) - Squatter pigeon (southern) surveys should be conducted by area searches or transect surveys in suitable habitat; - Additionally, flushing surveys are considered likely to be useful, however are not the preferable method; and Optimal survey conditions are likely between May to late October, and juveniles are predominantly detected during June.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. May 2024: 44 individual BUS; and - Opportunistic records. July/August 2024: 33 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 29 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records. May 2025: 33 BUS individual BUS; and - Opportunistic records. July 2025: 32 BUS individual BUS; and - Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including patches of eucalypt woodlands and open forests close to permanent bodies. No observation of the species occurred during field surveys however suitable habitat was detected within the Study Area.

Target Species and EPBC Act listing	Recommended Survey Technique / Effort (Survey Guidelines)	Survey Technique / Effort	Comment on Survey Adequacy
White-throated needletail (<i>Hirundapus caudacutus</i>) Vulnerable and Migratory	Species Profile and Threats Database: <i>Hirundapus caudacutus</i> – White-throated needletail (DCCEEW, 2019) - There are no targeted survey guidelines for this species however DCCEEW have advice of surveying efforts; - The species are primarily aerial and occur at great elevations. When flying at lower altitudes they are readily detectable; - Systematic surveys are difficult due to the species mobility and ability to cover immense distances in a day; and Any surveys must be conducted between October and April in northern and eastern Australia, and between December and March in south-eastern Australia.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 29 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including vantage points. Records within 50 km of the Study Area are concentrated in December to February (ALA, 2025), meaning that these are the optimal times for survey. Surveys coincided with this time, with BUS undertaken in December and February. No observation of the species occurred during field surveys however suitable aerial foraging habitat was detected within the Study Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Listed migratory birds			
Fork-tailed swift (<i>Apus pacificus</i>) Migratory	Referral guideline for 14 birds listed as migratory species under the EPBC Act (DoE, 2015) There are no specific survey guidelines for the fork-tailed swift, however, it is recommended that a two-hectare survey in 20 minutes is undertaken in preferred habitat (i.e., moist forests, eucalyptus or Brigalow woodlands); and During annual migration periods, standardised timed surveys should be conducted, and observers should listen for calls as well as sightings.	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 22 individual BUS; and - Opportunistic records. February 2024: 35 quaternary vegetation assessments; 24 habitat quality assessments; 28 individual BUS; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 29 individual BUS; and - Opportunistic records. February/March 2025: 27 individual BUS; and - Opportunistic records.	<i>Survey effort considered adequate</i> Survey effort was conducted in a range of habitats throughout the Study Area by suitably qualified ecologists, including vantage points. Surveys were conducted during the appropriate species migration periods to Australia (DoE, 2015). No observation of the species occurred during field surveys however suitable habitat was detected within the Study Area.

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
Listed threatened mammals			
Corben's long-eared bat (<i>Nyctophilus corbeni</i>) Vulnerable	Survey guidelines for Australia's threatened bats (DEWHA, 2010) Corben's long-eared bat should be surveyed using capture techniques. Passive acoustic detection – Bat detectors can be used to identify areas used by long-eared bats, even if they cannot be identified to species level. Acoustic detection can then be followed up with an appropriate level of trapping; and	December 2023: 77 quaternary vegetation assessments; 46 habitat quality assessments; 4 Anabats deployed for 4 consecutive nights (total 16 nights); 1 Anabat deployed for 3 consecutive nights (total 3 nights); and - Opportunistic records. February 2024:	<i>Survey effort considered adequate</i> Diurnal habitat quality assessments were conducted, which identified potential foraging and roosting habitat present within the Study Area. Anabats were deployed in suitable habitat of well-vegetated areas such as eucalypt forest

Target Species	Survey Guidelines and Requirements	Sampling Technique / Effort	Comment on Survey Adequacy
	Trapping – Mist nets and harp traps should be placed in woodland, mallee, and forest, given that the species forages below the tree canopy, often to ground level. Equipment should be placed both in open flyways and within cluttered vegetation. Effort for this method is not precisely stated, but studies have found that the use of 20 or more traps a night for increasing successful detection of bat species (Schulz, 1999). Planning guidance State code 23: Wind farm development (DSDILGP, 2023) State Code 23 recommends the use of survey techniques including mist nets and/or bat detection systems that record and analyse echolocation calls of bats.	35 quaternary vegetation assessments; 24 habitat quality assessments; 1 Anabat deployed for 4 consecutive nights (total 4 nights); 1 Anabat deployed for 88 nights (total 88 nights); 9 person hours of spotlighting over 2 nights; and - Opportunistic records. May 2024: 16 person hours of spotlighting over 2 nights; and - Opportunistic records. December 2024: 3 quaternary vegetation assessments; 2 habitat quality assessments; 10 Anabats deployed for 17 consecutive nights (total 17 nights); 4 harp traps deployed over 5 nights (total 14 nights); and - Opportunistic records. February/March 2025: 4 harp traps deployed over 5 nights (total 20 nights); and - Opportunistic records.	and in the appropriate seasons, totaling 281 recording nights. A <i>Nyctophilus</i> sp. call was recorded as 'possible' at detectors deployed across the Study Area. 36 harp trapping nights were carried out and did not trap the species, but captured other <i>Nyctophilus</i> spp.



APPENDIX D COMPILED BIRD SPECIES LIST

SUMMARY

	Order	Family	Genus	Species
Birds	21	54	111	162
Micro-bats	1	3	9	26

BIRD SPECIES LIST

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
Accipitriformes	Accipitridae	Aquila	<i>Aquila audax</i>	wedge-tailed eagle		✓	✓
		Milvus	<i>Milvus migrans</i>	black kite		✓	
		Elanus	<i>Elanus axillaris</i>	black-shouldered kite		✓	
				Kite spp.		✓	
		Circus	<i>Circus assimilis</i>	spotted harrier		✓	
		Haliastur	<i>Haliastur sphenurus</i>	whistling kite		✓	
Aegotheliformes	Aegothelidae	Aegotheles	<i>Aegotheles cristatus</i>	Australian owlet-nightjar			✓
Anseriformes	Anatidae	Anas	<i>Anas gracilis</i>	grey teal		✓	✓
			<i>Anas superciliosa</i>	Pacific black duck		✓	✓
		Chenonetta	<i>Chenonetta jubata</i>	Australian wood duck		✓	✓
		Dendrocygna	<i>Dendrocygna eytoni</i>	plumed whistling-duck		✓	✓
			<i>Duck spp.</i>			✓	
		Aythya	<i>Aythya australis</i>	hardhead		✓	
		Malacorhynchus	<i>Malacorhynchus membranaceus</i>	pink-eared duck		✓	

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
Apodiformes	Apodidae	Hirundapus	<i>Hirundapus caudacutus</i>	white-throated needletail	V; VU		✓
Caprimulgiformes	Eurostopodidae	Eurostopodus	<i>Eurostopodus mystacalis</i>	white-throated nightjar			✓
Casuariiformes	Casuariidae	Dromaius	<i>Dromaius novaehollandiae</i>	emu			✓
Charadriiformes	Turnicidae	Turnix	<i>Turnix maculosus</i>	red-backed buttonquail			✓
			<i>Turnix variegatus</i>	painted button-quail			✓
	Burhinidae	Burhinus	<i>Burhinus grallarius</i>	bush-stone curlew			✓
	Charadriidae	Elseyornis	<i>Elseyornis melanops</i>	black-fronted dotterel		✓	✓
		Vanellus	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		✓	✓
Ciconiiformes	Ciconiidae	Ephippiorhynchus	<i>Ephippiorhynchus asiaticus</i>	black-necked stork			✓
Columbiformes	Columbidae	Geopelia	<i>Geopelia humeralis</i>	bar-shouldered dove			✓
			<i>Geopelia placida</i>	peaceful dove		✓	✓
			<i>Geopelia sp.</i>	-			✓
	Columbidae	Ocyphaps	<i>Ocyphaps lophotes</i>	crested pigeon		✓	✓
		Phaps	<i>Phaps chalcoptera</i>	common bronzewing			✓
Coraciiformes	Alcedinidae	Dacelo	<i>Dacelo novaeguineae</i>	laughing kookaburra		✓	✓
			<i>Dacelo leachii</i>	blue-winged kookaburra		✓	
		Todiramphus	<i>Todiramphus sanctus</i>	sacred kingfisher			✓
	Meropidae	Merops	<i>Merops ornatus</i>	rainbow bee-eater		✓	✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
Cuculiformes	Cuculidae	Cacomantis	<i>Cacomantis pallidus</i>	pallid cuckoo			✓
			<i>Cacomantis variolosus</i>	brush cuckoo			✓
		Chalcites	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		✓	✓
			<i>Chalcites lucidus</i>	shining bronze- cuckoo			✓
			<i>Chalcites osculans</i>	black-eared cuckoo			✓
		Eudynamys	<i>Eudynamys orientalis</i>	eastern koel		✓	✓
		Scythrops	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo			✓
		<i>Centropus</i>	<i>Centropus phasianinus</i>	Pheasant coucal		✓	
Falconiformes	Falconidae	Falco	<i>Falco cenchroides</i>	nankeen kestrel		✓	
			<i>Falco berigora</i>	brown falcon		✓	
			<i>Falco longipennis</i>	Australian hobby		✓	
Galliformes	Phasianidae	Coturnix	<i>Coturnix pectoralis</i>	stubble quail			✓
Gruiformes	Rallidae	Rallidae	<i>Porphyrio porphyrio</i>	Purple swamphen		✓	
		Tribonyx	<i>Tribonyx ventralis</i>	black-tailed native-hen			✓
Passeriformes	Passeridae	<i>Passer</i>	<i>Passer montanus</i>	Eurasian tree sparrow	I		
	Acanthizidae	Acanthiza	<i>Acanthiza apicalis</i>	inland thornbill		✓	✓
			<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		✓	✓
			<i>Acanthiza nana</i>	yellow thornbill		✓	✓
			<i>Acanthiza pusilla</i>	brown thornbill			✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
			<i>Acanthiza reguloides</i>	buff-rumped thornbill		✓	✓
			<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill			✓
			<i>Acanthiza spp.</i>			✓	
		Gerygone	<i>Gerygone fusca</i>	western gerygone			✓
			<i>Gerygone olivacea</i>	white-throated gerygone		✓	✓
		Pyrrholaemus	<i>Pyrrholaemus sagittatus</i>	speckled warbler		✓	✓
		Smicrornis	<i>Smicrornis brevirostris</i>	weebill		✓	✓
	Acrocephalidae	Acrocephalus	<i>Acrocephalus australis</i>	Australian reed-warbler			✓
	Artamidae	Artamus	<i>Artamus cinereus</i>	black-faced woodswallow			✓
			<i>Artamus leucorhynchus</i>	white-breasted woodswallow		✓	✓
			<i>Artamus personatus</i>	Masked Woodswallow		✓	
		Cracticus	<i>Cracticus nigrogularis</i>	pied butcherbird		✓	✓
			<i>Cracticus torquatus</i>	grey butcherbird		✓	✓
		Gymnorhina	<i>Gymnorhina tibicen</i>	Australian magpie		✓	✓
		Strepera	<i>Strepera graculina</i>	pied currawong		✓	✓
	Campephagidae	Coracina	<i>Coracina novaehollandiae</i>	black-faced cuckooshrike		✓	✓
			<i>Coracina papuensis</i>	white-bellied cuckoo-shrike			✓
		Edolisoma	<i>Edolisoma tenuirostre</i>	common cicadabird			✓
		Lalage	<i>Lalage tricolor</i>	white-winged triller			✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
	Climacteridae	Cormobates	<i>Cormobates leucophaea</i>	white-throated treecreeper		✓	✓
			<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)			✓
		Climacteris	<i>Climacteris picumnus</i>	brown treecreeper		✓	
	Corcoracidae	Corcorax	<i>Corcorax melanorhamphos</i>	white-winged chough		✓	✓
		Struthidea	<i>Struthidea cinerea</i>	apostlebird		✓	✓
	Corvidae	Corvus	<i>Corvus coronoides</i>	Australian raven		✓	✓
			<i>Corvus orru</i>	Torresian crow		✓	✓
	Dicaeidae	Dicaeum	<i>Dicaeum hirundinaceum</i>	mistletoebird		✓	✓
	Estrildidae	Neochmia	<i>Neochmia temporalis</i>	red-browed finch			✓
			<i>Neochmia modesta</i>	plum-headed finch		✓	
		Taeniopygia	<i>Taeniopygia bichenovii</i>	double-barred finch		✓	✓
			<i>Taeniopygia guttata</i>	zebra finch		✓	
	Motacillidae	Anthus	<i>Anthus novaeseelandiae</i>	Australian pipit		✓	
	Alaudidae	Mirafr	<i>Mirafr javanica</i>	Horsfield's Bushlark		✓	
	Hirundinidae	Hirundo	<i>Hirundo neoxena</i>	welcome swallow		✓	✓
		Petrochelidon	<i>Petrochelidon nigricans</i>	tree martin		✓	✓
			<i>Petrochelidon ariel</i>	fairy martin		✓	
	Locustellidae	Cincloramphus	<i>Cincloramphus mathewsi</i>	rufous songlark			✓
			<i>Cincloramphus cruralis</i>	brown songlark		✓	

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
	Sturnidae	Acridotheres	<i>Acridotheres tristis</i>	common myna		✓	
		Sturnus	<i>Sturnus vulgaris</i>	common starling		✓	
	Maluridae	Malurus	<i>Malurus cyaneus</i>	superb fairy-wren		✓	✓
			<i>Malurus lamberti sensu lato</i>	variegated fairy-wren		✓	✓
			<i>Malurus leucopterus</i>	white-winged fairy-wren			✓
			<i>Malurus spp.</i>			✓	
			<i>Malurus melanocephalus</i>	Red-backed fairy-wren		✓	
	Meliphagidae	Acanthagenys	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		✓	✓
		Caligavis	<i>Caligavis chrysops</i>	yellow-faced honeyeater		✓	✓
		Entomyzon	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		✓	✓
		Gavicalis	<i>Gavicalis virescens</i>	singing honeyeater			✓
		Lichenostomus	<i>Lichenostomus melanops</i>	yellow-tufted honeyeater			✓
		Lichmerasongla	<i>Lichmera indistincta</i>	brown honeyeater		✓	✓
		Manorina	<i>Manorina flavigula</i>	yellow-throated miner			✓
			<i>Manorina melanocephala</i>	noisy miner		✓	✓
		Melithreptus	<i>Melithreptus brevirostris</i>	brown-headed honeyeater			✓
			<i>Melithreptus gularis</i>	black-chinned honeyeater		✓	
		Myzomela	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		✓	✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
		Nesoptilotis	<i>Nesoptilotis leucotis</i>	white-eared honeyeater		✓	✓
		Philemon	<i>Philemon citreogularis</i>	little friarbird		✓	✓
			<i>Philemon corniculatus</i>	noisy friarbird		✓	✓
		Plectorhyncha	<i>Plectorhyncha lanceolata</i>	striped honeyeater		✓	✓
		Ptilotula	<i>Ptilotula fusca</i>	fuscous honeyeater			✓
			<i>Ptilotula penicillata</i>	white-plumed honeyeater		✓	✓
	Monarchidae	Grallina	<i>Grallina cyanoleuca</i>	magpie-lark		✓	✓
		Myiagra	<i>Myiagra inquieta</i>	restless flycatcher		✓	✓
			<i>Myiagra rubecula</i>	leaden flycatcher		✓	✓
			<i>Myiagra spp.</i>			✓	
	Neosittidae	Daphoenositta	<i>Daphoenositta chrysoptera</i>	varied sittella		✓	✓
	Oriolidae	Oriolus	<i>Oriolus sagittatus</i>	olive-backed oriole		✓	✓
	Pachycephalidae	Colluricincla	<i>Colluricincla harmonica</i>	grey shrike-thrush		✓	✓
		Pachycephala	<i>Pachycephala pectoralis</i>	golden whistler		✓	✓
			<i>Pachycephala rufiventris</i>	rufous whistler		✓	✓
	Pardalotidae	Pardalotus	<i>Pardalotus punctatus</i>	spotted pardalote			✓
			<i>Pardalotus striatus</i>	striated pardalote		✓	✓
	Petroicidae	Eopsaltria	<i>Eopsaltria australis</i>	eastern yellow robin		✓	✓
		Microeca	<i>Microeca fascinans</i>	jacky winter		✓	✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
		Petroica	<i>Petroica goodenovii</i>	red-capped robin		✓	✓
	Pomatostomidae	Pomatostomus	<i>Pomatostomus temporalis</i>	grey-crowned babbler		✓	✓
	Rhipiduridae	Rhipidura	<i>Rhipidura albiscapa</i>	grey fantail		✓	✓
			<i>Rhipidura leucophrys</i>	willie wagtail		✓	✓
	Zosteropidae	Zosterops	<i>Zosterops lateralis</i>	silveryeye		✓	✓
Pelecaniformes	Ardeidae	Ardea	<i>Ardea intermedia</i>	medium egret			✓
			<i>Ardea pacifica</i>	white-necked heron		✓	✓
			<i>Ardea spp.</i>			✓	
			<i>Ardea alba</i>	Great egret		✓	
		Egretta	<i>Egretta novaehollandiae</i>	white-faced heron		✓	✓
	Pelecanidae	Pelecanus	<i>Pelecanus conspicillatus</i>	Australian pelican		✓	✓
	Threskiornithidae	Platalea	<i>Platalea flavipes</i>	yellow-billed spoonbill			✓
		Threskiornis	<i>Threskiornis spinicollis</i>	straw-necked ibis		✓	
			<i>Threskiornis molucca</i>	Australian white ibis		✓	
Podargiformes	Podargidae	Podargus	<i>Podargus strigoides</i>	tawny frogmouth			✓
Podicipediformes	Podicipedidae	Poliocephalus	<i>Poliocephalus poliocephalus</i>	hoary-headed grebe			✓
		Tachybaptus	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		✓	✓
	Cacatuidae	Cacatua	<i>Cacatua galerita</i>	sulphur-crested cockatoo		✓	✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Observation	WildNet Records
Psittaciformes		Eolophus	<i>Eolophus roseicapilla</i>	galah		✓	✓
		Nymphicus	<i>Nymphicus hollandicus</i>	cockatiel			✓
		Cacatua	<i>Cacatua sanguinea</i>	little corella		✓	
		Calyptorhynchus	<i>Calyptorhynchus lathami lathami</i>	Glossy black-cockatoo	V; VU	✓	
	Psittacidae	Alisterus	<i>Alisterus scapularis</i>	King parrot		✓	
	Psittaculidae	Aprosmictus	<i>Aprosmictus erythropterus</i>	red-winged parrot		✓	✓
		Neophema	<i>Neophema pulchella</i>	turquoise parrot			✓
		Platycercus	<i>Platycercus adscitus</i>	pale-headed rosella		✓	✓
		Psephotus	<i>Psephotus haematonotus</i>	red-rumped parrot		✓	✓
		Trichoglossus	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet			✓
			<i>Trichoglossus moluccanus</i>	rainbow lorikeet		✓	
		Polytelis	<i>Polytelis swainsonii</i>	superb parrot		✓	
Strigiformes	Strigidae	Ninox	<i>Ninox boobook</i>	southern boobook			✓
			<i>Ninox connivens</i>	barking owl			✓
Suliformes	Phalacrocoracidae	Microcarbo	<i>Microcarbo melanoleucos</i>	little pied cormorant		✓	✓
		Phalacrocorax	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant		✓	
			<i>Phalacrocorax varius</i>	pied cormorant		✓	
	Anhingidae	Anhinga	<i>Anhinga novaehollandiae</i>	Australasian darter		✓	✓

MICRO-BAT SPECIES LIST

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records
Chiroptera	Emballonuridae	Saccolaimus	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat		definite	✓
	Vespertilionidae	Chalinolobus	<i>Chalinolobus gouldii</i>	Gould's wattled bat		definite	✓
			<i>Chalinolobus morio</i>	Chocolate wattled bat		definite	
			<i>Chalinolobus nigrogriseus</i>	Hoary wattled bat		definite	
			<i>Chalinolobus picatus</i>	Little pied bat		definite	
		Nyctophilus	<i>Nyctophilus gouldi</i>	Gould's long-eared bat			✓
			<i>Nyctophilus spp.</i>				✓
			<i>Nyctophilus corbeni</i>	Corben's long-eared bat	V; VU	possible	
			<i>Nyctophilus geoffroyi</i>	Lesser long-eared bat		possible	
			<i>Nyctophilus gouldi</i>	Greater long-eared bat		possible	
		Miniopterus	<i>Miniopterus orianae oceanensis</i>	Large bent-wing bat		definite	
		Scotorepens	<i>Scotorepens balstoni</i>	Inland broad-nosed bat		Probable	✓
			<i>Scotorepens greyii</i>	little broad-nosed bat		Definite	✓
			<i>Scotorepens spp.</i>			Probable	✓
			<i>Scotorepens spp. (Parnaby)</i>	central-eastern broad-nosed bat			✓
		Scoteanax	<i>Scoteanax rueppellii</i>	Greater-broad nosed bat		Definite	
		Vespadelus	<i>Vespadelus spp.</i>				✓

Order	Family	Genus	Scientific Name	Common Name	Status	Field Survey Records	WildNet Records
			<i>Vespadelus trougtoni</i>	Large forest bat		Probable	
			<i>Vespadelus vulturinus</i>	little forest bat		Definite	✓
			<i>Vespadelus braverstoki</i>	Inland forest bat		Definite	
			<i>Vespadelus regulus</i>	Southern forest bat		Probable	
	Molossidae	Austronomus	<i>Austronomus australis</i>	white-striped freetail bat		Definite	✓
		Mormopterus	<i>Mormopterus petersi</i>	inland free-tailed bat			✓
			<i>Mormopterus ridei</i>	eastern free-tailed bat			✓
			<i>Mormopterus spp.</i>				✓
		Ozimops	<i>Ozimops lumsdenae</i>	Northern free-tailed bat		Definite	
			<i>Ozimops petersi</i>	Eastern free-tailed bat		Definite	
			<i>Ozimops ridei</i>	Eastern free-tailed bat		possible	



APPENDIX E ACOUSTIC BAT REPORTS

Bat Call Analysis Report

Cattle Creek Project

Prepared for ERM

Prepared by:

The logo for Green Tape SOLUTIONS, featuring the company name in a green serif font with 'SOLUTIONS' in a smaller, spaced-out sans-serif font below it.

Green Tape
SOLUTIONS

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Document Records - Quality

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FILED AS	ME23108_Bat report_Cattle Creek

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Version A	25/01/2024	First draft	OA, Ecologist	KM Principal Ecologist	Client
Version B	15/03/2024	Final Draft	OA, Ecologist	KM Principal Ecologist	Client
Version C	27/06/2024	Post second survey – add analysis and results	OA, Ecologist	KM Principal Ecologist	Client
Version D	11/07/2024	Feedback from client	OA, Ecologist	KM Principal Ecologist	Client
Version E	17/02/2025	Post Third survey – add analysis and results	KM Principal Ecologist	KM Principal Ecologist	Client

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I.0 Introduction

I.1 Background

Green Tape Solutions were commissioned to undertake bat call analysis for the Cattle Creek project located near Dalby in Queensland.

I.2 Scope of Work

The specific scope of works for this report includes the following:

- Outline the methodology used to analyse the microbat call within the subject site; and,
- Present the findings of all of the bat call surveys conducted at the project site.

2.0 Methodology

2.1 Capture Technique

Microbat calls were sampled using Anabat Swift detectors and Anabat Chorus detectors (Titley Electronics). Passive monitoring surveys were undertaken:

- from 4th to 8th December 2023; and,
- from 13th February to 10th May 2024; and,
- from 2nd to 19th December 2024.

The original call files display Australian Eastern Standard Time. The data was analysed using Anabat Insight.

Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Ultrasonic call monitoring surveys on anabat detectors were conducted using full-spectrum fitted with omnidirectional ultrasonic microphone.

2.2 Call Identification

Anabat recordings were analysed using Anabat software (Anabat Insight). Identifications were made by categorising call shape and frequency, with a species match given in consideration to region, known bat distributions, and habitats present. The focus of the bat surveys was to assess the presence of bat species found within the Project Area, and to assess the potential for rare and threatened species to occur.

Call identification for this dataset was based on call keys and descriptions published for Queensland (Reinhold *et al.*, 2001) and New South Wales (Pennay *et al.*, 2004).

Species' identification was further refined using the probability of occurrence of each species based on their geographic distribution (Churchill, 2008, Van Dyck and Strahan, 2008). Species nomenclature used in this report follows Churchill (2008).

The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and,
- **Possible** - call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

2.3 National Standard

The format and content of this report complies with the nationally accepted standards for the interpretation and reporting of Anabat and Songmeter data (Reardon, 2003), which is currently available from the Australasian Bat Society at www.ausbats.org.au.

3.0 Results

3.1 Total Species Recorded

The majority of calls were considered to be of medium to good quality calls.

The February 2024 survey suffered from some data issues. One device (CH7) has no usable data, this may have been caused by the device not writing properly or an SD card fault. Another device (CH25) had a corrupted SD card with no data available for analysis. Therefore, only two devices were successfully analysed for the Feb-May 2024 survey.

A total of 12,846 sequence files were analysed. A proportion of these files (850) in this dataset contained background noise or resulted in poor quality calls that did not provide bat calls for analysis. While some call sequences were recognised as bat calls, the quality was not sufficient to assign species identification.

The location of each detector, including both the locality and GPS coordinates, is included in **Table 1**.

A summary of the species identified through bat call analysis is provided in **Table 2**. The total number of calls per detector is also given in **Table 2**, this number is indicative of bat activity but may still include some background noise or poor quality calls which were not identifiable.

Table 1: Detector locations

Survey period	Detectors	Coordinates	Locality
February 2024	ANA3	-27.702657, 150.756848, 340m	West of Cecil Plains
	ANA14	-27.661068, 150.808747, 314	West of Cecil Plains
	ANA20	-27.597992, 150.863270, 351 m	West of Cecil Plains
	CH07	-27.632507, 150.751617, 373 m	West of Cecil Plains
	ANA16	-27.559062, 150.925633	West of Cecil Plains
	CH10 (Feb 2024)	-27.626486, 150.705521, 336 m	West of Cecil Plains
	CH1 (May 2024)	-27.559488, 150.816025, 440 m	West of Cecil Plains
December 2024	AS01	-27.617290,150.753767	West of Cecil Plains
	AS02	-27.681790,150.737860	West of Cecil Plains
	Chorus X	-27.653133,150.867142	West of Cecil Plains
	Chorus 1	-27.542521,150.982605	West of Cecil Plains
	Chorus 3	-27.709749,150.739548	West of Cecil Plains

Survey period	Detectors	Coordinates	Locality
	Chorus 6	-27.663570,150.690704	West of Cecil Plains
	Chorus 9	-27.661674,150.808090	West of Cecil Plains
	Chorus 10	-27.668999,150.720856	West of Cecil Plains
	Chorus 18	-27.625948,150.779541	West of Cecil Plains
	Chorus 24	-27.536877,150.920853	West of Cecil Plains

Table 2: Summary of Bat Call Analysis 2023-2024

			Dec 2023					Feb 2024	May 2024
Species	NC Act	EPBC Act	ANA3	ANA14	ANA20	CH07	ANA16	CH10	CH1
Total Calls			390	92	204	369	10447	425	919
<i>Austronomus australis</i>	LC	NOC			Definite	Definite			Definite
<i>Chalinolobus gouldii</i>	LC	NOC	Definite		Definite		Definite	Definite	Definite
<i>Chalinolobus morio</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	
<i>Chalinolobus nigrogriseus</i>	LC	NOC	Probable		Probable	Definite	Definite	Probable	Definite
<i>Chalinolobus picatus</i>	LC	NOC	Definite	Definite			Definite	Probable	Probable
<i>Miniopterus orianae oceanensis</i>	LC	NOC	Probable	Definite	Definite	Definite	Definite	Definite	Definite
<i>Nyctophilus corbeni</i>	V	V	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Nyctophilus geoffroyi</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Nyctophilus gouldi</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Ozimops lumsdenae</i>	LC	NOC	Definite		Definite		Definite		Probable
<i>Ozimops ridei</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Probable
<i>Saccolaimus flaviventris</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Scotorepens balstoni</i>	LC	NOC	Probable			Probable	Probable		Probable
<i>Scotorepens greyii</i>	LC	NOC	Definite	Definite	Possible	Possible	Definite	Definite	
<i>Scotorepens sp. (Parnaby)</i>	LC	NOC	Possible	Possible	Probable	Probable	Possible	Probable	
<i>Vespadelus troughtoni</i>	LC	NOC		Probable	Probable	Probable	Probable		Possible
<i>Vespadelus vulturnus</i>	LC	NOC	Definite	Probable			Definite	Definite	Definite

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

Table 3: Summary of Bat Call Analysis December 2024

			Dec 2024 (Device names and device serial numbers)									
Species	NC Act	EPBC Act	AS01 (669177)	AS02 (669196)	CH1 (661657)	CH3 (661650)	CH6 (661631)	CH9 (661629)	CH10 (661665)	CH18 (661632)	CH24 (661634)	CH (661663)
Total Calls			8762	5069	11427	1900	7675	1418	10123	1206	17844	5148
<i>Austronomus australis</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Chalinolobus gouldii</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Chalinolobus morio</i>	LC	NOC			Definite		Definite		Definite		Definite	Definite
<i>Chalinolobus nigrogriseus</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite				
<i>Chalinolobus picatus</i>	LC	NOC			Definite	Definite		Definite				
<i>Miniopterus orianae oceanensis</i>	LC	NOC	Definite		Definite		Definite	Definite	Definite	Definite	Definite	Definite
<i>Nyctophilus corbeni</i>	V	V		Possible	Possible	Possible			Possible	Possible		Possible
<i>Nyctophilus geoffroyi</i>	LC	NOC		Possible	Possible	Possible			Possible	Possible		Possible
<i>Nyctophilus gouldi</i>	LC	NOC		Possible	Possible	Possible			Possible	Possible		Possible
<i>Ozimops lumsdenae</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Ozimops petersi</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Ozimops ridei</i>	LC	NOC	Possible	Possible	Possible	Possible	Definite	Definite	Possible	Possible	Definite	Definite
<i>Saccolaimus flaviventris</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Scoteanax rueppellii</i>	LC	NOC	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite	Definite
<i>Scotorepens balstoni</i>	LC	NOC	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable
<i>Scotorepens greyii</i>	LC	NOC	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable	Probable

			Dec 2024 (Device names and device serial numbers)									
Species	NC Act	EPBC Act	AS01 (669177)	AS02 (669196)	CH1 (661657)	CH3 (661650)	CH6 (661631)	CH9 (661629)	CH10 (661665)	CH18 (661632)	CH24 (661634)	CH (661663)
<i>Scotorepens sp. (Parnaby)</i>	LC	NOC	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible
<i>Vespadelus regulus</i>	LC	NOC			Probable	Probable		Probable	Probable	Probable	Probable	
<i>Vespadelus trougtoni</i>	LC	NOC	Probable	Probable	Possible	Possible		Possible	Possible	Possible	Possible	
<i>Vespadelus vulturnus</i>	LC	NOC			Possible	Possible		Possible	Possible	Possible	Possible	

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

3.2 Samples of Calls / Sequences Files

Samples of call extracted from the dataset for each species identified is provided in the following figures.

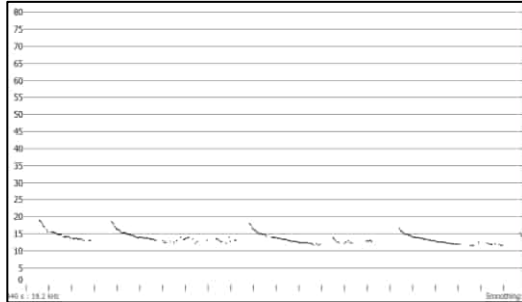
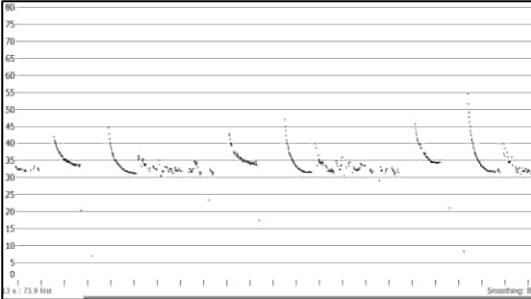
Species	Calls	Known distribution (Extract from Ausbats maps from Australian Bat Society)
Figure 1: <i>Austronomus australis</i> Definite call. This bat is easily recognised by its constant frequency calls range in bandwidth from 10.5 to 15 kHz (Pennay <i>et al.</i>, 2004).		
Figure 2: <i>Chalinolobus gouldii</i> Definite call. This species has a curved shape call with characteristic frequency 28 to 34kHz. Pulse alternates in frequency and mostly down-sweeping tail or no tail.		

Figure 3: *Chalinolobus morio*

Definite call.

C. morio has a down-sweeping tail curved pulse with characteristic frequency 47.5 to 53 kHz. It has often a very brief characteristic section. Species that overlap in frequency (*Vespadelus troughtoni*, *V. pumilus* and *V. vulturnus*) but all have up-sweeping tails.

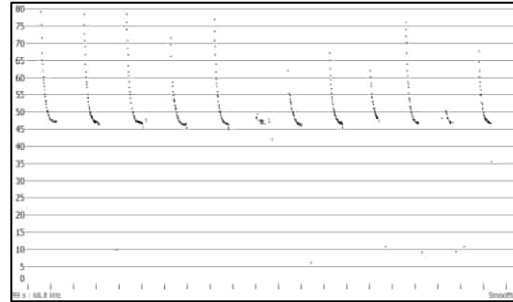


Figure 4: *Chalinolobus nigrogriseus*

Definite call.

This species has a curved shape pulse with characteristic frequency between 37 to 40 kHz. Usually with no tail or occasionally up sweeping tail. *C. nigrogriseus* have relatively longer characteristic and tail sections, usually 2/3 or more of the total pulse (Pennay et al 2004).

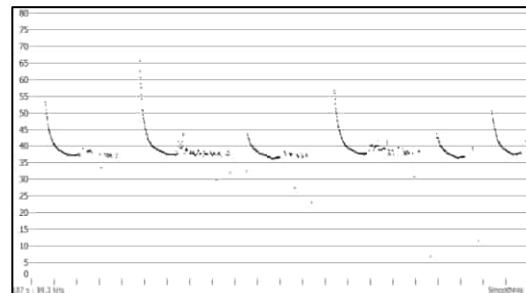


Figure 5: *Chalinolobus picatus*

Definite call.

The call is composed of alternate curved pulses without a tail or short up-sweeping tail when in search phase. Average characteristic frequency 38 to 42 kHz. Every second pulse is stepped-up by about 2 kHz.

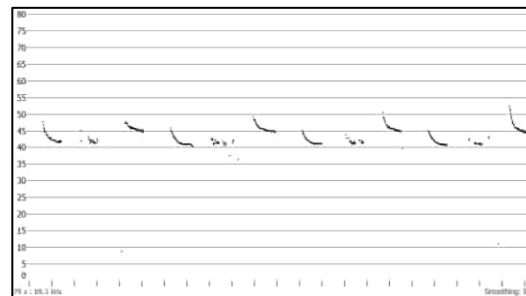


Figure 6: *Miniopterus orianae oceanensis*

Definite call.

The species call is characterised by its long curved pulse with a small down-sweeping tail and its frequency between 43-47kHz (Reinhold, 2001).

Pulse shape and time between calls usually variable within a sequence.

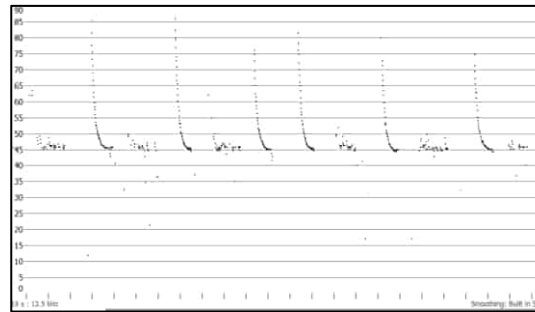
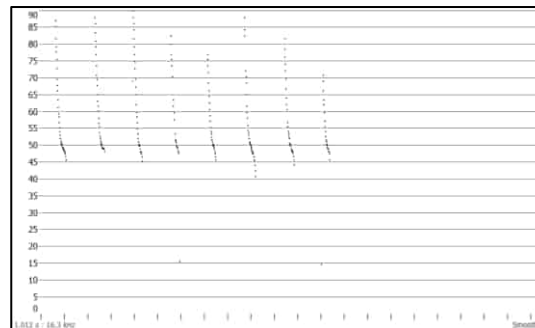


Figure 7: *Nyctophilus spp*

Possible call.

This species displays a near-vertical pulse, characteristic frequency between 80 and 35KHz (Pennay *et al*, 2004).

The species from this genus cannot be distinguished from each other. There are 3 species that are known to occur in the project area.



N. corbeni



N. geoffroyi



N. gouldi

Figure 8: *Ozimops lumsdenae*

Definite call.

Characteristic frequency higher than 22 and lower than 24kHz. *O. lumsdenae* pulse can be confused with *S. flaviventris*. However, the latest rarely have calls above 22kHz. *O. lumsdenae* reference calls have pulse rising in frequency and can get up to 27kHz.

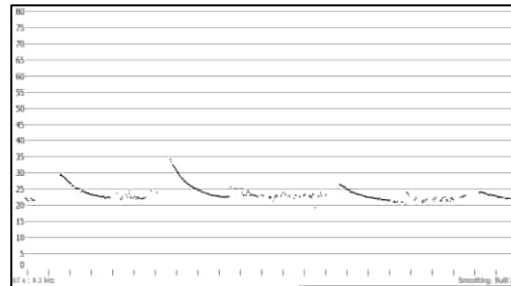


Figure 9: *Ozimops petersi*

Possible call.

This species has flat pulse with a characteristic frequency 29 to 31.5 kHz. Unless calling at lower than 30.5 kHz, it is indistinguishable from *Ozimops ridei*.

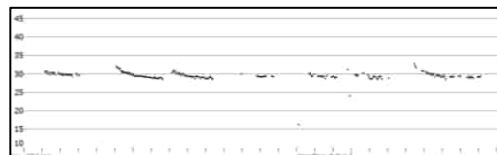
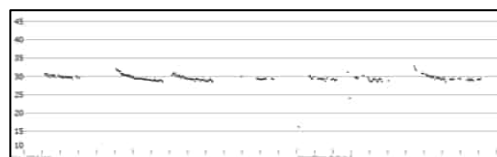


Figure 10: *Ozimops ridei*

Possible call.

O. ridei calls are flat and sometimes a bit curved with frequency a bit lower than 30kHz. Characteristic frequency of this species is between 28 to 36 kHz. Calls in the same frequency range as *Micronomus norfolkensis*, but *O. ridei* calls may jump up to a higher frequency than the surrounding pulses, this



does not occur in a regular pattern like in *M. norfolkensis*.

Figure 11: *Saccolaimus flaviventris*

Definite call.

Curved, characteristic frequency 18 to 21.5 kHz. The characteristic frequency does not go above 22 kHz. Other species that could overlap do not occur in this area.

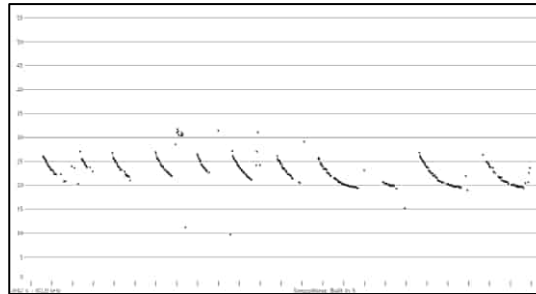


Figure 12: *Scoteanax rueppellii*

Definite Call

Curved call without tail and a characteristic frequency varying between 33 to 36 kHz. Frequency of the knee higher than 37 kHz. Pre-characteristic section drops over more than 3 kHz. This feature mostly distinguishes it from *Scotorepens spp.*

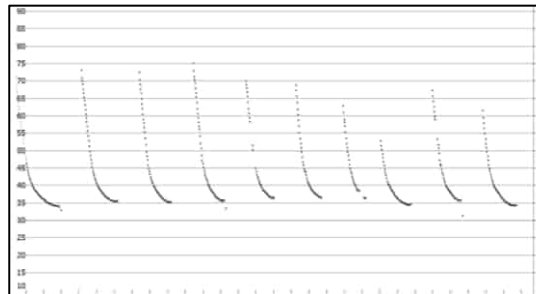


Figure 13: *Scotorepens balstoni*

Probable call.

Pulse of this species is curved with tail variable, but an up-sweeping tail is often more prominent with greater duration. Characteristic frequency 31 to 35 kHz (n = 28) and the frequency of the knee 33 to 37 kHz.

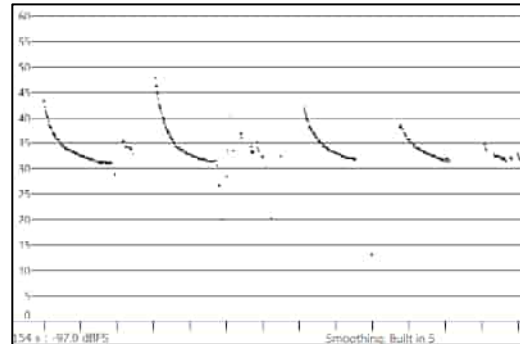


Figure 14: *Scotorepens greyii*

Definite call.

S. greyii has a curved and up-sweeping tail pulse. Its characteristic frequency is between 36 to 41.5 kHz. The up-sweeping tail and time of characteristic section + tail exceeding time of pre-characteristic section will distinguish this from *Falsistrellus tasmaniensis* most of the time.

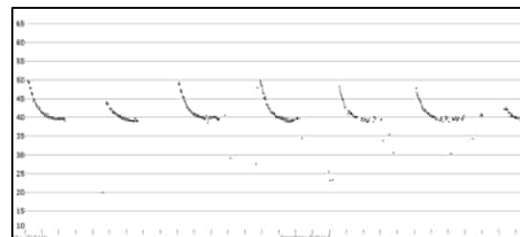


Figure 15: *Scotorepens* sp.

Possible call.

The pulse is curved with an up-sweeping tail. And a characteristic frequency between 36 to 41.5 kHz. The characteristic section and the tail of *S. sp.* takes up about half or less than half the time of the pulse. This distinguishes it from *Chalinolobus nigrogriseus*, which has a relatively longer characteristic section + tail. Indistinguishable from *S. greyii*.

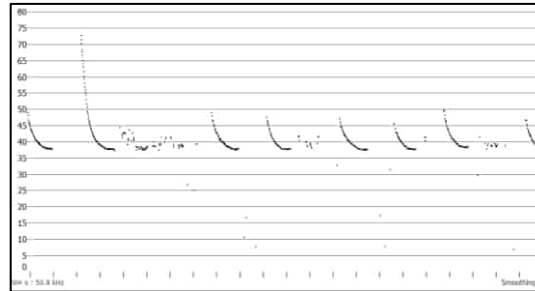


Figure 16: *Vespadelus troughtoni*

Definite call.

This species displays a curved pulse with not prominent up-sweeping tail. Its characteristic frequency is between 48.5 to 55 kHz (Pennay *et al*, 2004). If the end, frequency is lower than 51 kHz, then the call can be identified to *V. Troughtoni* and be differentiated from *V. pumilus*.

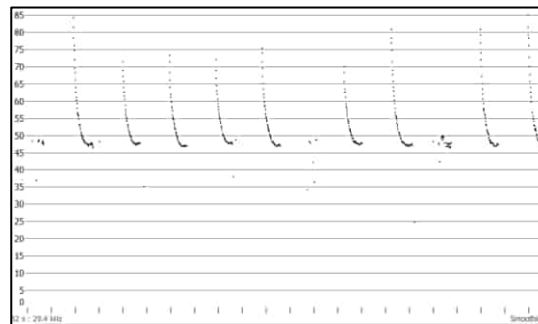


Figure 17: *Vespadelus regulus*

Possible call.

Characteristic frequency varies significantly over distribution from 40 to 55 kHz (n = 95). Call shape also varies between regions. Characteristic frequency 45 to 47 kHz (n = 19). Curved with up-sweeping tail.

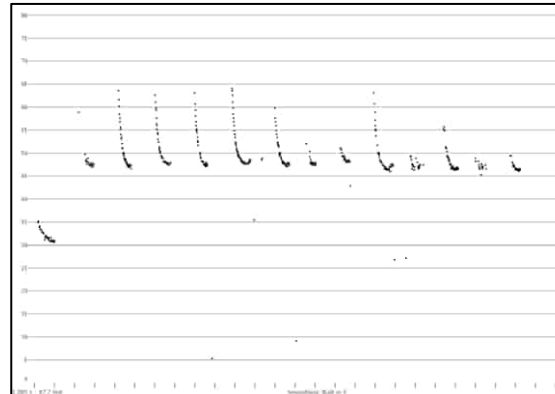
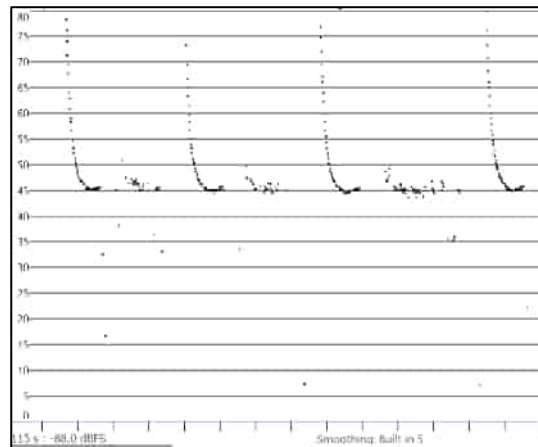


Figure 18: *Vespadelus vulturnus*

Definite call.

Curved and up-sweeping tail calls with characteristic frequency between 45 to 53 kHz.



4.0 Conclusion

A total of 20 microbat species were either confirmed 'definite', 'probable' or 'possible' within the Project area. Anabat 16 during the first survey had extremely high call numbers compared to the other sites with 10,446 calls recorded on this one detector.

Calls from *Nyctophilus sp* have been confirmed across the project areas. Three species of *Nyctophilus* possibly occur within the Project Area (*N. corbeni*, *N. geoffroyi*, and *N. gouldi*). *N. corbeni* is listed Vulnerable under the EPBC Act and NC Act. The calls of these species cannot be distinguished from each other.

- *Nyctophilus* species:
 - ✓ Steep, almost-linear (FM) call pulses are distinctive from those of other bat calls but cannot be reliably identified to species
 - ✓ Three species potentially occur in the project area (*N. corbeni*, *N. geoffroyi*, and *N. gouldi*)

5.0 References

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APPENDIX F

COLLISION RISK ASSESSMENT

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Listed Migratory and Threatened Birds					
Southern whiteface (<i>Aphelocephala leucopsis</i>)	V, VU	Rare	Low	Negligible	This species is considered potential to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as potential. - There are a low number of historically relevant records (388) of the species within the broader locality (150 km) of the Project Area (ALA); - The species predominantly occurs below canopy level. - There is suitable habitat in the form of woodlands and fringing agricultural land. Therefore, it is considered rare that the species will collide with the WTGs due to the species behaviour, and there is a low consequence of this happening due to the species threatened listing and population size. Thus, the risk rating for this species is negligible.
Fork-tailed swift (<i>Apus pacificus</i>)	Mi and Ma, SLC	Likely	Low	Low	This species is considered potential to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as potential. - There are a moderate number of historically relevant records (296) of the species within the broader locality (150 km) of the Project Area (ALA); - The species is known to frequently fly within the RSA; - The species is known to form large flocks of thousands of individuals (the largest flock recorded within 50 km of the Study Area involved 30 individuals (ALA)); - The species is considered an aerial visitor and can forage over the entirety of the Project Area.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered likely that the species will collide with the WTGs due to the species behaviour and records within the broader locality, and there is a low consequence of this happening due to the species migratory listing and population size. Thus, the risk rating for this species is low.
South-eastern glossy black cockatoo (<i>Calyptorhynchus lathami lathami</i>)	V, -	Unlikely	Moderate	Low	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known as it was directly observed during field surveys. - There are a high number of historically relevant records (816) of the species within the broader locality (150 km) of the Project Area (ALA); - Species was observed incidentally on multiple occasions, either perched and foraging or flying below RSA height; - The species is known to fly within canopy height within foraging areas and can fly just above . - The species has innumerable patches of foraging habitat throughout the Project Area. Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and records within the broader locality. However, should collision occur, this may result in moderate consequence due to the species threatened listing, population size and importance of the population in the broader region to the overall species. Thus, the risk rating for this species is low.
Latham's snipe (<i>Gallinago hardwickii</i>)	Mi and Ma, SL	Unlikely	Low	Negligible	This species is considered potential to occur within the Project Area. The following information was also considered for the risk rating: The presence of this species was considered as potential.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					- There are a high number of historically relevant records (1,113) of the species within the broader locality (150 km) of the Project Area (ALA), but limited records in the Project Area or locality - The species has the potential to fly within the RSA as this species can reach great heights when flying between foraging areas. - There is suitable habitat in the form of farm dams. Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and presence within the broader locality. Should collision occur, this is considered to result in a low consequence to the species due to its threatened listing and population size. Thus, the risk rating for this species is negligible.
Squatter pigeon (southern) (<i>Geophaps scripta scripta</i>)	V, VU	Rare	Low	Negligible	This species is considered potential to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as potential. - There are a low number of historically relevant records (122) of the species within the broader locality (150 km) of the Project Area (ALA); - The species predominantly occurs on the ground and when in flight stays within canopy. - There is suitable habitat in the form of farm dams with adjacent woodlands. Therefore, it is considered rare that the species will collide with the WTGs due to the species behaviour and low records within the broader locality, and there is a low consequence of this happening due to the species threatened listing and population size. Thus, the risk rating for this species is negligible.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
White-throated needletail (<i>Hirundapus caudacutus</i>)	V and Mi, VU	Likely	Moderate	Moderate	This species is considered likely to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species is considered likely; - There are a high number of historically relevant records (1,310) of the species within the broader locality (150 km) of the Project Area (ALA); - The species is known to frequently fly within the RSA (known to fly 1-300m above ground); - The species is considered an aerial visitor and can forage over the entirety of the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species behaviour and records within the broader locality, and there is a moderate consequence of this happening due to the species threatened listing and population size. Thus, the risk rating for this species is moderate.
Diamond firetail (<i>Stagonopleura gutatta</i>)	V, VU	Rare	Low	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known. - There are a low number of historically relevant records (1,406) of the species within the broader locality (150 km) of the Project Area (ALA); - The species predominantly occurs below canopy level. - There is suitable habitat in the form of woodlands and fringing agricultural land. Therefore, it is considered rare that the species will collide with the WTGs due to the species behaviour, and there is a low consequence of this happening due to the species threatened listing and population size. Thus, the risk rating for this species is negligible.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Raptors					
Australian hobby (<i>Falco longipennis</i>)	-, LC	Unlikely	Low	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (2,210) of the species within the broader locality (150 km) of the Project Area (ALA); 1 individual was sighted. No observations within the RSA; - Hunting strategy typically above open areas in fast pursuit of birds. Does occur in RSA, but not common; - There is foraging habitat throughout the Project Area. Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour, and there is a low consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is negligible.
Black kite (<i>Milvus migrans</i>)	-, LC	Likely	Low	Low	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (5,793) of the species within the broader locality (150 km) of the Project Area (ALA); 31 individuals were sighted, 30 of these individuals were seen within the RSA flying in a large group (96.7%); - The species hunts over woodlands and open areas, on occasion known to enter the RSA; - There is foraging habitat throughout the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species behaviour and high records within the broader

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					locality, and there is a low consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Black-shouldered kite (<i>Elanus axillaris</i>)	-, LC	Likely	Low	Low	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: • The presence of this species was considered as known; • There are a high number of historically relevant records (7,234) of the species within the broader locality (150 km) of the Project Area (ALA); • 10 individuals were sighted, four individuals were within the RSA (40%); • Hunting behaviour typically occurs over treetops or canopy height amongst open grassland areas. Hovering in place, occasionally observed to fly up to and hover in place within the RSA; • There is foraging habitat throughout the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a low consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Brown falcon (<i>Falco berigora</i>)	-, LC	Likely	Low	Low	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: • The presence of this species was considered as known;

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					- There are a high number of historically relevant records (4,010) of the species within the broader locality (150 km) of the Project Area (ALA); - Eight individuals were sighted, 1 individual was within the RSA (12.5%); - This species is known to occur within and flying over wooded, forests and open land however is known to soar at large heights; - There is foraging habitat throughout the Project Area. Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a low consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Nankeen kestrel (<i>Falco cenchroides</i>)	-, LC	Unlikely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (12,937) of the species within the broader locality (150 km) of the Project Area (ALA); 13 individuals were sighted, no individuals were observed within the RSA (0%); - Hunting strategy typically above open areas, staying in place hovering before diving to the ground. Species is known to relocate high in the air for prospecting of potential prey items; - There is foraging habitat throughout the Project Area. Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a low consequence of this happening due to the

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					species being listed as least concern and population size. Thus, the risk rating for this species is negligible.
Spotted harrier (<i>Circus assimilis</i>)	-, LC	Rare	Low	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: • The presence of this species was considered as known; • There are a high number of historically relevant records (1,638) of the species within the broader locality (150 km) of the Project Area (ALA); • 8 individuals were sighted, no individuals were observed within the RSA (0%); • Hunting strategy typically above open areas, flying low and slow typically 5m above ground vegetation. Drops on top of prey from air to the ground; • There is foraging habitat throughout the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a low consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is negligible.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Wedge-tailed eagle (<i>Aquila audax</i>)	-, LC	Almost certain	Low	Low	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (6,929) of the species within the broader locality (150 km) of the Project Area (ALA); 54 individuals were sighted, 45 individuals were observed within the RSA (83.3%); - This species is known to occur within and flying over wooded, forests and open land. Utilising thermals to spiral up to great heights and travel over large. Therefore, it is considered almost certain that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a low consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Whistling kite (<i>Haliastur sphenurus</i>)	-, LC	Unlikely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (10,450) of the species within the broader locality (150 km) of the Project Area (ALA); 10 individuals were sighted, 3 individuals were observed within the RSA (30%); - This species is known to occur within and flying over wooded, forests and open land. Utilising thermals to spiral up to great heights and travel over large.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Least concern birds					
Fairy martin (<i>Petrochelidon ariel</i>)	-, LC	Likely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (4,684) of the species within the broader locality (150 km) of the Project Area (ALA); 81 individuals were sighted, 10 individuals were observed within the RSA (12.3%); - This species travels above the canopy when moving between areas and can forage just above the ground up to extreme heights. Therefore, it is considered likely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Grey teal (<i>Anas gracilis</i>)	-, LC	Likely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (15,184) of the species within the broader locality (150 km) of the Project Area (ALA); 22 individuals were sighted, 10 individuals were observed within the RSA (45.2%); - The species typically flies low or just above canopy when within a feeding area, however, can get to large heights when travelling longer distances between feed areas or when spooked from water sources. Therefore, it is considered likely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Hardhead (<i>Aythya australis</i>)	-, LC	Unlikely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (9,766) of the species within the broader locality (150 km) of the Project Area (ALA); 30 individuals were sighted, 3 individuals were observed within the RSA (10%); - The species typically flies low or just above canopy when within a feeding area, however, can get to large heights when travelling longer distances between feed areas or when spooked from water sources.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is low.
Sulphur-crested cockatoo (<i>Cacatua galerita</i>)	-, LC	Unlikely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: • The presence of this species was considered as known; • There are a high number of historically relevant records (20,952) of the species within the broader locality (150 km) of the Project Area (ALA) and few within the Project Area; • 276 individuals were sighted, 10 individuals were observed within the RSA (3.6%); • The species typically flies within or just above canopy when within a feeding area, however, can get to large heights travelling in large flocks when travelling longer distances and circle downward toward the canopy to perch. Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is negligible.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Torresian crow (<i>Corvus orru</i>)	-, LC	Rare	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (46,328) of the species within the broader locality (150 km) of the Project Area (ALA) and few within the Project Area; 224 individuals were sighted, 3 individuals were observed within the RSA (2.6%); - The species typically flies within or just above canopy when within a feeding area, however, can reach great heights. Therefore, it is considered rare that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is negligible.
White-faced heron (<i>Egretta novaehollandiae</i>)	-, LC	Unlikely	Negligible	Negligible	This species is considered known to occur within the Project Area. The following information was also considered for the risk rating: - The presence of this species was considered as known; - There are a high number of historically relevant records (13,533) of the species within the broader locality (150 km) of the Project Area (ALA) and few within the Project Area; 20 individuals were sighted, 1 individual was observed within the RSA (5%); - The species typically flies within or just above canopy when within a feeding area, however, can reach great heights when travelling between feeding areas.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered unlikely that the species will collide with the WTGs due to the species behaviour and high records within the broader locality, and there is a negligible consequence of this happening due to the species being listed as least concern and population size. Thus, the risk rating for this species is negligible.
Bat Species					
Central-eastern broad-nosed bat (<i>Scotorepens</i> sp. (Parnaby))	-, LC	Rare	Low	Negligible	This species is considered potential to occur within the Project Area due to acoustic analysis defining the species as Probable. The following information was also considered for the risk rating: - The presence of this species was accounted as Probable from the audio analysis; - There are no records of the species on ALA, this can be attributed to species not being taxonomically confirmed as further research is still being undertaken for the genus <i>Scotorepens</i> to clarify species diagnosis; - Little is known about the species and its behaviour; the species is a part of the Vespertilinidae family which vary in foraging behaviour. From catching insect prey on the wing in open areas, or above water to gleaning insects off of and around foliage within the canopy. For the sake of this CRA foraging behaviours will be compared with that of the <i>Scotorepens greyii</i> species of the same family that occurs in similar habitats within Queensland. Foraging occurs within the canopy, around woodland patches and open areas adjacent, catching insects on the wing. - Suitable foraging habitat for this species has been identified within the Project Area.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered rare that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a low consequence of this happening due to the species least-concern listing. Thus, the risk rating for this species is moderate.
Chocolate wattled bat (<i>Chalinolobus morio</i>)	-, LC	Rare	Low	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: • The presence of this species was accounted as Definite from the audio analysis; • There are moderate records of the species on ALA in the broader locality (103); • Forage and eat on the wing, often moving fast and with great agility hunting flying invertebrates such as moths. Foraging in open areas and within canopy or understory. • Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a low consequence of this happening due to the species least-concern listing and moderate presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Eastern cave bat (<i>Vespadelus troughtoni</i>)	-, LC	Rare	Moderate	Negligible	This species is considered potential to occur within the Project Area due to acoustic analysis defining the species as Probable. The following information was also considered for the risk rating: • The presence of this species was accounted as Probable from the audio analysis;

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					- There are low records of the species on ALA in the broader locality (35); - The Project Area occurs within the likely expert distribution for this species; - Foraging occurs within and around woodlands with the species able to travel over open paddock to reach other stands of vegetation, being directly observed foraging above watercourses (typically only 10m above) surrounded by timber. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a moderate consequence of this happening due to the species listing being Least-concern and lower presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Gould's wattled bat (<i>Chalinolobus gouldii</i>)	-, LC	Rare	Negligible	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are high number of records of the species on ALA in the broader locality (273); - Species is highly adaptable living in urban landscapes, remnant woodlands and fragmented landscapes. Fast non-maneuvrable flight pattern catching various insects on the wing hunting just below canopy level. - Suitable foraging habitat for this species has been identified within the Project Area.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a negligible consequence of this happening due to the species listing being Least-concern and high presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Gould's long-eared bat (<i>Nyctophilus gouldi</i>)	-, LC	Rare	Negligible	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Possible. The following information was also considered for the risk rating: - The presence of this species was accounted as Possible from the audio analysis; - There are high number of records of the species on ALA in the broader locality (418); - Species can forage within densely vegetated areas, inclusive of understory within trees, shrubbery and regrowth. Often preferring to forage along the edges of vegetated areas. However, can also forage within open vegetation. Gleans insects off of vegetation but also drops on prey on the on ground. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a negligible consequence of this happening due to the species listing being Least-concern and high presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Greater-broad nosed bat	-, LC	rare	low	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as definite. The following information was also considered for the risk rating:

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
<i>(Scoteanax rueppellii)</i>					- The presence of this species was accounted as Definite from the audio analysis; - There are a low number of records of the species on ALA in the broader locality (14); - Species can forage within open woodlands below canopy and often on the outside of vegetated patches. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a low consequence of this happening due to the species listing being Least-concern and low presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Hoary wattled bat <i>(Chalinolobus nigrogriseus)</i>	-, LC	Rare	Moderate	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are low number of records of the species on ALA in the broader locality (17); - Species prefers open habitats amongst woodlands, forests, grasslands, mangroves, beach scrub and urban areas. Foraging adjacent to and within the canopy and sub-canopy. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a moderate consequence of this happening due to the species listing being Least-

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					concern and high presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Inland broad-nosed bat (<i>Scotorepens balstoni</i>)	-, LC	Rare	Low	Negligible	This species is considered potential to occur within the Project Area due to acoustic analysis defining the species as Probable. The following information was also considered for the risk rating: - The presence of this species was accounted as Probable from the audio analysis; - There are moderate number of records of the species on ALA in the broader locality (85); - Species foraging behaviours is limited and research is ongoing. the species is a part of the Vespertilinidae family which vary in foraging behaviour. From catching insect prey on the wing in open areas, or above water to gleaning insects off of and around foliage within the canopy. For the sake of this CRA foraging behaviours will be compared with that of the <i>Scotorepens greyii</i> species of the same family that occurs in similar habitats within Queensland. Foraging occurs within the canopy, around woodland patches and open areas adjacent, catching insects on the wing (Baker, 2024). - Suitable foraging habitat is present within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a low consequence of this happening due to the species listing being Least-concern and moderate presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Inland forest bat (<i>Vespadelus baverstocki</i>)	-, LC	Rare	Low	Negligible	This species is considered known to occur within the Project Area due to capture in harp trapping. The following information was also considered for the risk rating:

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					- The presence of this species was accounted known from harp trapping; - There are low number of records of the species on ALA in the broader locality (6); - Species foraging behaviours is limited but are known to forage within various woodlands and over rivers, below canopy. - Suitable foraging habitat is present within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour, and there is a low consequence of this happening due to the species listing being Least-concern and moderate presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Large bent-wing bat (<i>Miniopterus orianae oceanensis</i>)	-, LC	Likely	Moderate	Moderate	This species is considered potential to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are low number of records of the species on ALA in the broader locality (3); - Species has the ability to forage above the canopy, along open tracks and watercourses, and on the edges of vegetated patches. - Suitable foraging habitat is present within the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species foraging behaviour above the canopy, and there is a moderate consequence of this happening due to the species listing being Least-concern and low presence throughout the broader locality. Thus, the risk rating for this species is moderate.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Lesser long-eared bat (<i>Nyctophilus geoffroyi</i>)	-, LC	Rare	Negligible	Negligible	This species is considered potential to occur within the Project Area due to acoustic analysis defining the species as Possible. The following information was also considered for the risk rating: - The presence of this species was accounted as Possible from the audio analysis; - There are high number of records of the species on ALA in the broader locality (226); - Species aerial hunts on the wing or gleans off of vegetation, often flying quite low to the ground having a high risk of predation. When foraging around vegetation stays below canopy. Therefore, it is considered rare that the species will collide with the WTGs due to the species foraging behaviour above the canopy, and there is a negligible consequence of this happening due to the species listing being Least-concern and high presence throughout the broader locality. Thus, the risk rating for this species is negligible.
Little broad-nosed bat (<i>Scotorepens greyii</i>)	-, LC	Rare	Negligible	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are high number of records of the species on ALA in the broader locality (406); - Foraging occurs within the canopy, around woodland patches and open areas adjacent, catching insects on the wing. - Suitable foraging habitat for this species has been identified within the Project Area.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					Therefore, it is considered rare that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a negligible consequence of this happening due to the species least-concern listing and high abundance of records in the broader locality. Thus, the risk rating for this species is negligible.
Little forest bat (<i>Vespadelus vulturnus</i>)	-, LC	Rare	Negligible	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: • The presence of this species was accounted as Definite from the audio analysis; • There are high number of records of the species on ALA in the broader locality (467); • Foraging occurs below the canopy and catches insects exclusively on the wing. Tolerant of disturbance known to utilise agricultural and urban landscapes as long as the presence of woodland habitat is nearby for roosting. • Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a negligible consequence of this happening due to the species least-concern listing and high abundance of records in the broader locality. Thus, the risk rating for this species is negligible.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Little pied bat (<i>Chalinolobus picatus</i>)	-, LC	Rare	Negligible	Negligible	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are high number of records of the species on ALA in the broader locality (127); - Foraging occurs within the low and middle strata of the canopy and the species is an aerial forager. Foraging within woodlands, forests and vine forests. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a negligible consequence of this happening due to the species least-concern listing and high abundance of records in the broader locality. Thus, the risk rating for this species is negligible.
Northern free-tailed bat (<i>Ozimops lumsdenae</i>)	-, LC	Likely	Moderate	Moderate	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are low number of records of the species on ALA in the broader locality (21); - Foraging occurs above the canopy of where it is foraging, coming low to the ground when going over waterbodies. The species occurs within

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
					various eucalypt communities (woodlands, savannahs and forests) and rainforests. Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a moderate consequence of this happening due to the species least-concern listing and low abundance of records in the broader locality. Thus, the risk rating for this species is moderate.
Ride's free-tailed bat (<i>Ozimops ridei</i>)	-, LC	Rare	Low	Negligible	This species is considered potential to occur within the Project Area due to acoustic analysis defining the species as Probable. The following information was also considered for the risk rating: - The presence of this species was accounted as Probable from the audio analysis; - There are low number of records of the species on ALA in the broader locality (40); - Foraging occurs predominantly over wetter habitat types (estuaries, swamps and rivers and creeks). However, has the capacity it forages within open expanses, amongst paddock trees and within forests. Typically foraging occurs 10m above the ground or waterbody. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered rare that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a low consequence of this happening due to the species least-concern listing and low abundance of records in the broader locality. Thus, the risk rating for this species is moderate.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
White-striped freetailed Bat (<i>Austronomus australis</i>)	-, LC	Likely	Low	Low	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are moderate number of records of the species on ALA in the broader locality (130); - Foraging occurs over open landscapes and above the canopy. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a low consequence of this happening due to the species least-concern listing and low-moderate abundance of records in the broader locality. Thus, the risk rating for this species is low.

Species	EPBC Act, NC Act	Likelihood of Event	Consequence of Event	Risk Rating	Comments
Yellow-bellied sheath-tailed bat (<i>Saccolaimus flaviventris</i>)	-, LC	Likely	Low	Low	This species is considered known to occur within the Project Area due to acoustic analysis defining the species as Definite. The following information was also considered for the risk rating: - The presence of this species was accounted as Definite from the audio analysis; - There are moderate number of records of the species on ALA in the broader locality (109); - Foraging occurs over open landscapes and above the canopy in eucalypt forests, often getting lower in height in mallee environments. - Suitable foraging habitat for this species has been identified within the Project Area. Therefore, it is considered likely that the species will collide with the WTGs due to the species potential foraging behaviour, and there is a low consequence of this happening due to the species least-concern listing and low-moderate abundance of records in the broader locality. Thus, the risk rating for this species is low.

Status listing per EPBC Act, NC Act: CE, CR = Critically Endangered; E, EN= Endangered; V, VU = Vulnerable; Mi = Migratory, - = no listing, SLC = Special Least Concern and LC = Least Concern



APPENDIX G BIRD AND BAT METHODOLOGY

The below methodology is suitable for detection of a wide range of bird species including those identified as target species that could be potentially impacted by WTG strike. The survey program has taken into consideration the seasonal variation of migratory and threatened species and is structured to ensure two visits occur each year within the suitable season and habitat of each targeted species. The bird and bat seasonal consideration table below details the seasonal considerations for each targeted species.

Appendix C details the full list of *EPBC Act* and *NC Act* listed bird and bat species targeted during the baseline surveys, their survey guideline requirements and survey adequacy.

The survey guidelines for diurnal bird surveys and their requirements are as follows:

- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland:*
 - Diurnal bird surveys involve six 5-10 min area searches within 100 x 100 m survey site; and
 - Two surveys conducted in the morning (<two hours after sunrise), two in mid-morning (two to four hours after sunrise) and two in less optimal times (four hours after sunrise and two hours before sunset).

Operational Bird and Bat Utilisation Surveys (Operational BBUS)

Operational BBUS will target the species listed as 'known' or 'likely' or 'potential' to occur within the Project Area as well as general bird and bat utilisation, particularly of species prone to occurring in the rotor swept area (RSA). Operational BBUS surveys as part of the before-after-control-impact (BACI) will occur during the first two years of operation with two wet season and two dry season surveys being undertaken in those years. Monitoring during the operation of the Proposed Development will be consistent with techniques used during pre-operational BBUS.

The location of the operational BBUS will be determined by the final layout of the Proposed Development, in that both control and impact locations (from pre-operational BBUS) will be selected based on proximity to the Disturbance Footprint.

Bird Utilisation Surveys (BUS)

As with pre-operational BUS, operational BUS will involve 20-minute fixed point surveys to provide data based on the species present, height, speed and direction of flight as stipulated by the Band Model (SNH, 2012; Band, 2000). As mentioned, each fixed-point survey site will be repeated locations from pre-operational BUS located to provide a search radius of at least 100 m for small birds and up to 800 m for large birds with range finders used to determine distances. Searches primarily focused on birds most likely to be affected by the Proposed Development, such as raptors (birds of prey) and large flocks of birds.

The *Interim guidelines on the management of bird and bat species in onshore windfarms* (Interim guidelines for birds and bats), developed in December 2021 by the Department of Agriculture and Environment (now DCCEEW), details the need to undertake a risk assessment



for birds and bats following BUS for the Project Area. This risk assessment has taken into account the likelihood and consequences of events including collision with WTGs and the impact of construction and operation of the Proposed Development causing changes in site utilisation by bird and bat species.

State Code 23 details the requirement for BUS for proposed wind farm developments. Such surveys identify avian species, numbers present, height flown and site utilisation. The 2023-2025 field surveys undertook BUS in accordance with the Band Model, at waterbodies and in open areas for birds of prey (Band, 2000).

State Code 23 also recommends a BACI design principle for surveys where the Project Area is determined to support significant bird species. The aim of the BACI design is to compare environmental variables before and after a human activity and between the area affected by the Disturbance Footprint (impact) and an unaffected area (control) (Stewart-Oaten, 1986). As mentioned, BUS locations visited during the pre-operational 2023-2025 BUS will be identified as impact or control locations. The final location of BACI survey sites will be dependent on changes in proposed infrastructure placement that may result from findings of the second phase design field program.

The BACI designed bird surveys include BUS such as point, waterbody and birds of prey surveys, as was conducted during the phase one design field investigations.

Point Surveys

Point surveys are conducted to target diurnal woodland and riparian bird species. Suitable woodland and riparian habitats will be traversed by suitably trained ecologists, with 20-minute timed surveys to be conducted for all birds in the Project Area.

Waterbody Surveys

Waterbody surveys are conducted in order to target waterbirds (particularly some migratory species), and woodland species utilising the waterbodies. Observations are made from a stationary position, and birds identified by call detection and visual observations. The Project Area contains various artificial waterbodies (farm dams), with potential to act as important water sources in the landscape, particularly during dry conditions.

Birds of Prey Surveys

Birds of prey surveys will be undertaken to target birds of prey that may be at risk of collision with WTGs during operation. Surveys are undertaken at vantage points (e.g. large hills and extensively cleared areas) at mid-morning when birds of prey become increasingly active.

Call Playback

Call playback surveys are conducted to target cryptic (such as diamond firetail), nocturnal bird species. Within suitable habitat 2-minute calls are broadcast interspersed with 2 minutes of silence to listen for response calls. Suitable habitat includes vegetated gully lines and areas with suitably sized tree hollows. A handheld Bluetooth speaker is used to broadcast calls. Following two rounds of call broadcasts, a spotlighting search is performed to search for owls that had responded by flying quietly to the broadcast area.



BIRD AND BAT SEASONAL CONSIDERATION

Species Name	Threatened Species Status		Likelihood of Occurrence	Seasonal Consideration
	EPBC Act	NC Act		

Listed Threatened and Migratory Bird Species

Southern squatter pigeon (<i>Geophaps scripta scripta</i>)	V	V	Potential	Wet and dry season
White-throated needletail (<i>Hirundapus caudacutus</i>)	V, Mi	V	Likely	October to April
South-eastern glossy black cockatoo (<i>Calyptorhynchus lathami lathami</i>)	V	-	Known	Wet and dry season
Fork-tailed swift (<i>Apus pacificus</i>)	Mi	SLC	Potential	Dry season
Latham's snipe (<i>Gallinago hardwickii</i>)	Mi	SLC	Potential	Wet season
Southern white face (<i>Aphelocephala leucopsis</i>)	V	V	Potential	Wet and dry season
Diamond firetail (<i>Stagonopleura guttata</i>)	V	V	Known	Wet and dry season

Non-listed Bird Species (Raptors within the RSA)

Black kite (<i>Milvus migrans</i>)				
Black-shouldered kite (<i>Elanus axillaris</i>)	-	LC	Known	Wet and dry season
Brown falcon (<i>Falco berigora</i>)	-	LC	Known	Wet and dry season
Wedge-tailed eagle (<i>Aquila audax</i>)	-	LC	Known	Wet and dry season

Bats

Operational bat surveys will involve deploying Anabats in the same locations as during pre-operational bat surveys in both impact and control areas as per the BACI design. The BACI design has also been implemented for bat surveys in order to identify any impacts on bats as a result of the Proposed Development. Impact and control bat survey locations will be determined based on the final Disturbance Footprint. Additionally, if required, targeted bat surveys will be undertaken for threatened species if required.



APPENDIX H

EXAMPLE OF UPDATED DATA COLLECTION

Site	GPS Coordinates	Date	Time	Type	Weather	Common Name
BUS14		26/11/2025	13:15	PM	28 degrees, high wind, dusty, 2/8 cloud	Black Kite
BUS18		27/11/2025	13:34	MID	25 degrees, moderate wind, 1/8 cloud	Black Kite
BUS12		25/11/2025	9:03	AM	24 degrees, low wind, 1/8 cloud	Black Kite
BUS12		25/11/2025	9:03	AM	24 degrees, low wind, 1/8 cloud	Black Kite
BUS12		27/11/2025	15:10	PM	28 degrees, moderate wind, 1/8 cloud	Black Kite
BUS11		26/11/2025	10:05	MID	26 degrees, high wind, 2/8 cloud	Black Kite
BUS11		25/11/2025	9:40	AM	25 degrees, moderate wind, 1/8 cloud	Nankeen Kestrel
BUS10		25/11/2025	7:50	AM	21 degrees, low wind, 2/8 cloud	Nankeen Kestrel
BUS11		25/11/2025	9:40	AM	25 degrees, moderate wind, 1/8 cloud	Nankeen Kestrel
BUS14		26/11/2025	13:15	PM	28 degrees, high wind, dusty, 2/8 cloud	Nankeen Kestrel
BUS19		27/11/2025	11:22	MID	22 degrees, moderate wind, 6/8 cloud	Nankeen Kestrel
BUS10		25/11/2025	7:50	AM	21 degrees, low wind, 2/8 cloud	Nankeen Kestrel
BUS11		26/11/2025	10:05	MID	26 degrees, high wind, 2/8 cloud	Nankeen Kestrel
BUS09		28/11/2025	8:54	AM	20 degrees, still, thin cloud, 6/8 cloud	Wedge-tailed Eagle
BUS34		28/11/2025	11:05	MID	28 degrees, light wind, 6/8 cloud	Wedge-tailed Eagle
BUS38		27/11/2025	10:25	MID	18 degrees, moderate wind, 7/8 cloud	Wedge-tailed Eagle
BUS11		27/11/2025	14:30	PM	26 degrees, moderate wind, 1/8 cloud	Wedge-tailed Eagle
BUS15		27/11/2025	9:00	AM	18 degrees, moderate wind, 7/8 cloud	Wedge-tailed Eagle
BUS18		27/11/2025	13:34	MID	25 degrees, moderate wind, 1/8 cloud	Wedge-tailed Eagle
BUS11		26/11/2025	10:05	MID	26 degrees, high wind, 2/8 cloud	Wedge-tailed Eagle
BUS11		27/11/2025	14:30	PM	26 degrees, moderate wind, 1/8 cloud	Wedge-tailed Eagle
BUS02		26/11/2025	15:35	PM	29 degrees, high wind, 1/8 cloud	Wedge-tailed Eagle
BUS02		28/11/2025	11:48	MID	29 degrees, light wind, 6/8 cloud	Wedge-tailed Eagle
BUS02		28/11/2025	11:48	MID	29 degrees, light wind, 6/8 cloud	Wedge-tailed Eagle

Scientific Name	TaxonSort	Number of Individuals	Distance (m) from observer	Direction (degrees) from observer
<i>Milvus migrans</i>	804	1	1000	340
<i>Milvus migrans</i>	804	1	600	150
<i>Milvus migrans</i>	804	1	50	30
<i>Milvus migrans</i>	804	2	70	30
<i>Milvus migrans</i>	804	1	100	30
<i>Milvus migrans</i>	804	1	450	70
<i>Falco cenchroides</i>	848	1	150	260
<i>Falco cenchroides</i>	848	1	1000	160
<i>Falco cenchroides</i>	848	1	50	320
<i>Falco cenchroides</i>	848	1	50	290
<i>Falco cenchroides</i>	848	1	750	40
<i>Falco cenchroides</i>	848	1	250	190
<i>Falco cenchroides</i>	848	1	15	140
<i>Aquila audax</i>	781	1	800	130
<i>Aquila audax</i>	781	3	850	100
<i>Aquila audax</i>	781	2	400	260
<i>Aquila audax</i>	781	1	300	340
<i>Aquila audax</i>	781	1	500	250
<i>Aquila audax</i>	781	1	900	50
<i>Aquila audax</i>	781	1	700	220
<i>Aquila audax</i>	781	1	850	120
<i>Aquila audax</i>	781	2	100	240
<i>Aquila audax</i>	781	1	750	180
<i>Aquila audax</i>	781	1	650	180

Direction of travel (to nearest 10 degree)	Flight height (0 - 5 minutes)	Flight height (5 - 10 minutes)
150		
90	100	
220		30
160		50
200	200	
340	15	
240		
260		
160		
350	18	
330	20	
290		15
0		
60		
280	50	100
260	50	100
60		
10		5
300		300
340		
40	100	
190	50	
90		50
90		

Flight height (10 - 15 minutes)	Flight height (15 - 20 minutes)	Comments	Microhabitat
	15	flying	
		hunting	
30		flying	
		flying toward	
		dam	
		flew overhead	
60		flying	
	30	flying	
	40	flying	
	50	soaring	
		flying	
30		flying	
30		hunting	
10		flying	
	10	flying	
70	120	flying	
100	120	flying	
	250	flying	
		flying	
300		soaring	
80		flying	
		circling	
		flying	
80		soaring	
30		circling	



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APPENDIX F

PRELIMINARY VFMP



Preliminary Vegetation and Fauna Management Plan

Cattle Creek Wind Farm

PREPARED FOR

RWE

RWE Cattle Creek Onshore Wind
Pty Ltd

DATE
09 July 2026

REFERENCE
0706881



DOCUMENT DETAILS

DOCUMENT TITLE	Preliminary Vegetation and Fauna Management Plan
DOCUMENT SUBTITLE	Cattle Creek Wind Farm
PROPOSED DEVELOPMENT NUMBER	0706881
DATE	09 July 2026
VERSION	6
AUTHOR	Environmental Resources Management Australia Pty Ltd
CLIENT NAME	RWE Cattle Creek Onshore Wind Pty Ltd

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
1	01	Courtney Whitehead	Adam Pavitt	David Dique	19.11.2024	
2	02	Jessia Kwok	Michael Rookwood	David Dique	14.03.2025	
3	03	Sophie Allan	Michael Rookwood	David Dique	03.12.2025	
4	04	Jevan Raghoobar	Matt Davis	David Dique	13.03.2026	
5	05	Jevan Raghoobar	Sophie Rice	David Dique	24.04.2026	
6	06	Amber Wood	Jessica Kwok	David Digue	09.07.2026	Final

Cattle Creek Wind Farm

Preliminary Vegetation and Fauna Management Plan

0706881



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ACRONYMS AND ABBREVIATIONS

Name	Description
BESS	Battery Energy Storage System
CEMP	Construction Environment Management Plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERM	Environmental Resources Management Australia Pty Ltd
GPS	Global Positioning System
ha	Hectares
HSEQ	Health, Safety, Environment and Quality (Manager role)
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
LC	Least Concern
LoO	Likelihood of occurrence
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
MW	Megawatts (electricity)
NC Act	<i>Nature Conservation Act 1992</i>
PMST	Protected Matters Search Tool
RE	Regional Ecosystem
RPZ	Riparian Projection Zone
SLC	Special Least Concern
TEC	Threatened Ecological Communities
VFMP	Vegetation and Fauna Management Plan
VM Act	<i>Vegetation Management Act 1999</i>
RWE	RWE Cattle Creek Onshore Wind Pty Ltd
WoNS	Weeds of National Significance
WTGs	Wind Turbine Generators

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by RWE Cattle Creek Onshore Wind Pty Ltd (RWE) to prepare a Preliminary Vegetation and Fauna Management Plan (VFMP) for the proposed Cattle Creek Wind Farm (herein referred to as the 'Proposed Development').

The Proposed Development is located approximately 60 (kilometres) km south-west of Dalby, in the Toowoomba Regional Council and Western Downs local government areas of Queensland. The Proposed Development is located on freehold grazing land, covering twelve separate lots and road reserves, see Figure 1-1.

The Project Area is approximately 20,404.5 hectares (ha) in size and consists of 12 individual land parcels (lots) spanning five properties plus adjacent road reserves. The property lots and their respective sizes are outlined in Table 1-1.

TABLE 1-1 PROJECT AREA PROPERTY LIST

Property	Lot on Plan	Tenure	Size (ha)
Property 1	2DY452	Freehold	4,698.8
Property 2	27CP882781	Freehold	2,406.6
	2DY831	Freehold	3,013.8
Property 3	1RP174414	Freehold	2,049.6
	16SP201705	Freehold	1,019.9
	15SP201705	Freehold	1,032.3
	3RP174414	Freehold	823.6
Property 4	2RP174414	Freehold	1,176.7
Property 5	8DY247	Freehold	964.9
	9DY247	Freehold	965.5
	22DY800	Freehold	1,028.3
	21DY218	Freehold	1,041.1
Road Reserves			179.5 ¹
TOTAL			20,404.5

¹This includes the total of mapped road reserve areas within the Project Area

The Proposed Development consists of the construction, operation, maintenance, and decommissioning of up to 135 Wind Turbine Generators (WTGs), Battery Energy Storage System (BESS) of up to 450 Megawatts (MW) and ancillary infrastructure (supporting infrastructure) consisting of:

- WTG foundations, crane hardstands, crane boom laydown, blade laydown and rotor assembly area;
- Access tracks, including:

- New and upgraded tracks within the Project Area, generally comprising of a nominal range of 5.5 m – 10 m wide permanent access track, and a maximum 50 - 95 m wide cleared corridor for Oversize Overmass (OSOM) vehicles;
- Low voltage (LV) and medium voltage (MV) underground cabling, as well as MV and high voltage (HV) overhead transmission lines;
- Internal collector substations;
- A switching station adjacent to the existing 330 kV Powerlink transmission line. This has been accounted for within the Disturbance Footprint, thereby allowing the clearing of the site to be assessed as part of the impacts associated with the Proposed Development (noting, however, that the switching station infrastructure will be constructed, owned and operated by Powerlink);
- Permanent meteorological masts;
- Construction compounds and laydown areas;
- Washdown areas;
- Operational and maintenance facilities; and
- A construction workers accommodation facility.

Further, there is the potential for the inclusion of the below infrastructure:

- Concrete batching plants;
- Borrow pits; and
- Communications tower.

For this VFMP Report, the following terms are defined:

- **Project Area** - The host properties which the Proposed Development will be undertaken, covering a total area of 20,404.5 ha; and
- **Disturbance Footprint** - The area where direct disturbance associated with construction, operation and decommissioning of the Proposed Development, within the Project Area, encompassing approximately 2,221.2 ha.

1.1 PURPOSE AND SCOPE

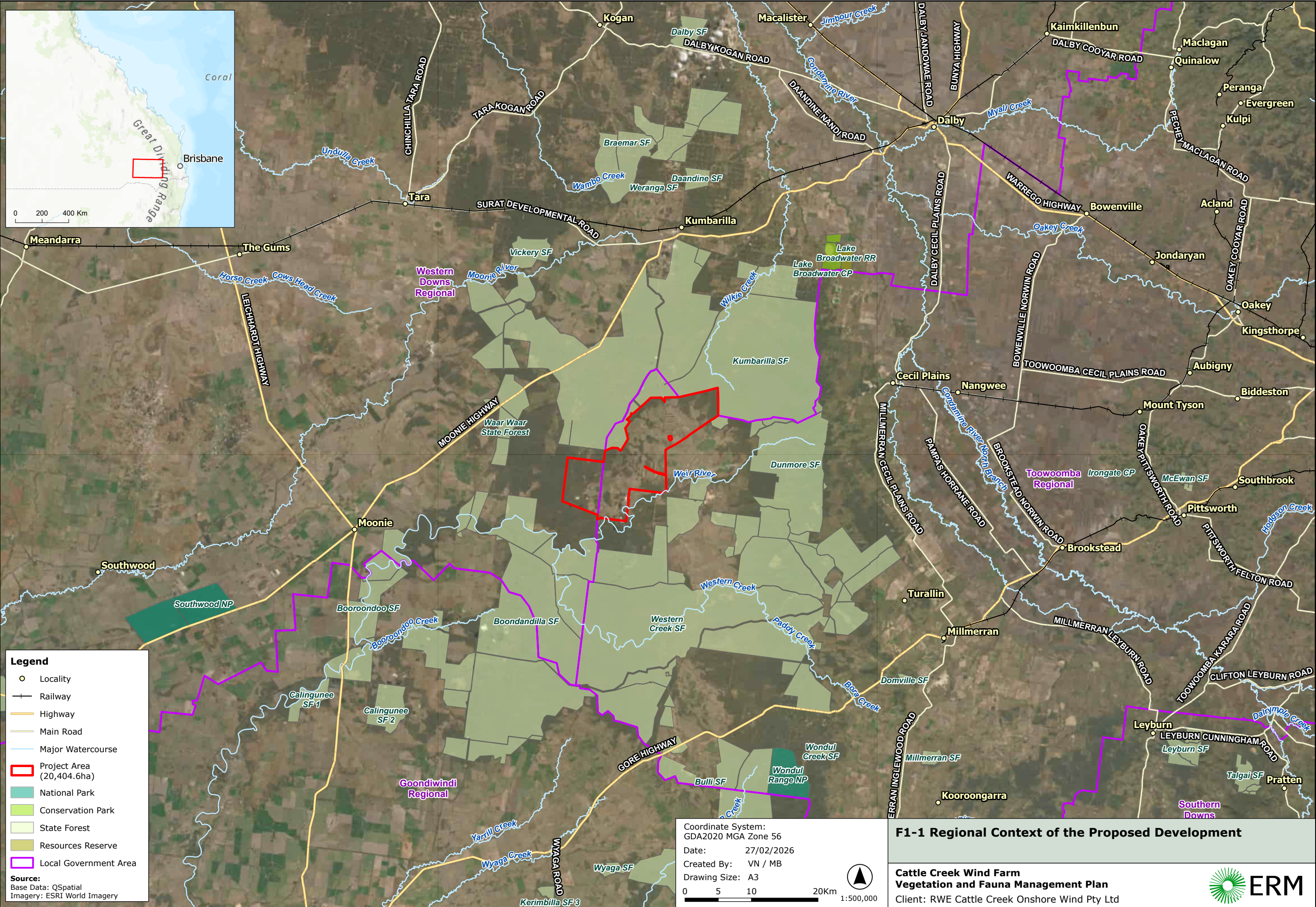
This VFMP has been prepared in support of:

- Assesses and manages potential impacts to Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (*EPBC Act*) and *Queensland Vegetation Management Act 1999* (VM Act) and/or the *Nature Conservation Act 1999* (NC Act).

The objective of this VFMP is to minimise any potential residual impacts to vegetation, fauna and associated habitats with the Proposed Development. This is through:

- Description of existing environment including identified flora and fauna species;
- Description of potential direct and indirect impacts to flora and fauna during construction, operation and decommissioning; and
- Description of how impacts on species will be minimised and managed during construction and operation of the Proposed Development.

A detailed VFMP will be prepared prior to construction.



1.2 AVOIDANCE MEASURES AND POTENTIAL RESIDUAL IMPACT MANAGEMENT

The Proposed Development has the potential to impact flora and fauna values directly and indirectly within the Project Area. Generally, the greatest potential impact to biodiversity values is associated with clearing and grading activities during which vegetation and fauna habitat is removed. Where possible, vegetation disturbance associated with the Proposed Development has been avoided, and where avoidance is not possible, is being minimised through the ongoing detailed design process. However, possible residual impacts to biodiversity values may include:

- Vegetation clearing;
- Fauna habitat loss;
- Mortality or injury of fauna;
- Dust impacts;
- Noise and light impacts; and
- Exacerbation of exotic flora and fauna (animal pests and weeds).

An ecological Impact assessment has been prepared by ERM, and this management plan aims to minimise the potential residual impacts associated with the Proposed Development.

While vegetation and habitat mapping were considered in site selection, environmental disturbance is not entirely avoidable. The Proposed Development layout will consist of widely spaced WTGs and associated infrastructure, some of which is within remnant vegetation. As a result, ecology surveys have been, and will continue to be, conducted to guide design, to avoid and minimise impacts to the greatest extent possible, across two design phases. The key component of the vegetation management strategy is avoidance through layout design.

The two-stage design process includes:

- First design phase – avoidance of identified important ecological values; and
- Detailed design phase – pre-clearance surveys.

The first design phase is based on avoidance of identified important ecological values (vegetation and potential mapped habitat for listed threatened species) identified from the desktop and field surveys conducted from December 2023 to October 2025. The findings from these surveys documented important ecological values across the Project Area, to assist in refining the Proposed Development design to avoid and minimise potential impacts to ecological values.

The detailed design phase is recommended to involve pre-clearance surveys to target known, likely and potentially occurring listed Threatened Ecological Communities (TECs), threatened and/or migratory species or micro-habitat features at proposed infrastructure locations in the Project Area within the weeks/months prior to clearing. Where required and feasible, infrastructure should be micro-sited up to 100 m to avoid large hollow bearing trees, nests, and other important micro habitat features.

The pre-clearance surveys will assess the localised environmental values, including threatened species breeding habitat and protected plants to determine if micro-siting can be used to avoid key values.

Several more avoidance measures have been implemented, including, but not limited to, the following:

- Identification of areas with high ecological value and avoidance of these;
- Clearly delineate approved vegetation clearance areas/ work zones to prevent over-clearing;
- Turbines will be sited where possible to minimise impacts to mature trees;
- Implementation of the VFMP;
- Where required, a qualified fauna spotter-catcher will conduct a search immediately prior to clearing of vegetation for the presence of fauna species and important habitat values. Where fauna or important habitat values are detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts as a result of clearing; and
- Offsets for areas which cannot be avoided and may cause significant impact to Fauna/Flora.

2. EXISTING ENVIRONMENT

The Project Area is located in the southern Brigalow Belt bioregion. The topography of the Project Area is predominantly flat to undulating abounded by ridgelines and central, sporadic, occurrences of jump ups. The incline and decline of these rises are generally rocky with remnant ironbark woodland along the ridges. Detached remnant forest and woodland are occasionally present in open expanses of grazing land and native vegetation regrowth. Numerous ephemeral creeks and rivers intersect the Project Area as a part of alluvial plains, deposits and riparian zones.

The dominant historical land use of clearing and cattle grazing has prevented recovery of native ecological condition throughout the majority of Project Area. Patches of remnant vegetation exist in areas of the Project Area as well as regrowth areas of numerous juvenile species. Cleared areas are dominated by pastured land, sparse shrubs and juvenile regrowth. Additionally, the riparian fringing woodlands are limited to creek lines where they are sparse and thin as a result of grazing activities and historic clearing.

The Project Area lies adjacent to and within the locality (10 km) of five State Forests:

- The Kumbarilla State Forest is located on the northern boundary of the Project Area and has an area of approximately 86,000 ha;
- The Western Creek State Forest is located approximately 5 km south-east and has an area of approximately 100,000 ha;
- Dunmore State Forest is located approximately 10 km south-east and has an area of approximately 20,000 ha;
- Waar Waar State Forest is located approximately 9 km west, and covers an area of approximately 4,000 ha; and
- Boondandilla State Forest is located approximately 5 km south-west and covers an area of approximately 57,300 ha.

2.1 LANDSCAPE ATTRIBUTES

The Project Area is located within the Southern Brigalow Belt bioregion as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) framework. Ecological and landscape features observed within the Project Area are typical of the region and include eucalypt dominated open forest and woodlands on alluvial plains and igneous rock. The landscape is characterised largely by non-remnant grasslands with historic clearing and dieback. Numerous regions of the Project Area are less degraded however and offer higher ecological value.

The Project Area occurs within the Toowoomba and Western Downs region, and thus alignment with the Toowoomba Regional Planning Scheme 2022 and Western Downs Planning Scheme 2017 is required for the Proposed Development. The Planning Schemes provides the framework for managing development within the local area in a way that advances the purpose of the *Planning Act 2016*, including identifying assessable development and outcomes sought to be achieved in the Local Government Area, as the context for assessing development.

The Project Area has been classified into ten broad habitat types:

- Cleared land;

- Agricultural land with sparse eucalypts or other paddock trees;
- Riparian open forests to woodland primarily on sandplains or depositional plains;
- Ironbark open forests to woodland on hilly terrain;
- Ironbark and smooth-barked apple woodland with cypress-pine and/or buloke understory;
- Poplar box grassy woodland;
- Gum-topped box open forests to woodland;
- Buloke and poplar box open forests to woodland with varied shrubby understory;
- Belah with or without brigalow open forests to woodlands; and
- Permanent waterbodies.

2.2 REGIONAL ECOSYSTEMS AND REGULATED VEGETATION

State-mapping and ground-truthing of Regional Ecosystems (REs) and vegetation communities in the Project Area shows that there are 13 REs present in the Project Area with presence of non-remnant vegetation. The vegetation communities in the Project Area are highly fragmented due to extensive clearing and agricultural disturbances. Of the remaining remnant and regrowth communities, the dominant RE in the Project Area is *Eucalyptus crebra* and *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces (REs 11.5.1 and 11.5.1a). Additionally, *Eucalyptus fibrosa* subsp. *Nubilis*, *Corymbia* spp. *Eucalyptus* spp. woodland on Cainozoic lateritic duricrust (RE 11.7.7) is also a dominant RE within the Project Area.

Other REs/communities in the Project Area include eucalypt open forests fringing riparian areas, dominated by *E. tereticornis* and *E. camaldulensis* (RE 11.3.25), brigalow (*Acacia harpophylla*) woodlands (RE 11.9.5), and Eucalyptus woodland of REs below;

- 11.3.2;
- 11.3.14;
- 11.3.8;
- 11.5.4;
- 11.5.4a;
- 11.5.20;
- 11.7.4; and
- 11.7.5.

The REs/communities within the Project Area are presented in Table 2-1.

TABLE 2-1 STATE-MAPPING REGIONAL ECOSYSTEMS WITHIN THE PROJECT AREA AND DISTURBANCE FOOTPRINT

Res	Short Description	VM Act Class	VM Structure Category	Area in Disturbance Footprint (ha)
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of Concern	Sparse	< 0.1
11.3.14	<i>Eucalyptus</i> spp., <i>Angophora</i> spp., <i>Callitris</i> spp. woodland on alluvial plains	Least Concern	Sparse	11.6
11.3.18	<i>Eucalyptus populnea</i> , <i>Callitris glaucophylla</i> , <i>Allocasuarina luehmannii</i> shrubby woodland on alluvium	Least Concern	Sparse	0
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least Concern	Sparse	1.3
11.5.1	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	Least Concern	Sparse	88.4
11.5.1a	<i>Eucalyptus populnea</i> woodland with <i>Allocasuarina luehmannii</i> low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones.	Least Concern	Sparse	17.1
11.5.4	<i>Eucalyptus chloroclada</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains and/or remnant surfaces	Least Concern	Sparse	0.8
11.5.4a	<i>Callitris glaucophylla</i> +/- <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland. Occurs on Cainozoic plains with deep sandy soils.	Least Concern	Sparse	170.3
11.5.20	<i>Eucalyptus moluccana</i> and/or <i>E. microcarpa</i> and/or <i>E. woollsiana</i> +/- <i>E. crebra</i> woodland on Cainozoic sand plains	Least Concern	Sparse	60.7
11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> woodland on Cainozoic lateritic duricrust	Least Concern	Sparse	108.0

Res	Short Description	VM Act Class	VM Structure Category	Area in Disturbance Footprint (ha)
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks	Least Concern	Sparse	0
11.7.7	<i>Eucalyptus fibrosa subsp. nubilis</i> +/- <i>Corymbia</i> spp. +/- <i>Eucalyptus</i> spp. woodland on Cainozoic lateritic duricrust	Least Concern	Sparse	355.5
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on fine-grained sedimentary rocks	Endangered	Mid-dense	< 0.1
Non-remnant				1,407.5
Total				2,221.4*
*Total area does not equal 2,221.2 ha (Disturbance Footprint) due to rounding of individual RE areas.				

2.2.1 REGULATED VEGETATION - CATEGORY B ENDANGERED, OR OF CONCERN REMNANT RE

The desktop assessment identified the presence of Category B – Endangered or Of Concern vegetation within the Project Area. Field verification occurred during the survey periods through the verification of ground-truthed REs. A total of 362.3 ha within the Project Area is Category B – Endangered or Of Concern vegetation, which constitutes an MSES.

2.2.2 REGULATED VEGETATION - CATEGORY C ENDANGERED, OR OF CONCERN REGROWTH RE

The desktop assessment identified the presence of Category B – Endangered or Of Concern vegetation within the Project Area. Field verification occurred during the survey periods through the verification of ground-truthed REs. A total of 1.3 ha within the Project Area is Category C – Endangered or Of Concern vegetation, which constitutes an MSES.

2.2.3 REGULATED VEGETATION – ESSENTIAL HABITAT

Essential habitat identifies habitat for endangered, vulnerable, and near threatened wildlife, also known as 'protected wildlife' and is prescribed under the NC Act (DES, 2020b). Essential habitat is also defined under Section 20AC of the Vegetation Management Act 1999. The Project Area contains 0.8 ha of essential habitat.

2.2.4 REGULATED VEGETATION – CATEGORY B VEGETATION INTERSECTING A WATERCOURSE

Category B vegetation intersecting with VM Act watercourse or drainage feature is protected as regulated vegetation under the VM Act. Different stream order watercourses have different buffer zones of protection under the VM Act; Category B vegetation that falls within these buffer zones (riparian vegetation) are regulated vegetation. Watercourses within the Project Area are stream orders 1-5 and riparian vegetation buffers for watercourses (Riparian Protection Zone [RPZ]) protected under the NC Act are as follows:

- RPZ includes 10 m from the defining bank of a Stream Order 1 or 2 watercourse or drainage feature;
- RPZ includes 25 m from the defining bank of a Stream Order 3 or 4 watercourse or drainage feature; or
- RPZ includes 50 m from the defining bank of a Stream Order 5 or higher, watercourse of drainage feature.

There is 529.5 ha of regulated vegetation, that is Category B vegetation intersecting a watercourse within the Project Area.

2.3 THREATENED ECOLOGICAL COMMUNITIES

Based on the *EPBC Act* Protected Matters Search Tool, four TECs were identified as occurring or potentially occurring within the Project Area and were:

- Endangered Brigalow (Acacia harpophylla dominant and co-dominant);
- Endangered Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
- Endangered Poplar Box Grassy Woodland on Alluvial Plains; and

- Endangered Weeping Myall Woodlands.

Ground-truthing of the vegetation communities present within the Project Area determined that two TECs occur in the Project Area:

- Brigalow (*Acacia harpophylla* dominant and co-dominant); and
- Poplar Box Grassy Woodland on alluvial plains.

The other two TECs are considered unlikely to occur in the Project Area, as no associated REs are mapped to occur within the Project Area, nor were the vegetation communities observed during field surveys conducted to date.

2.4 FLORA SPECIES

2.4.1 THREATENED FLORA SPECIES

Six *EPBC Act* and/or *Nature Conservation Act 1992 (NC Act)* listed flora threatened species were identified from desktop assessment as potentially occurring within 10 km of the Project Area. The field survey program confirmed only one of these species as known to occur in the Project Area, which was Kogan waxflower (*Philotheca sporadica*), Endangered under the *EPBC Act* and *NC Act*.

The other species were not observed during the field survey program but are considered as having the potential to occur (through a likelihood of occurrence (LoO) assessment) due to the presence of suitable habitat, and their ranges overlapping with the Project Area (see Table 2-3).

Pre-clearance surveys are proposed as part of the micro-siting phase of layout design. This will ensure that threatened plant species are located where present, and that appropriate mitigation measures will be taken, including avoidance of individuals and their habitat.

2.4.2 INTRODUCED FLORA SPECIES

The field survey period identified two introduced flora species listed as Weeds of National Significance (WoNS) and listed under the Queensland Biosecurity Act 2014 in the Project Area (Table 2-2).

Category 3 restricted invasive species under the Biosecurity Act 2014 must not be given away, sold or released into the environment. WoNS are weed species that have been agreed upon by Australian governments using an assessment process that prioritised these weeds based on their invasiveness, potential for spread and environmental impacts. The proponent must take reasonable and practical measures to minimise the biosecurity risks associated with dealing with prickly pear, known as a general biosecurity obligation. Local government biosecurity plans may also need to be consulted to determine any local measures that should be adopted for management and included in the Proposed Development's Environmental Management Plan.

TABLE 2-2 INTRODUCED WONS KNOWN TO OCCUR IN THE PROJECT AREA

Species Name	Common Name	WoNS	Biosecurity Act Status
<i>Opuntia tomentosa</i>	Velvety pear tree	Yes	Category 3 – Restricted invasive
<i>Opuntia spp</i>	-	Yes	Category 3 – Restricted invasive

Field surveys identified 31 introduced species, which represented 18% of the total flora species identified.

2.5 FAUNA SPECIES

2.5.1 THREATENED FAUNA SPECIES

The preliminary LoO based on desktop resources identified several listed *EPBC Act* or *NC Act* species as known, likely or as having potential to occur in the Project Area. The field survey program was designed to include targeted surveys to identify these species, as well as collection of data to support habitat mapping.

Based on the final LoO, which incorporated the results of the field survey program Table 2-3 lists the threatened fauna species that are known, likely or potentially occurring in the Project Area.

2.5.2 INTRODUCED FAUNA SPECIES

Six invasive mammalian species were confirmed to occur within the Project Area through desktop records through this assessment, including:

- European cattle (*Bos taurus*);
- Feral pig (*Sus scrofa*);
- Domestic and wild dog (*Canis familiaris*);
- Feral cat (*Felis catus*);
- House mouse (*Mus musculus*); and
- Black rat (*Rattus rattus*).

Only two invasive avifauna species, common myna (*Acridotheres tristis*) and common starling (*Sturnus vulgaris*), were recorded, representing only 1.9% of the avifauna species recorded.

2.6 LISTED THREATENED SPECIES IN THE PROJECT AREA

Overall, there are four listed threatened species known to occur in the Project Area, two listed TECs known to occur, one threatened species that is likely to occur, and 8 that have the potential to occur. These species are summarised in Table 2-3.

TABLE 2-3 SUMMARY OF LISTED SPECIES LIKELIHOOD OF OCCURRENCE

Scientific Name	Common Name	EPBC Act	NC Act
Known			
<i>Stagonopleura guttata</i>	Diamond firetail	V	V
<i>Phascolarctos cinereus</i>	Koala	E	E

Scientific Name	Common Name	EPBC Act	NC Act
<i>Calyptorhynchus lathamii lathamii</i>	Glossy black cockatoo	V	V
<i>Tachyglossus aculeatus</i>	short-beaked echidna	-	SLC
<i>Philotheca sporadica</i>	Kogan waxflower	E	E
Likely			
<i>Hirundapus caudacutus</i>	White-throated needletail	V, Mi	V
Potential			
<i>Aphelocephala leucopsis</i>	Southern whiteface	V	V
<i>Gallinago hardwickii</i>	Latham's snipe	V	V
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V
<i>Apus pacificus</i>	Fork-tailed swift	Mi	SLC
<i>Petauroides volans</i>	Greater glider (southern and central)	E	E
<i>Petaurus australis australis</i>	Yellow-bellied glider (south-eastern)	V	V
<i>Acacia lauta</i>	Tara wattle	V	V
<i>Prostanthera</i> sp.	Dunmore (D.M. Gordon 8A)	V	V
<i>Rutidosia glandulosa</i>		-	NT
<i>Rutidosia lanata</i>	Woolly wrinklewort	-	NT
<i>Westringia parvifolia</i>		V	V

EPBC Act and NC Act listing statuses are as follows: CE = Critically Endangered; E = Endangered; V = Vulnerable; Mi = Migratory; Ma = marine; SLC = Special Least Concern

3. ASPECTS AND RISKS

3.1 CONSTRUCTION ACTIVITIES

Construction-phase impacts are the focus of this VFMP. The key activities that could result in impacts on ecological resources during construction are:

- Vegetation clearing for permanent and temporary construction facilities (e.g. WTGs, BESS and associated infrastructure, transmission lines, compound sites and access tracks). The consequences of this impact may include:
 - Direct loss of native flora and fauna habitat;
 - Injury and mortality to fauna during clearing of fauna habitat;
 - Fragmentation of connectivity areas;
 - Introduction and spread of priority weeds and pathogens that impact fauna;
- Disturbance to fallen trees, dead wood and bush rock:
 - Indirect impacts identified include risks for soil and water contamination, creation of barriers to fauna movement, or the generation of excessive dust, light or noise.
- Construction traffic movements and plant operation (rock crushing and concrete batching plant).

Potential direct and indirect impacts to threatened flora and fauna within the Project Area, as a result of the above listed operational activities, include:

Direct Impacts

- Clearing native vegetation and the resultant loss of habitat for threatened fauna and flora;
- Direct mortality as a result of bird and bat collision risks with WTGs;
- Potential vehicle mortality and incidents as a result of vehicular movements, for maintenance, during the operational phase;
- Loss of fauna movement opportunities (e.g. habitat clearance, fencing during development);
- Habitat disturbance (albeit at a smaller scale than construction phase impacts) as a result of vehicular movements, for maintenance, during the operational phase; and
- Potential hazardous materials exposure.

Indirect Impacts

- Indirect impacts to adjacent habitat areas as a result of noise, light, blasting, dust, runoff and/or erosion, including impacts to downstream environments;
- Indirect impacts to adjacent habitat areas as a result of an introduction or spread of weed and pest species;
- Indirect impacts to species' behaviour through creating barriers to movement and dispersal;
- Indirect impacts to adjacent habitat areas as a result of noise, light, blasting, dust, runoff and/or erosion, including impacts to downstream environments;
- Indirect impacts to adjacent habitat areas as a result of an introduction or spread of weed and pest species;
- Indirect impacts to species behavior through creating barriers to movement and dispersal;

- Soil erosion and sedimentation leading to reduced water quality, and impacting chemical properties in soil;
- Dust impacts to vegetation health and biological functions; and
- Fragmentation of connectivity areas.

The duration of construction works is yet to be confirmed. The construction phase is anticipated to result in a maximum impact of 2,221.2 ha across the Project Area, including within MNES and MSES habitats. Following construction, sections of the Project Area will be rehabilitated to their original condition. As the construction front progresses, natural regeneration of grasses will be allowed in disturbed areas as a result of construction, which are not required for operation.

3.2 OPERATIONAL ACTIVITIES

The operational phase activities of the Proposed Development include:

- Operation of the WTGs for an estimated 35 year period;
- Operation of the BESS for an estimated 20-25 year period;
- Routine maintenance and servicing of WTGs, access tracks, electrical installation and infrastructure (as required); and
- Light traffic movements.

While operational phase activities occur for considerably longer than the construction phase, potential impacts are anticipated to be of lower frequency and in more indirect nature, and lower intensity than those during the construction phase.

Following the completion of the construction phase, construction laydown areas and widened access tracks not required for operation will be rehabilitated to the pre-development conditions, unless otherwise agreed upon with landowners, or the area is required for safety purposes (e.g., bushfire setbacks). Potential impacts to ecological values within the Project Area, as a result of the above listed operational activities can be delineated into direct and indirect impacts including:

Direct Impacts

- Direct mortality as a result of bird and bat collision risks with WTGs;
- Potential vehicle mortality and incidents as a result of vehicular movements, for maintenance, during the operational phase; and
- Potential hazardous materials exposure.

Indirect Impacts

- Indirect impacts to adjacent habitat areas as a result of noise, dust, runoff and erosion, including impacts to downstream environments; and
- Vegetation maintenance.

3.3 DECOMMISSIONING PHASE ACTIVITIES

When a decision is taken to decommission the Proposed Development, activities are anticipated to involve:

- Dismantling and removal of WTGs and BESS;
- Removal of electrical reticulation where not part of the permanent network infrastructure;

- Responsible disposal/recycling/reuse of infrastructure removed from the Project Area in accordance with the waste hierarchy; and
- Rehabilitation of all land disturbance in accordance with good practice at the time, and where not required for ongoing grazing of agricultural uses.

It should be noted that the following decommissioning aspects will be as follows:

- Underground cabling and hardstand pads will be left in situ, or deep ripped where rehabilitation is required;
- Turbine foundations will be removed up to 500 mm below rehabilitated ground level, as there is no risk to people or livestock;
- Excavations will be backfilled and rehabilitated;
- Access tracks may be retained for landholder benefit, or rehabilitated.

Potential impacts to ecological values, as a result of decommissioning activities are largely similar to those during the construction phase, albeit of lower magnitude, and largely consist of habitat loss and disturbance.

Following decommissioning activities, the disturbed Project Area will be rehabilitated to the extent agreed upon with the landholder.

Each WTG generally has a useful life of approximately 30 years, after which the WTG, footings (down to 0.5 m below natural ground surface) and any overhead transmission lines will be removed.

Rehabilitation activities will be undertaken in the post-construction phase and at the end-of-life decommissioning phase. A detailed Rehabilitation and Decommissioning Plan will be prepared in the early stages of operation, as part of the post-construction activities and will include overarching principles for the decommissioning phase.

4. MANAGEMENT MEASURES

The purpose, objectives, targets and key references of management and mitigation measures is captured in Table 4-1. Management and mitigation measures are listed in Table 4-2.

TABLE 4-1 MANAGEMENT MEASURES

Aspect	Implementation
Purpose	The purpose of VFMP is to describe how impacts on vegetation and fauna will be minimised and managed during construction of the Proposed Development.
Objectives	The key objective of the VFMP is to ensure that impacts to vegetation and fauna are managed and are within the scope permitted by the Development Permit. To achieve this objective, the following will be undertaken: • Ensure appropriate controls and procedures are implemented during construction activities to avoid (where necessary) or minimise potential adverse impacts to biodiversity values in the Proposed Development footprint; • Ensure appropriate measures are implemented to address the mitigation measures detailed in the Development Permit; and • Ensure appropriate measures are implemented to comply with relevant legislation and other requirements.
Targets	The following targets have been established for the management of vegetation and fauna impacts during construction of the Proposed Development: • Ensure full compliance with the relevant legislative requirements; • Ensure full compliance with relevant requirements of the Development Permit; • No disturbance to vegetation outside the construction footprint; • Minimise disturbance to vegetation within the Project Area; • Minimise disturbance to fauna within the Project Area; • No increase in distribution of noxious weeds currently existing within the Project Area; • No new noxious weeds introduced to the Project Area; • No fauna mortality during clearing and construction; and • No pollution or siltation of aquatic ecosystems, wetlands, endangered ecological communities or threatened species habitat.
Key References	• <i>Nature Conservation Act 1992</i> (NC Act); • <i>Environmental Protection Act 1994</i> (and Regulation) (EP Act); • <i>Vegetation Management Act 1999</i> (VM Act); • <i>Biosecurity Act 2014</i> (and Regulation); and • <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth) (EPBC Act).

TABLE 4-2 MANAGEMENT AND MITIGATION MEASURES FOR THE PROPOSED DEVELOPMENT

Stage	Management Actions	Responsibility	Timing
Pre-Development	Undertake a 'constructability assessment' to ensure vegetation clearing is minimised through design process.	Proponent	Design
	The two-stage design process involving initial mapping of ecological constraints has been completed and pre-clearance micro-siting surveys will be undertaken. Areas of remnant and regrowth vegetation will be avoided through development design following the constraints identified during the first-stage field surveys and subsequent micro-siting (pre-clearance) survey stages.	Proponent	Design
	Prior to construction and detailed design, the incorporation of road pinch points to maximise connectivity will be considered to maintain habitat connectivity. While pinch points have a benefit for habitat, they present a technical and logistical barrier to safe and effective construction. Pre-clearance surveys will determine appropriate locations for road pinch points.	Proponent	Design
	Design of a turbine with a blade sweep area >40 m above ground level to provide a collision-free foraging zone within the canopy and 20 m above the canopy	Proponent	Design
	Powerline (power pole) heights designed to allow for safe operations of a powerline noting buffers between conductors and the ground, and conductors and adjacent vegetation. Where possible, powerline heights have been adjusted to avoid fauna obstruction/entanglement and maximise canopy retention.	Proponent	Design
	Turbines have been located away from key habitats, where feasible (including remnant vegetation and waterways and drainage lines)	Proponent	Design
Pre-Construction	Pre-clearance surveys and on ground micro-siting will ensure infrastructure is located in areas which avoid, and subsequently minimise edge effects and the isolation, fragmentation, or dissection of tracts of native vegetation and identified habitat for listed protected species.	Principal Contractor	Prior to Construction
	Pre-clearance surveys and micro-siting will identify threatened flora species so that the Disturbance Footprint can be refined, or so threatened individuals can be translocated to suitable habitat outside the Disturbance Footprint.	Principal Contractor	Prior to Construction
	A biosecurity plan will be developed and implemented for the Project. This will include measures such as vehicle wash downs, weed certification and obligations to remain on access tracks throughout the Project Area.	Principal Contractor	Pre-Start Works

Stage	Management Actions	Responsibility	Timing
	VFMP will be implemented which outlines management measures to mitigate impacts to vegetation and fauna.	Principal Contractor	Pre-Start Works
	Species-specific management and mitigation measures have been identified and will be implemented to specifically minimise risks.	Principal Contractor	At All Times
	All clearing shall be within clearly marked boundaries and in accordance with the Development Permit.	Principal Contractor	At All Times
Construction	Staff and contractors will be made aware through general site induction and training of the potential to generate dust emissions and mitigation and management measures that should be implemented to avoid clearing prior to pre-clearing checks.	Principal Contractor	At All Times
	Blade Manipulator trucks are only just being introduced to the Australian market and we can't guarantee the project will utilise them. The disturbance footprint has been designed based on industry standard delivery methods. If clearing can be reduced due to technological improvements, these will be considered for adopting in construction, however given the novel nature of this particular technology a commitment to its use cannot be made.	Principal Contractor	At All Times
	Where trenching and excavations are created which may entrap fauna, suitable escape measures are put in place, and excavation are checked for fauna before backfilling.	Principal Contractor	At all times
	Provide site specific information on relevant threatened species.	Principal Contractor	At all times
	Where fencing is required, barbed wire fencing will not be used. Proponent has a contractual commitment to install fencing on site that replicates the existing fencing that is present on the Land. If any additional permanent fencing is required, it must reflect what the host landholders use for their farming operations or complies with relevant electrical safety guidelines.	Principal Contractor	At all times
	Include toolbox talks for site specific flora and fauna information to all field staff and contractors.	Principal Contractor	Daily
	Construction activities must not interfere or block natural drainage e.g. disturbing channel contours.	Principal Contractor	At All Times
	Where required, watercourse crossing points will be adequately stabilised to prevent erosion.	Principal Contractor	At All Times
	Activities will be planned so that movement of vehicles, plant, machinery and equipment avoids moving between properties as required.	Principal Contractor	At All Times

Stage	Management Actions	Responsibility	Timing
	Ensure appropriate waste management (lidded bins), including food scraps, to reduce potential for feral species to become established on-site	Principal Contractor	At All times
	Imported materials are able to transport weed seeds will be assessed to ensure they are free of contamination, disease and invasive weeds.	Principal Contractor	At All Times
	Access roads, easements and yards will be kept weed free where practicable.	Principal Contractor	At All Times
	Only registered herbicides will be used by licenced weed sprayer.	Principal Contractor	At All Times
Monitoring	Daily inspections by spotter / catcher during clearing, specifically hollow trees or food tree species.	Principal Contractor	Where required
	Weekly site inspections to review flora and fauna control measures during construction.	Principal Contractor	Weekly
	Auditing of the Construction Environmental Management Plan (CEMP) during construction.	Principal Contractor	Quarterly
Reporting	Sightings and incidents reported in daily pre-starts during construction.	Principal Contractor	Daily
	Fauna spotter-catcher will keep an inventory of any fauna species encountered with details of species, capture and release condition and capture and release GPS co-ordinates during construction, in accordance with NC Act.	Spotter Catcher	Daily
	Injured native fauna to be reported to the Health, Safety, Environment and Quality (HSEQ) Manager.	Principal Contractor	Within 24 hours
	GPS co-ordinates of all MNES and MSES flora locations to be reported when clearing activities are planned.	Principal Contractor	As Required
	Any cleared vegetation not designated to be cleared to be reported to HSEQ Manager.	Principal Contractor	Within 24 hours
	Monthly report during construction to report on clearing activities aligned with approval requirements.	Principal Contractor	Monthly
	Annual report on weed management measures and maintenance of vegetation activities, aligned with approval requirements	O&M Contractor	Annually
Corrective Action	All near misses and incidents will be investigated to establish root cause. Where necessary corrective actions will be developed to improve existing processes.	All Personnel	As Required

5. CONCLUSION

The nine field investigations between December 2023 and October 2025 have determined the ecological values and associated vegetation communities and habitats that occurred within the Project Area. As a result of these field investigations, the layout design has been informed such that areas with high ecological value vegetation within the Project Area have been avoided.

The second phase of layout design will involve pre-clearance surveys of the Development Footprint, which will further avoid impact to listed species habitat. These pre-clearance surveys will assess the proposed locations for infrastructure and adjust these accordingly if any vegetation communities or habitats for threatened species are located within the proposed locations.

Construction and operational activities that will potentially impact vegetation have been identified and subsequent mitigation measures have been outlined in this Preliminary VFMP, in order to adequately manage these potential impacts.

This VFMP is a dynamic document that will be reviewed and amended throughout the development and life of the Proposed Development to ensure the mitigation and management measures remain effective. This document will be updated:

- Throughout the detailed development phase of the Proposed Development, and prior to construction of the Proposed Development;
- Where there is a significant change to the Proposed Development schedule, site layout, or a change in the construction methods that require amendment to vegetation and fauna protection measures;
- Where a corrective action is recorded, or performance criteria are not being met and additional measures are identified for inclusion to prevent reoccurrence; and
- Where a change in legislation or best practice methodology has been identified.



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APPENDIX G SRIA FOR THREATENED FAUNA

APPENDIX G

SIGNIFICANT RESIDUAL IMPACT
ASSESSMENT FOR PROTECTED FAUNA

G. SIGNIFICANT RESIDUAL IMPACT ASSESSMENTS

G.1 DIAMOND FIRETAIL

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to:		
Lead to a long-term decrease in the size of a local population	Despite a large survey effort, the diamond firetail has not been observed within the Project Area. However, the species has been considered known to occur due to a 2021 desktop record of the species located within the Project Area. The estimated population size for diamond firetail is 136,000 individuals, with a very low reliability (DCCEEW, 2023b). The Proposed Development is unlikely to result in direct mortality to the species as it does not fly at RSA height, and has not been observed in the Project Area. Further, the diamond firetail's capacity for breeding and dispersal will not be impeded by the Proposed Development, given it is a highly mobile species.	Unlikely
Reduce the extent of occurrence of the species	The area of occupancy for this species is roughly estimated at 25,000 km ² (DCCEEW, 2023b). The Proposed Development will lead to a permanent impact to 433.7 ha, or 5.2% of the total available diamond firetail habitat within the Project Area which equates to <0.1% of the species area of occupancy. The broad habitat requirements of this species suggest that this species is likely to have high availability of habitat within the wider region. Although 433.7 ha of habitat will be permanently impacted within the Project Area, the area of retained habitat within the Project Area is likely to continue to support any potentially occurring local populations. Therefore, the Proposed Development is unlikely to reduce the area of extent of diamond firetail.	Unlikely
Fragment an existing population	Impacts from the Proposed Development will mostly involve the clearing of thin (average 40m), linear strips of remnant vegetation for WTGs and linear infrastructure. Given the high mobility of this species, habitat within the Project Area will remain largely connected in the landscape, and to higher quality habitat associated with adjacent areas. It is therefore unlikely that the Proposed Development will result in a barrier to movement for this species or fragment any existing populations into two or more populations.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As detailed above, the Proposed Development's potential fragmentation impacts are unexpected to result in fragmentation impacts to bird species, as cleared corridors will only be an average of 40m wide. As a bird that is known to persist in disturbed environments, the diamond firetail will be able to disperse across these corridors to prevent any habitat isolation impacts.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	Invasive species are a known threat to diamond firetail, through habitat degradation, weed invasion into habitats, competition for resources, and predation. Specifically, the diamond firetail is threatened by habitat degradation caused by rabbits and weed invasion in habitats, specifically African lovegrass (<i>Eragrostis curvula</i>); both of which are not known to occur within the Project Area. While not considered invasive species, competition by noisy miners (<i>Manorina melanocephala</i>) and predation by pied currawongs (<i>Strepera graculina</i>) are threats to the species, with both species known to occur within the Project Area. The Proposed Development will adopt and follow a Biosecurity Plan as part of the EMP, as outlined in Section 7. The activities related to the Proposed	Unlikely

Criteria	Response	SRI?
	Development, both during construction and operation, will implement and follow biosecurity measures to reduce the risk of introducing new invasive species and to prevent the further spread of existing invasive species. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in harmful invasive species becoming established in the diamond firetail habitat.	
Introduce disease that may cause the population to decline	As per the species conservation advice (DCCEEW, 2023b), there is currently limited evidence of diseases causing detrimental effects to diamond firetail populations in Queensland. There is also no evidence to suggest the Proposed Development would introduce a disease that may cause the species to decline. Regardless, the Proposed Development will implement appropriate mitigation and management measures during the construction phase, including biosecurity measures as part of the EMP, to reduce any risks of diseases (as outlined in Section 7). Therefore, with the management and mitigation measures applied, the Proposed Development is considered unlikely to introduce disease that may cause the species to decline.	Unlikely
Interfere with the recovery of the species	Construction and operation of the Proposed Development will involve the establishment of large, industrial impacts within diamond firetail habitat on the edge of its 'likely to occur' distribution. This is likely to interfere with the species recovery, especially considering up to 433.7 ha of diamond firetail habitat will be permanently impacted.	Likely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	Construction and operation of the Proposed Development will involve the establishment of large, industrial impacts within diamond firetail habitat. Additionally, nearby high-quality habitat areas (State Forest's) are likely to be somewhat disturbed by the Proposed Development to the extent that ecologically significant locations for the diamond firetail may be disrupted. The Project Area is situated on the edge of the species core 'likely to occur' distribution, meaning that habitat in the Project Area and in proximity to it are likely to be relatively important.	Likely

G.2 GLOSSY BLACK COCKATOO

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	The Project Area contains 809.3 ha of foraging habitat. A total of 57.5 ha (or 7.1%) of this habitat is likely to be impacted by the Proposed Development, which is not expected to result in a long-term decrease in the local population of glossy black cockatoo that occur in the Project Area. Additionally, no breeding habitat will be impacted, as there is not expected to be any in the Project Area. Further, the species is considered to be at low risk to collision with WTG (see BBMP). The BBMP also details an impact trigger framework which will be implemented to prevent a significant impact occurring to the species via turbine collision. Therefore, the Proposed Development is considered unlikely to lead to a long-term decrease in the size of population of the species.	Unlikely
Reduce the extent of occurrence of the species	The area of occupancy for the glossy black cockatoo (south-eastern) is estimated at 40,000 km² (DCCEEW, 2022a), or 4,000,000 ha. A total of 57.5 ha of glossy black cockatoo foraging habitat within the Project Area is expected to be impacted by the Proposed Development. This area makes up <0.001% of the species estimated area of occupancy. Further, the Proposed Development is not expected to fragment the species populations, due to its highly mobile dispersal capacity as a bird. Therefore, the Proposed Development is considered unlikely to reduce the area of occupancy of the species.	Unlikely
Fragment an existing population	Impacts from the Proposed Development will mostly involve clearing of small patches of remnant vegetation for WTGs as well as clearing for linear infrastructure. Given the high mobility of this species, habitat within the Project Area will remain largely connected in the landscape, and to higher quality habitat associated with adjacent areas. Therefore, it is considered unlikely that the Proposed Development will fragment an existing population into two or more populations.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As detailed above, the Proposed Development's potential fragmentation impacts are unexpected to result in fragmentation impacts to bird species, as cleared corridors will only be an average of 40m wide. As the glossy black cockatoo is a highly mobile, locally nomadic species, it will be able to disperse across these corridors to prevent any habitat isolation impacts.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	The species' habitat is threatened by the introduction of invasive weeds, as these have the ability to change the floristic and structural characteristics of the species' habitat. It should be noted that more research is required to assess the extent of this impact on foraging and breeding habitats (DCCEEW, 2022a). Predation by introduced predators such as feral cats (<i>Felis catus</i>) and European red fox (<i>Vulpes vulpes</i>) does not appear to be a major threat to the species (DCCEEW, 2022a). The Proposed Development will adopt and follow biosecurity measures as part of the EMP, as outline in Section 7. The activities related to the Proposed Development, both during construction and operation, will implement and follow biosecurity measures to reduce the risk of introducing new invasive species and to prevent the further spread of existing invasive species. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the glossy black cockatoo becoming established in the glossy black cockatoo habitat.	Unlikely

Criteria	Response	SRI?
Introduce disease that may cause the population to decline	Psittacine Beak and Feather Disease (PBFD), a potentially fatal diseases caused by psittacine circovirus, affects glossy black cockatoo. This disease is transmitted between adults, nestlings and through contaminated nest hollows, however, this threat is considered low. There is no evidence to suggest human development results in PBFD in the species (DCCEEW, 2022a). Regardless, the Proposed Development will implement appropriate mitigation and management measures during the construction phase, including biosecurity measures as part of the EMP, to reduce any risks of diseases (as outlined in Section 7). Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to introduce disease that may cause the species to decline.	Unlikely
Interfere with the recovery of the species	There is no adopted or made recovery plan for this species; however, a recovery plan is required. The species' conservation advice (DCCEEW, 2022a), lists the following short-term and long-term primary conservation objectives: • Short term (5–10 years): ◦ Protect, enhance extent and quality of habitat across the subspecies' range; ◦ Address critical knowledge gaps of the subspecies' ecological needs to guide and refine management strategies; and ◦ Enhance community awareness and stewardship of the conservation of the subspecies. • Long term (+10 years): ◦ The subspecies' population is stable, such that it no longer qualifies for listing as threatened under the EPBC Act listing criteria. The Proposed Development will remove a maximum of 57.5 ha (or 7.1%) of the foraging habitat identified within the Project Area, which is a small proportion of habitat in the species distribution range. As such, the Proposed Development is considered unlikely to interfere with the recovery of the species.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	Construction and operation of the Proposed Development will involve the establishment of large, industrial impacts within glossy black cockatoo habitat. While there is no mapped breeding or nesting habitat, the Project Area's location on the edge of the species 'likely to occur' distribution means that the mapped foraging habitat may be considered an ecologically significant location. Additionally, nearby high-quality habitat areas (State Forest's) are likely to be somewhat disturbed by the Proposed Development.	Likely

G.3 KOALA

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	Field surveys confirmed koala occurrence in the Project Area through the observation of scat or scratches at seven separate locations. The Project Area contains a total of 10,471.0 ha of breeding, foraging and core dispersal habitat, and 5,642.8 ha of safe intervening ground matrix habitat for the koala. Of this, a maximum of 644.0 ha (or 6.1%) of breeding, foraging and core dispersal habitat within the Project Area is expected to be permanently impacted by the Proposed Development. A total of 484.5 ha of safe intervening ground matrix habitat will be temporarily impacted, but this will not affect the functionality of these areas for koala. The Proposed Development will implement mitigation and management measures, including pre-clearance surveys and micro-siting of proposed infrastructure, to avoid direct mortality or impact to locally important or higher quality trees for the koala (where possible). Implementation of the measures (described in Section 7) will mitigate indirect impact to the species such as fragmentation, noise, dust and light pollution to reduce the likelihood that koalas would be dissuaded from occurring in the Project Area. Connectivity and dispersal opportunities are also retained, as impacts to waterways are minimal and the narrow, linear nature of the clearing footprint will also maintain the ability for koalas to traverse through the safe intervening ground matrix. Therefore, it is considered unlikely that the Proposed Development would lead to a long-term decrease in the size of a local population. This is especially true considering the abundance of higher quality habitat in the locality associated with the various State Forest's.	Unlikely
Reduce the extent of occurrence of the species	Koala has a widespread distribution across the east coast of Australia that ranges more than 1,660,000 km², or 166,000,000 ha. The species has a smaller and more fragmented area of occupancy estimated at 19,428 km² (DAWE, 2022). A total of 10,471.0 ha of breeding, foraging and core dispersal habitat for the koala has been mapped to occur throughout the Project Area, with projected permanent impacts to up to 644.0 ha (or 6.1%) of this. This impact equates to <0.01% of the species estimated area of occupancy. Additionally, disturbance to the safe intervening ground matrix habitat will not permanently remove the function of this habitat or create a barrier to movement, allowing for retention of important habitat patches and maintained connectivity between these patches. It is therefore considered unlikely that the Proposed Development will reduce the area of occupancy of the species.	Unlikely
Fragment an existing population	The home range for the koala is highly variable, with the species known to disperse between 3 to 500 ha across various habitats . The Proposed Development will result in a permanent impact to up to 644.0 ha (or 6.1%) of breeding, foraging and core dispersal habitat within the Project Area. However, impacts associated with the Proposed Development will only remove habitat in small linear patches. Due to the linear nature of clearing it is expected koala will still be able to disperse across tracks and small cleared areas within the Project Area. It is therefore unlikely the Proposed Development will fragment an existing koala population into two or more populations.	Unlikely

Criteria	Response	SRI?
Avoid genetically distinct populations forming as a result of habitat isolation	As discussed above, the Proposed Developments fragmentation impacts are not expected to result in any significant impact to the koala. This is because the koala is known to be able to disperse across unsealed roads the narrow linear clearing that will arise due to the Proposed Development. As such, habitat isolation and subsequent genetically distinct populations are not expected to arise due to the Proposed Development.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	The species conservation advice (DAWE, 2022) specifies the koala is threatened by predation by feral cats (<i>Felis catus</i>) and wild dogs (<i>Canis lupus</i>), both of which were not recorded within the Project Area. The Proposed Development will adopt and follow biosecurity measures as part of the EMP, as outline in Section 7. The activities related to the Proposed Development, both during construction and operation, will implement and follow biosecurity measures to reduce the risk of introducing new invasive species and to prevent the further spread of existing invasive species. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the koala becoming established in the koala habitat.	Unlikely
Introduce disease that may cause the population to decline	Koala populations are known to be impacted by diseases, specifically koala retrovirus (KoRV) and <i>Chlamydia pecorum</i> (chlamydia). There is no evidence to suggest the construction and/or operational activities of the Proposed Development would introduce a disease, such as chlamydia or KoRV, that would cause the species to be at risk of illness and subsequent population decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur, as detailed in a EMP. This includes following biosecurity measures and ensuring proper personal protection equipment is worn by construction workers and vehicle washdowns before entering any sites near koala habitat. Therefore, with the appropriate management and mitigation measures applied, it is considered unlikely that the Proposed Development will introduce disease that may cause the species to decline.	Unlikely
Interfere with the recovery of the species	The National Recovery Plan for the koala (<i>Phascolarctos cinereus</i>) outlines the following recovery goal for the koala (DAWE, 2022): <i>To stop the trend of decline in population size of the listed Koala, by having resilient, connected, and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied.</i> To achieve this goal, three long-term recovery objectives have been developed, these are: 1. <i>Area of occupancy:</i> ◦ <i>The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased;</i> ◦ <i>The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased;</i> 2. <i>Metapopulation processes are maintained or improved; and</i> 3. <i>Partners, communities and individuals have a greater role and capability in listed koala monitoring, conservation and management.</i>	Likely

Criteria	Response	SRI?
	As discussed above, the Proposed Development is considered unlikely to reduce the area of occupancy of the species, however, it is considered potential that a permanent impact to 644.0 ha of breeding, foraging and core dispersal habitat has the potential reduce the area of occupancy of the local population that is currently utilising the Project Area. Therefore, the proposed Development is likely to interfere will the recovery of the species.	
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	Construction and operation of the Proposed Development will involve the establishment of large, industrial impacts within koala habitat. Additionally, nearby high-quality habitat areas (State Forest's) are likely to be somewhat disturbed by the Proposed Development to the extent that ecologically significant locations for the koala may be disrupted.	Likely

G.4 WHITE-THROATED NEEDLETAIL

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	White-throated needletail is almost exclusively aerial in nature while in Australia, with the entire Project Area (20,404.5 ha) considered aerial foraging habitat for the species. It is unlikely that development for the Proposed Development will interfere with this species ability to forage and disperse. The minimum threshold for an ecologically significant impact to a population for white-throated needletail is 40 individuals over a five-year period (Garnett & Crowley, 2000). The white-throated needletail is considered likely to occur within the Project Area, with no individuals recorded during field surveys. If the species were to occur within the Project Area in the future, the BBMP outlines the decision-making framework and adaptive management to be completed in the event of impact triggers being met. Importantly, if triggers are met, than adaptive management and corrective actions will be implemented to prevent a long-term decrease in the size of a population. Based on the current data, it is considered unlikely that the Proposed Development will lead to a long-term decrease in the size of the species population.	Unlikely
Reduce the extent of occurrence of the species	White-throated needletail's area of occupancy while migrating through coastal Eastern Australia is estimated at approximately 126,000 km ² (TSSC, 2019). As discussed, white-throated needletail, is almost exclusively aerial whilst migrating across Australia. The disturbance of vegetation associated with the Proposed Development is unlikely to reduce this area of occupancy considering the species broad use of most habitat types.	Unlikely
Fragment an existing population	White-throated needletail is a highly mobile species that migrates southwards over large areas of coastal Eastern Australia in the spring, summer, and autumn seasons (TSSC, 2019). Given the dispersive and aerial nature, it is considered unlikely that the Proposed Development will fragment an existing population into two or more populations.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	White-throated needletail is a highly mobile species that migrates southwards over large areas of coastal Eastern Australia in the spring, summer, and autumn seasons (TSSC, 2019). The Proposed Development will not interfere with this migratory pathway, or affect the breeding cycle of the species. Therefore, the Proposed Development is considered unlikely to result in isolated populations or genetically distinct populations.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	No invasive species have been identified as a threat to the white-throated needletail (TSSC, 2019). The Proposed Development will adopt and follow biosecurity measures as part of the EMP, as outlined in Section 7. The activities related to the Proposed Development, both during construction and operation, will follow biosecurity measures to reduce the risk of introducing new invasive species and to prevent the further spread of existing invasive species. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the white-throated needletail species becoming established in the white-throated needletail habitat.	Unlikely
Introduce disease that	While not necessarily a disease, the use of insecticides, particularly organochlorines, has been linked with the decline	Unlikely

Criteria	Response	SRI?
may cause the population to decline	of white-throated needletail through indirect impacts. These indirect impacts include secondary poisoning through bioaccumulation of insecticides in prey species, and the decrease in the availability of preferred invertebrate prey species (Tarburton, 2021). There is no evidence to suggest that the Proposed Development will increase the risk of these impacts. However, precautions will be taken to ensure that insecticides are not improperly applied within the Project Area (see Section 7).	
Interfere with the recovery of the species	There is no adopted or made recovery plan for this species however the conservation advice lists the following primary conservation objectives (TSSC, 2019): • Work with governments in East Asia to minimise destruction of key breeding habitats; and • Important habitats in Australia are identified and protected. Due to no individuals being observed during field surveys, and the habitat within the Project Area being exclusively aerial foraging habitat, it is considered unlikely that the Proposed Development will interfere with the recovery of the species.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	Given the species highly mobile nature, migratory existence in Australia, and the absence of observation of the species during an extensive field survey effort, there are not expected to be any ecologically significant locations in the Project Area.	Unlikely

G.5 GREATER GLIDER

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	The Proposed Development will result in permanent impact up to 200.1 ha of potential denning and breeding habitat and 53.1 ha of potential foraging/future denning habitat. However, considering the limited evidence to suggest the species occurs in the Project Area, and the proposed mitigation measures, this is unlikely to reduce the long-term size of the species population in the region. For example, pre-clearance surveys in areas mapped as potential habitat for the species will ensure that any impact to known denning trees is avoided or accounted for. Further, as the majority of available potential habitat for the species in the Project Area will remain, there will be a large quantity of potential habitat available after the Proposed Development is established.	Unlikely
Reduce the extent of occurrence of the species	The area of occupancy of the greater glider (southern and central) is estimated at 15,316 km ² , or 15,316,000 ha. The Proposed Development will permanently impact only 253.2 ha of potential habitat, which is 0.001% of this area of occupancy, a negligible impact. The Project Area is on the border of the species known distribution, but there is a large quantity of potential habitat in the Locality, associated with the State Forests, which means that the Proposed Development will not reduce the species distribution.	Unlikely
Fragment an existing population	Impacts of habitat fragmentation are a serious threat to the greater glider and must be appropriately managed by the Proposed Development, considering that the Disturbance Footprint intersects a large contiguous area of potential denning/breeding habitat. The incorporation of vegetation pinch points and fauna movement solutions (ie. glide poles) will reduce the severity of fragmentation impacts such that it is unlikely that a population would become completely fragmented. This is because no patch of existing potential habitat will be fully enclosed by direct impact without vegetation pinch points and glide poles to enable between-patch dispersal.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As discussed above, fragmentation impacts from the Proposed Development are expected to be suitably mitigated and managed in order to prevent a significant impact. These impacts will be mitigated by the implementation of glide poles and vegetation pinch points in mapped greater glider habitat to prevent the complete isolation of habitat patches. As such, the Proposed Development is not expected to isolate habitat patches or result in genetically distinct populations of the species.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	Greater glider is threatened by predation by feral cats (<i>Felis catus</i>) and European red foxes (<i>Vulpes vulpes</i>) (DCCEEW, 2022). Of these two species, only feral cats have been recorded within the Project Area. The Proposed Development's EMP will include biosecurity mitigation measures which will reduce the likelihood of introduction or exacerbation of invasive species in the Project Area.	Unlikely
Introduce disease that may cause the	There are no known identified diseases associated with greater glider (DCCEEW, 2022), as well as no evidence to suggest the Proposed Development will introduce diseases harmful to the greater glider. However, precautions will be taken to ensure	Unlikely

Criteria	Response	SRI?
population to decline	that the spread of disease does not occur, including following biosecurity measures listed as part of the EMP (see Section 7). Therefore, with the appropriate management and mitigation measures applied, it is considered unlikely that the Proposed Development will introduce disease that may cause the species to decline.	
Interfere with the recovery of the species	There is no adopted recovery plan for the species, but the conservation advice lists the following conservation and management priorities which are relevant to the Proposed Development: • Reduce severity of fire in greater glider habitat; • Ensure that eucalypt forests and the impacts of disturbance (including fire) are managed to prevent them transitioning to less nutritious, hotter, and/or more fire-prone plant communities, and to ensure that food tree species preferred by the greater glider continue to be the dominant canopy trees; • Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity, to sustain viable subpopulations throughout the species' range; • Protect hollow-bearing trees on private property, roadside reserves, and along the edges of roads/tracks. Prior to removing trees identified to be a 'hazard', undertake a risk assessment by a suitably qualified person to determine whether their removal is necessary, including a consideration of the potential impacts of tree removal on the greater glider. Incorporate measures to ensure ongoing recruitment of hollow-bearing trees into planning processes. • Avoid fragmentation and loss of habitat due to development of new transport corridors. Include consideration of the species in planning processes, and where possible re-locate recreational activities and roads away from habitat; • Avoid the use of barbed wire, and replace the top strands of existing barbed wire with single-strand wire in habitat known to be occupied by greater gliders; • Protect all habitat likely to be climate change refuges, including sites buffered against desiccating conditions (e.g. sheltered and/or on south-facing aspects), under future climate change scenarios; and • Implement control measures to reduce impact from invasive predators. The Proposed Development will not interfere with these priorities, as the broad suite of mitigation measures described in Section 7 include measures to control fire, invasive species, protect hollow-bearing trees, minimize fragmentation and avoid barbed wire. Further, the species is only considered to have the potential to occur.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	There are not expected to be any ecologically significant locations for the greater glider in the Project Area, as the species is only considered to have the potential to occur, with no historical records in the Project Area or adjacent State Forests. As such, the Proposed Development is not expected to disrupt any ecologically significant locations for the greater glider.	Unlikely

G.6 YELLOW-BELLIED GLIDER

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	A total of 2,036.5 ha of potential foraging and future denning habitat has been identified within the Project Area. Yellow-bellied glider is considered as having the potential to occur within the Project Area with no individuals observed within the Project Area or Locality. Up to 62.8 ha of available potential foraging and future denning habitat may be impacted by the Proposed Development, however this impact only makes up 3.1% of the available potential foraging and future denning habitat within the Project Area. Therefore, the Proposed Development is unlikely to lead to a long-term decrease in the size of a population.	Unlikely
Reduce the extent of occurrence of the species	This species is predicted to have an area of occupancy of 12,724 km ² (DAWE, 2022), or 1,272,400 ha. The Proposed Development is expected to impact up to 62.8 ha of the potential yellow-bellied glider habitat within the Project Area, which equates to <0.01% of the predicted area of occupancy for this species. Therefore, it is considered unlikely that the Proposed Development will reduce the area of occupancy of a population.	Unlikely
Fragment an existing population	Habitat fragmentation will be managed to ensure that any potentially present yellow-bellied gliders are able to move and disperse throughout the entirety of identified habitat, maintaining connectivity with the landscape within and surrounding the Project Area. Yellow-bellied glider has a glide ratio of around 2:1 and a maximum glide distance that could be as high as 120 m–140 m (DAWE, 2022). All clearing for access corridors will have an average of 40 m, with pinch points and glide poles proposed as additional mitigation measures to reduce impacts from fragmentation. Therefore, it has been concluded that the Proposed Development is unlikely to fragment an existing population.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As discussed above, fragmentation impacts from the Proposed Development are expected to be suitably mitigated and managed in order to prevent a significant impact. These impacts will be mitigated by the implementation of glide poles and vegetation pinch points in mapped yellow-bellied glider habitat to prevent the complete isolation of habitat patches. As such, the Proposed Development is not expected to isolate habitat patches or result in genetically distinct populations of the species.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	The yellow-bellied glider is threatened by predation from European red foxes (<i>Vulpes vulpes</i>) and feral cats (<i>Felis catus</i>), and habitat degradation from feral deer (various species) (DAWE, 2022). Of these invasive species, only feral cats are known to occur within the Project Area. The Proposed Development will adopt and follow biosecurity measures which will be outlined in the EMP, as per Section 7. The activities related to the Proposed Development, both during construction and operation, will implement and follow biosecurity measures to reduce the risk of introducing new invasive species and to prevent the further spread of existing invasive species. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the yellow-bellied glider becoming established in the potential yellow-bellied glider habitat.	Unlikely

Criteria	Response	SRI?
Introduce disease that may cause the population to decline	There is currently limited evidence of diseases noted in the conservation advice or literature causing detrimental effects on yellow-bellied glider populations in Queensland (DAWE, 2022). There is also no evidence to suggest the Proposed Development would introduce a disease that could cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures as part of a EMP (see Section 7). Therefore, with the appropriate management and mitigation measures applied, it is considered unlikely that the Proposed Development will introduce disease that may cause the species to decline.	Unlikely
Interfere with the recovery of the species	There is no adopted or made recovery plan for this species, however the conservation advice lists the following primary conservation outcome for the species (DAWE, 2022): - Population size has stabilised because sufficient areas of habitat are protected from extensive severe fire, fragmentation and timber harvesting; and - Known threats are mitigated and key habitat features (e.g., sap trees, hollow-bearing trees) and habitat connectivity are retained. Clearing will largely occur within small, isolated WTG locations, or narrow linear areas within the Project Area, retaining habitat connectivity for the species within the Project Area. Additionally, the Project Area will remain connected to adjacent State Forests that provide suitable habitat for the species. The pre-clearance surveys and micro siting of infrastructure will ensure that key habitat features are avoided as much as possible. Therefore, it is considered unlikely that the Proposed Development will interfere with the recovery of the species.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	There are not expected to be any ecologically significant locations for the yellow-bellied glider in the Project Area, as the species is only considered to have the potential to occur, with no historical records in the Project Area or adjacent State Forests. As such, the Proposed Development is not expected to disrupt any ecologically significant locations for the yellow-bellied glider.	Unlikely

G.7 SOUTHERN WHITEFACE

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to:		
Lead to a long-term decrease in the size of a local population	The southern whiteface was not recorded during field surveys and is considered to have potential to occur within the Project Area. A total of 653.5 ha of potential habitat for the species has been mapped within the Project Area, of which up to 25.4 ha (or 3.9%) may be permanently impacted by the Proposed Development. The species is at a negligible risk from turbine-related impacts, due to its proclivity to fly no higher than canopy height. Due to the limited impacts to the species habitat and its negligible risk of being impacted by turbines, the Proposed Development is considered unlikely to lead to a long-term decrease in the size of a population of southern whiteface.	Unlikely
Reduce the extent of occurrence of the species	The southern whiteface occurs across the majority of mainland Australia (south of the tropics), from the north-eastern Western Australia wheatbelt, east to the Great Dividing Range (DCCEEW, 2023). The area of occupancy for the southern whiteface is estimated at 80,000 km ² (DCCEEW, 2023), or 8,000,000 ha. The Proposed Development is expected to have a permanent impact on 25.4 ha of potential southern whiteface habitat. This impact equates to < 0.01% of the species estimated area of occupancy. Therefore, the Proposed Development is considered unlikely to reduce the area of occupancy of the species.	Unlikely
Fragment an existing population	Impacts from the Proposed Development will mostly involve the clearing of small patches of remnant vegetation for turbines as well as clearing for linear infrastructure. Given the high mobility of this species, potential habitat within the Project Area will remain largely connected in the landscape, and to higher quality habitat associated with adjacent areas. It is therefore unlikely that the Proposed Development will result in a barrier to movement for this species, or fragment any existing population into two or more populations.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As detailed above, the Proposed Development's potential fragmentation impacts are unexpected to result in fragmentation impacts to bird species, as cleared corridors will only be an average of 40m wide. As a bird that is known to persist in disturbed environments, the southern whiteface will be able to disperse across these corridors to prevent any habitat isolation impacts.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	Invasive species have not been identified as a main threat to the southern whiteface within the species conservation advice (DCCEEW, 2023). The conservation advice does however list habitat degradation caused by domestic livestock grazing as a main threat to the species (DCCEEW, 2023). The potential habitat within the Project Area has already been affected by both historical and ongoing grazing practices. The Proposed Development is not expected to increase these impacts beyond their existing level. Additionally, the Proposed Development will adopt and follow biosecurity measures as part of the EMP, as outlined in Section 7. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the southern whiteface becoming established in the potential southern whiteface habitat.	Unlikely

Criteria	Response	SRI?
Introduce disease that may cause the population to decline	As per the species conservation advice (DCCEEW, 2023), there are no known identified diseases associated with southern whiteface. There is also no evidence to suggest the Proposed Development would introduce a disease that may cause the species to decline. Regardless, the Proposed Development will implement appropriate mitigation and management measures during the construction phase, including biosecurity measures as part of the EMP, to reduce any risks of diseases (as outlined in Section 7). Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to introduce disease that may cause the species to decline.	Unlikely
Interfere with the recovery of the species	There is no adopted or made recovery plan for this species, however the species conservation advice lists the following conservation and management priorities for the species, regarding habitat loss (DCCEEW, 2023): • Cease all land clearing of habitat critical to the survival of southern whiteface; • Secure occupied habitat patches in areas where the birds have a patchy distribution from further degradation and loss; • Undertake revegetation, using a diverse mix of locally appropriate native species, focusing on expanding and connecting areas of existing habitat or widening wildlife corridors wherever possible; and • Promote ecological management and connectivity of woodland remnants on public and private land; and • Promote the uptake of agriculture and biodiversity stewardship programs to retain southern whiteface habitat. The Project Area contains 653.5 ha of potential habitat for the southern whiteface, which is not considered habitat critical to the survival of the species, due to its degradation by historical grazing. Additionally, there is no evidence to suggest that the identified habitat within the Project Area is occupied by the species with no observations of the species during field surveys or recent historical records of the species within the Project Area. Therefore, it is considered unlikely that the Proposed Development will interfere with the recovery of the species.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	There are not expected to be any ecologically significant locations for southern whiteface in the Project Area, as the species is only considered to have the potential to occur. Furthermore, the Project Area is not on the edge of the species 'likely to occur' or 'may occur' distribution, indicating that it is not ecologically significant in this regard. The Proposed Development's impacts on the southern whiteface are also expected to be suitably mitigated and managed to prevent any significant disruptions to the species potential occurrence in the Project Area. As such, the Proposed Development is not expected to disrupt any ecologically significant locations for the southern whiteface.	Unlikely

G.8 LATHAM'S SNIPE

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	The Proposed Development will result in an impact to 0.1 ha (or 0.2%) of the available 65.7 ha of potential Latham's snipe habitat identified within the Project Area. Latham's snipe is considered as having potential to occur within the Project Area, although no observations of the species have been recorded as occurring within the Project Area or the Locality during field surveys. The species also has a negligible risk of impact from turbine-related collision. Due to direct impacts to the species expected to be so minimal, the Proposed Development is considered unlikely to lead to a long-term decrease in the size of a population.	Unlikely
Reduce the extent of occurrence of the species	The area of occupancy for Latham's snipe is estimated at 13,000 km ² (DCCEEW, 2024), or 1,300,000 ha. As a migratory visitor to Australia that uses a range of different types of water sources, the Proposed Development is unlikely to reduce the species extent of occurrence.	Unlikely
Fragment an existing population	The Latham's snipe is highly mobile, having the ability to disperse great distances between suitable habitat areas. The Proposed Development is expected to impact 0.1 ha of potential Latham's snipe habitat, which is considered insignificant in relation to the availability of potential habitat within the Project Area and the broader region. Therefore, it is considered unlikely that the Proposed Development will fragment an existing population into two or more populations.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As detailed above, the Proposed Development's potential fragmentation impacts are unexpected to result in fragmentation impacts to bird species. As a bird that is known to fly great distances, and does not carry out breeding activities in Australia, Latham's snipe populations are unlikely to be isolated due to the Proposed Development.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	The Latham's snipe is threatened by European red foxes (<i>Vulpes vulpes</i>) and feral cats (<i>Felis catus</i>) (DCCEEW, 2024). Of these two species, only feral cats have been recorded within the Project Area. The Proposed Development will adopt and follow biosecurity measures as part of the EMP, as outlines in Section 7. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the Latham's snipe becoming established in potential Latham's snipe habitat.	Unlikely
Introduce disease that may cause the population to decline	As per the species conservation advice (DCCEEW, 2024), there are no known identified diseases associated with Latham's snipe. There is also no evidence to suggest the Proposed Development would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures as part of an EMP (see Section 7). Therefore, with the appropriate management and mitigation measures applied, it is considered unlikely that the Proposed Development will introduce disease that may cause the species to decline.	Unlikely

Criteria	Response	SRI?
Interfere with the recovery of the species	There is no adopted or made recovery plan for this species, however, the species conservation advice lists the following primary conservation objectives (DCCEEW, 2024): • Latham's snipe populations are stable or increasing within the Australian jurisdiction; • Ensure no further loss of habitat critical to the survival of Latham's snipe throughout Australia (including habitat predicted to become habitat critical to the survival in the future because of climate change); and • Protect and manage important feeding and roosting areas in Australia and staging and breeding areas throughout the East Asian - Australasian Flyway for Latham's snipe. The Project Area does not contain important feeding, roosting or breeding areas, or habitat critical to the survival of the species, and therefore the Proposed Development is unlikely to interfere with the recovery of the species.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	There are not considered to be any ecologically significant locations for the Latham's snipe in the Project Area, as there are no natural wetlands or high-quality habitat. Additionally, the species does not breed in Australia. As such, the Proposed Development is unlikely to disrupt ecologically significant locations for the Latham's snipe.	Unlikely

G.9 SQUATTER PIGEON

Criteria	Response	SRI?
An action is likely to have a SRI on habitat for Endangered and Vulnerable wildlife if it is likely to :		
Lead to a long-term decrease in the size of a local population	The Project Area contains 9,661.7 ha of potential squatter pigeon habitat, including 5,690.7 ha of potential breeding habitat and 3,971.0 ha of potential foraging and dispersal habitat. The Proposed Development may have a permanent impact on up to 556.4 ha of potential squatter pigeon habitat, including 365.8 ha (or 6.4%) of potential breeding habitat and 190.6 ha (or 4.7%) of potential foraging and dispersal habitat. The squatter pigeon is known to persist in disturbed landscapes such as that which will be created by the Proposed Development. The species is also only considered as having the potential to occur due to a lack of reliable records in the Project Area despite an extensive field survey effort. The species is considered to be at a negligible risk from turbine-related collision impacts, as it seldom flies, and does not fly at RSA heights. Therefore, the Proposed Development is considered unlikely to lead to a long-term decrease in the size of population of squatter pigeon.	Unlikely
Reduce the extent of occurrence of the species	The area of occupancy for the squatter pigeon is estimated at 10,000 km ² , or 1,000,000 ha, with a presumed low reliability in this figure (Garnett & Crowley, 2000). Up to 556.4 ha of potential squatter pigeon habitat identified within the Project Area may be permanently impacted by the Proposed Development. This area makes up <0.1% of the species estimated area of occupancy, and the expected impacts are unlikely to fully dissuade squatter pigeon use of the Project Area. Therefore, the Proposed Development is considered unlikely to reduce the area of occupancy of a population.	Unlikely
Fragment an existing population	Clearing associated with the Proposed Development will largely occur within small, isolated WTG locations, or narrow linear areas within the Total Impact Area. The nature of the proposed clearing will ensure that the squatter pigeon potential habitat remains connected, both within and outside of the Project Area. Further to this, squatter pigeons have a known tendency to inhabit disturbed and partially disturbed areas, further reducing the chance of fragmentation of the species potential habitat. Therefore, it is considered unlikely that the Proposed Development will fragment an existing population into two or more populations.	Unlikely
Avoid genetically distinct populations forming as a result of habitat isolation	As detailed above, the Proposed Development's potential fragmentation impacts are unexpected to result in fragmentation impacts to bird species, as cleared corridors will only be an average of 40m wide. As a bird that is known to persist in disturbed environments and regularly occur on unsealed roads, the squatter pigeon will be able to disperse across these corridors to prevent any habitat isolation impacts.	Unlikely
Result in invasive species that are harmful to the species becoming established in the species' habitat	According to the species conservation advice (TSSC, 2015), squatter pigeons are threatened by predation from dingoes (<i>Canis lupus dingo</i>), European red foxes (<i>Vulpes vulpes</i>) and feral cats (<i>Felis catus</i>). Feral cats and dogs are known to occur within the Project Area. The Proposed Development will adopt and follow biosecurity measures as part of the EMP, as outlined in Section 7. Therefore, with the appropriate management and mitigation measures applied, the Proposed Development is considered unlikely to result in invasive species that are harmful to the squatter pigeon becoming established in the potential squatter pigeon habitat.	Unlikely

Criteria	Response	SRI?
Introduce disease that may cause the population to decline	There is currently limited evidence of diseases causing detrimental effects on squatter pigeon populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures as part of the EMP (see Section 7). Therefore, with the appropriate management and mitigation measures applied, it is considered unlikely that the Proposed Development will introduce disease that may cause the sub-species to decline.	Unlikely
Interfere with the recovery of the species	There is no adopted or made recovery plan for this species, however the sub-species conservation advice lists the following conservation and management priorities for the species (TSSC, 2015): • Identify sub-populations of high conservation priority, especially in the southern part of the squatter pigeon's (southern) range; • Protect and rehabilitate areas of vegetation that support important sub-populations; • Protect sub-populations of the listed subspecies through the development of covenants, conservation agreements or inclusion in reserve tenure; • Develop and implement a stock management plan for key sites; • Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the squatter pigeon (southern); and • Raise awareness of the squatter pigeon (southern) within the local community, particularly among land managers. The Proposed Development will implement appropriate mitigation and management measures during the construction and operational and maintenance phase, including an EMP, to mitigate potential impacts to the species. Further, the species is only considered as having the potential to occur, demonstrating that there is unlikely to be an important population in the Project Area. Therefore, the Proposed Development is considered unlikely to interfere with the recovery of the sub-species.	Unlikely
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	The species is only considered as having the potential to occur in the Project Area, due to a lack of observation of the species despite an extensive survey effort. The Project Area is also in the middle of the species 'may occur distribution', indicating that there are no key populations nearby and that the Project Area is not on the edge of the species distribution. Due to this, there are not considered to be any ecologically significant locations for the squatter pigeon in the Project Area. The species is also known to persist in disturb landscapes. With these factors considered, it is unlikely that the Proposed Development would disrupt ecologically significant locations for the squatter pigeon.	Unlikely

G.10 SHORT-BEAKED ECHIDNA

Criteria	Response	SRI?
An action is likely to have a SRI on SLC (non-migratory) animal wildlife habitat if it is likely that it will result in:		
A long-term decrease in the size of a local population	The short-beaked echidna is a highly adaptable species that is known to persist in disturbed environments. To mitigate risks of direct mortality from vehicle collision and construction works, vehicle speed limit restrictions and pre-clearance fauna spotter catcher searches will be conducted. As such, the Proposed Development is unlikely to result in the long-term decreased of the species population in the Project Area.	Unlikely
A reduced extent of occurrence of the species	The short-beaked echidna occurs across all of mainland Australia apart from the most arid regions. As the Proposed Development's impacts are confined to a 20,404.6 ha Project Area in southern Queensland, this will not reduce the species extent of occurrence.	Unlikely
Fragmentation of an existing population	Fragmentation impacts are not expected to occur to the short-beaked echidna, due to its known utilisation of a broad type of habitats, including those that are disturbed. The species is regularly observed traversing unsealed, and even sealed roads, so it's local populations are unlikely to be fragmented by the Proposed Development.	Unlikely
Reduced gene flow among populations	As detailed above, the Proposed Development's potential fragmentation impacts are unexpected to result in fragmentation impacts to the short-beaked echidna. As such, the Proposed Development is not expected to result in any habitat isolation impacts to the short-beaked echidna.	Unlikely
Disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species	The Project Area does not occur any ecologically significant locations for the short-beaked echidna, as the species has such broad habitat requirements. The short-beaked echidna is also known to be able to persist in disturbed habitats such as that which may be perpetuated by the Proposed Development.	Unlikely



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