

PRELIMINARY BIRD AND BAT ADAPTIVE MANAGEMENT PLAN

Dinner Hill Wind Farm, Shire of Dandaragan

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REPORT

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DECLARATION OF ACCURACY

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed

Grace Stewart

Full name (please print)

Grace Stewart

Organisation (please print)

on behalf of Dinner Hill Wind Farm Pty Ltd

Date

21/09/2026

GLOSSARY

Term / acronym	Description
BACI	Before-after-control-impact
Barotrauma	Bodily injury caused by changes in barometric (air) pressure
BBUS	Bird and bat utilisation surveys
BC Act	<i>Biodiversity Conservation Act 2016</i>
BESS	Battery Energy Storage System
CASA	Civil Aviation Safety Authority
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter at breast height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Development Footprint	The total area of land disturbance associated with the Project (997.13 ha), including all permanent and temporary infrastructure areas. Vegetation within the Development Footprint is assumed to be impacted, with areas outside permanent operational infrastructure to be rehabilitated post-construction.
DWER	Department of Water and Environmental Regulation
EO	Environmental Outcome
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPC	Engineering, Procurement and Construction
Feather spot	A clump of five feathers or more
FF	Focal Follow
ha	Hectare
IBA	Important Bird and Biodiversity Area
Indicative Project layout	Within the Development Footprint, an Indicative Project Layout is provided for key infrastructure, and it is expected that this layout will be confirmed during the detailed design stage and micro siting of infrastructure including WTGs may occur.
Involved land parcel	A property hosting Project infrastructure and with a landholder agreement with the Proponent.
km	Kilometres
km/hr	Kilometres/hour
kV	Kilovolt
LGA	Local Government Area
m	Metres
m AGL	Metres above ground level
m AHD	Metres Australian Height Datum
m ³	Cubic metres
mm	Millimetres
MW	Megawatts
N/A	Not applicable
O&M	Operations and Maintenance
P&D Act	<i>Planning and Development Act 2005</i>
PBBAMP	Preliminary Bird and Bat Management Plan

REPORT

Term / acronym	Description
Permanent Project infrastructure	The footprint (area) of operational Project infrastructure, including the wind turbine hard stands, access tracks, substation, O&M and BESS hardstands, transmission and met mast tower foundations.
Project	The Dinner Hill Wind Farm Project. The Project consists of up to 131 wind turbine generators, battery energy storage system (BESS) and associated ancillary infrastructure. Depending on final turbine model and number, the Project has been conceptually designed to generate up to 943 MW of electricity for transmission into the South West Interconnected System (SWIS), which provides energy throughout southern Western Australia (WA).
Project Area	Refers to the boundaries of all involved land parcels where consent has been granted for development of the Project and wherein all Project infrastructure will be contained.
Proponent	Dinner Hill Wind Farm Pty Ltd (ACN 660 596 556), a subsidiary of OX2 AB and an affiliate of OX2 Holdings Pty Ltd, is proposing to develop the Project.
RPS	RPS AAP Consulting Pty Ltd
RSA	Rotor Swept Area
SMART	Specific, Measurable, Achievable, Relevant and Timebound
Strike	An impact between bird or bat and wind turbine blade or associated infrastructure
SWIS	South West Interconnected System
Temporary Project infrastructure	The footprint (area) of temporary Project infrastructure established to support construction activities only, including temporary access tracks, construction compounds, laydown areas, crane pads and temporary hardstands. This infrastructure would be decommissioned and the affected areas rehabilitated following completion of construction.
VP	Vantage Point
WA	Western Australia
WTG	Wind Turbine Generator

1 INTRODUCTION

1.1 Background

Dinner Hill Wind Farm Pty Ltd (ACN 660 596 556), a subsidiary of OX2 AB and an affiliate of OX2 Holdings Pty Ltd (the Proponent), is proposing to develop the proposed Dinner Hill Wind Farm (the Project). The Project is located approximately 200 kilometres (km) north of Perth in Western Australia, within the Dandaragan Local Government Area (LGA) and within the Northern Wheatbelt zone.

The land on which the Project is located spans approximately 30,024 ha within the localities of Hill River, Boothendarra, and Badgingarra and is herein referred to as the Project Area (Figure 1). For the purposes of this Preliminary Bird and Bat Adaptive Management Plan (PBBAMP), the Project Area refers to the boundaries of all involved land parcels where consent has been granted for development of the Project and wherein all Project infrastructure will be contained.

The Project Area is located north of the Badgingarra township, east of Yerramullah Road and west of Coalara Road and includes 27 land parcels of freehold land tenure, the Brand Highway and local road corridors. The Project Area is almost entirely comprised of farmland that is largely cleared and utilised for mixed cropping and grazing.

The Proponent has progressed design of the Project with the objective of avoiding the removal of vegetation where possible, maintaining the majority of existing remnant vegetation located within the Project Area. The Project has also been designed to ensure farming activities can co-exist within the Project Area and will provide supplementary income support for local farmers hosting the wind turbines. A Community Benefit framework will also be provided to ensure benefits are shared in the wider community over the life of the Project.

The Development Footprint refers to the maximum area of land that will be used for the development of the Project including its infrastructure within the Project Area. It is based on a “worst case” largest possible layout which has been used to calculate the maximum area of impacts for technical assessments. The current Development Footprint includes three transmission line options. The final Development Footprint will only include one of these options. Within this Development Footprint, an Indicative Project Layout is provided for key infrastructure, and it is expected that this layout will be confirmed during the detailed design stage and micro siting of infrastructure including where Wind Turbine Generators (WTGs) may occur. Section 2 of this PBBAMP provides a detailed project description, with the turbine specifications summarised below:

- Quantity: Up to 131 WTGs
- Maximum hub height: Up to 168 metres above ground level (m AGL)
- Maximum turbine blade length: Up to 92m
- Maximum turbine blade tip height: 270 m AGL
- Minimum turbine blade ground clearance: 60 m AGL
- Generation capacity: Up to 943 MW.

The PBBAMP has been prepared to support a Development Application in accordance with the state *Planning and Development Act 2005* (P&D Act), a Section 38 referral under the state *Environmental Protection Act 1986* (EP Act) and a referral under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is expected that if Development approval is granted for the Project, Council will condition the approval to require the endorsement of the final BBAMP to form part of the planning permit. This means that the requirements of this document to minimise impacts to birds and bats will be enforceable under the P&D Act.

Figure 1 provides an overview of the location of the Project Area and Development Footprint.

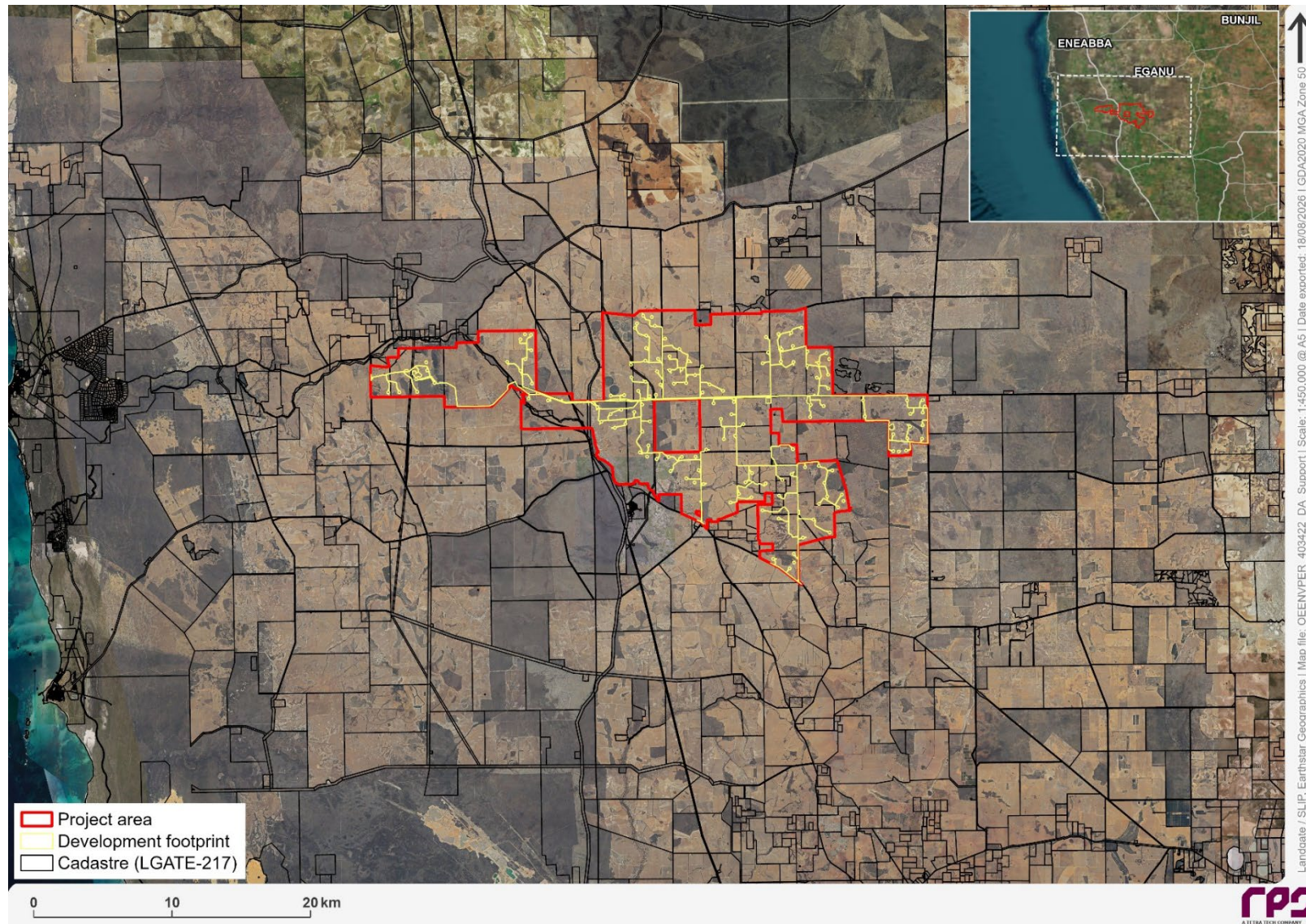


Figure 1: Project location

1.2 Purpose and scope

1.2.1 Purpose

Wind farms present three potential risks for birds and bats, including (Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2024a):

1. Direct loss of habitat through construction of wind farm infrastructure.
2. Displacement from habitat (or indirect loss of habitat) due to avoidance behaviour because of wind farm construction and operation, and potentially disrupting breeding activity of birds and bats.
3. Strike impact (collision) or barotrauma due to wind farm infrastructure, resulting in mortality or injury.

The purpose of a PBBAMP is to provide a structured and evidence-based framework to minimise and manage potential impacts to birds and bats from the construction and operation of wind farms. When approved to form part of the development approval, the final BBAMP will be enforceable, requiring the Proponent to implement the mitigation measures identified to achieve compliance with the development approval.

This PBBAMP has been prepared to demonstrate the approach to:

- Identify, manage and minimise potential impacts to relevant listed threatened and migratory bird species associated with individual mortality and / or injury from wind turbine and transmission line collision and barotrauma, and changes to species utilisation of the Project Area. This is applicable to relevant threatened and migratory bird species listed under the EPBC Act and the state *Biodiversity Conservation Act 2016* (BC Act).
- Identify and manage potential impacts to relevant common at-risk bird and bat species associated with multiple mortalities and / or injuries from wind turbine and transmission line collision and barotrauma, and changes to species utilisation of the Project Area.
- Implement an adaptive management framework, including impact triggers and associated contingency actions.
- Inform performance and compliance reporting and provide for independent environmental auditing.

1.2.2 Scope

The scope of the PBBAMP includes all activities associated with the Project during its construction, operation and decommissioning phases that have potential to adversely impact birds and bats.

This includes planned events detailed in this management plan during the construction phase, and unplanned events, such as birds and bats colliding with wind turbine blades in the operational phase.

The PBBAMP assesses the Project's potential impacts to bird and bat species likely to occur within the Project Area, considers the likelihood and consequence (or risk) of the Project's potential impacts, outlines monitoring and adaptive management measures to reflect the risk posed and, and reporting requirements to inform the Proponent's performance and compliance with the PBBAMP.

The PBBAMP (or subsequent approved iterations of the PBBAMP) will be implemented over the operational life of the Project, which is estimated to be 30 years. The Proponent's employees and subcontractors will be obliged to comply with the requirements of the PBBAMP for the operational life of the Project.

The final BBAMP is intended to form part of the conditions of the planning permit for the Project and, on endorsement by Council, will form part of the Project's approvals. Implementation of the BBAMP (or a subsequent approved iteration) is therefore a condition of, and a requirement for the Project to remain compliant with, the planning permit. The Proponent commits to implementing the mitigation, monitoring and adaptive management measures set out in this plan for the operational life of the Project.

This PBBAMP is considered preliminary as it is expected to be updated in the future in response to:

- The final Project design and final Development Footprint, as the PBBAMP considers three transmission line options and the maximum Development Footprint for the Project. The final Development Footprint will only include one transmission line layout and is expected to reduce to respond to the capacity available in the grid.

- Regulator feedback provided on the EPBC Act referral by the Commonwealth DCCEEW.
- Regulator feedback provided on the Section 38 referral under the EP Act by the state Environmental Protection Authority (EPA).
- Any Project approval conditions (subject to being granted by regulators), as applicable to the PBBAMP.

1.2.3 Framework of PBBAMP

The PBBAMP is structured as follows:

- Description of the Project (Section 2)
- Description of the existing environment and bird and bat assemblages (Section 3)
- Identification of potential impacts to bird and bat species from the Project's activities during construction, operation and decommissioning phases (Section 4)
- An initial species screening to identify at risk bird and bat species to be addressed in the risk assessment (Section 5)
- A risk assessment for the Project's potential impacts on at risk bird and bat species, considering the likelihood and consequence of potential impacts for each species (Section 6)
- Detailed collision risk modelling and collision likelihood scoring for conservation significant species, locally significant species and common species (Section 6.2; Appendix A).
- A monitoring and adaptive management program (Section 7), including:
 - Environmental outcomes (Section 7.1)
 - Mitigation measures (Section 7.2)
 - Bird and bat monitoring program (Section 7.3)
 - Adaptive management approach (Section 7.4)
 - Adaptive management mitigation measures (Section 7.5)
- Reporting and review (Section 8).

The PBBAMP's structure was developed to address the content of an environmental management plan, according to the Environmental Management Plan Guidelines (DCCEEW 2024b).

The PBBAMP and its implementation will be reviewed in accordance with Section 8.3.

1.3 Objectives

The objectives of the PBBAMP are to:

1. Define the level of project environmental performance for at risk birds and bats using Environmental Outcomes (EOs) that are Specific, Measurable, Achievable, Relevant and Timebound (SMART)
2. Implement a monitoring program capable of measuring the potential impacts on at risk birds and bats from the Project
3. Implement an adaptive management program informed by the monitoring results to implement additional measures where needed, following a mitigation hierarchy, to ensure EOs are achieved
4. Outline roles and responsibilities and reporting requirements.

1.4 Information sources

1.4.1 Guidance documents

The PBBAMP was prepared to be consistent with the EPBC Act guidance documents which are relevant to the preparation of bird and bat management plans, including:

- Environmental Management Plan Guidelines (DCCEEW 2024b)

- Onshore wind farm guidance – best practice approaches when seeking approval under Australia’s national environment law (DCCEEW 2024a). Draft for consultation
- Survey guidelines for Australia’s threatened birds (Department of the Environment, Water, Heritage and the Arts 2010a)
- Survey guidelines for Australia’s threatened bats (Department of the Environment, Water, Heritage and the Arts 2010b).

The PBBAMP was also informed by documents prepared as part of the DCCEEW Renewables Environmental Research Initiative which are relevant to the migratory shorebird habitat, impacts and collision risks for birds and bats from onshore wind farms and avoidance and mitigation measures, including:

- Australian Collision Risk Framework: Overview and user guide (Stark and Thompson 2026). Draft for industry consultation
- Australian National Directory of Important Migratory Shorebird Habitat (Driessen et al. 2025)
- Catalogue of measures to avoid and mitigate collisions of birds and bats with onshore and offshore wind farms (DCCEEW 2026a). Draft for consultation
- Impacts on birds and bats from onshore wind farms in Australia: an ecological risk assessment (Reid and Baker 2025)
- Review of effectiveness of onshore and offshore wind farm collision risk avoidance and mitigation measures (van Harten et al. 2026).

1.4.2 Project specific documents

The PBBAMP is underpinned by information from several ecological investigations and assessments undertaken within the Project Area, including:

- Dinner Hill Wind Farm, Bird and Bat Survey Annual Report (Kristancic, Shepherd and Bamford 2025)
- Dinner Hill Wind Farm, Bird and Bat Utilisation Survey Report (Shepherd and Bamford 2026a)
- Dinner Hill Wind Farm, Bird and Bat Risk Assessment Report (Shepherd and Bamford 2026b; Appendix A)
- Basic Fauna Report, Dinner Hill Wind Farm (RPS 2026a).
- Detailed Flora and Vegetation Assessment, Dinner Hill Wind Farm (RPS 2026b).
- Dinner Hill Wind Farm, Ecological Impact Assessment (RPS 2026c).

2 PROJECT DESCRIPTION

2.1 Location

The Project Area is located approximately 200 km north of Perth in Western Australia, within the Dandaragan LGA and within the Northern Wheatbelt zone (Figure 1). The Project Area is almost entirely comprised of productive farmland that is largely cleared and utilised for mixed cropping and grazing.

2.2 Project infrastructure

2.2.1 Development Footprint options

The Project layout has been designed with optionality relating to sections of the internal transmission line. For the purpose of the ecological impact assessment, these design options have been used to create three separate potential Development Footprint layout options. Potential ecological impacts from each of these options has been considered and calculated. Each of these Development Footprint options comprises:

- One of three overhead transmission line options
- Access roads
- Battery energy storage system (BESS), operations and maintenance (O&M)
- Compound areas
- Permanent met masts (eleven potential locations have been included in each Development Footprint option, however the final Project design will include only four of the met masts)
- Quarries
- Satellite substations
- Storage areas
- Substation / switchyard
- Swept paths, taking into account transport routes during construction
- Wind turbine crane pads.

The Development Footprint layout options are depicted in Figure 2 and Figure 4 with the alignment of the transmission line varying in each figure (refer to the insets provided).

Project design is ongoing to ensure the final Project design responds to site-specific ecological considerations to avoid or minimise impacts as far as practicable.

State and Commonwealth environmental referrals to the WA EPA and Commonwealth DCCEEW will present the impacts addressed in the Ecological Impact Assessment (RPS 2026c), acknowledging that the final layout is likely to have reduced impacts.

While the Proponent will seek to adopt the option with the least environmental impacts, the selection of the final transmission line option will also be influenced by constructability, land tenure arrangements and electrical design feasibility, all of which are still under investigation for that section of the transmission line.

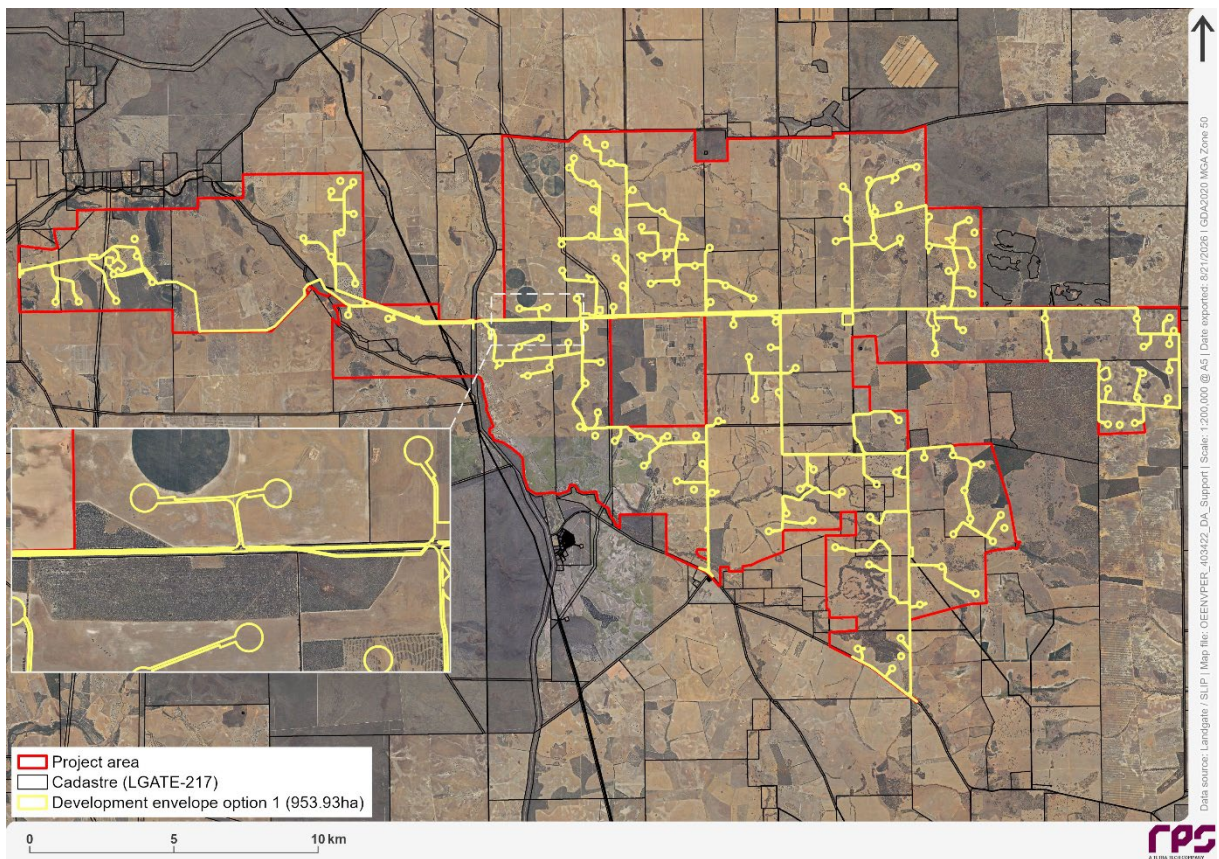


Figure 2: Development Footprint layout option 1

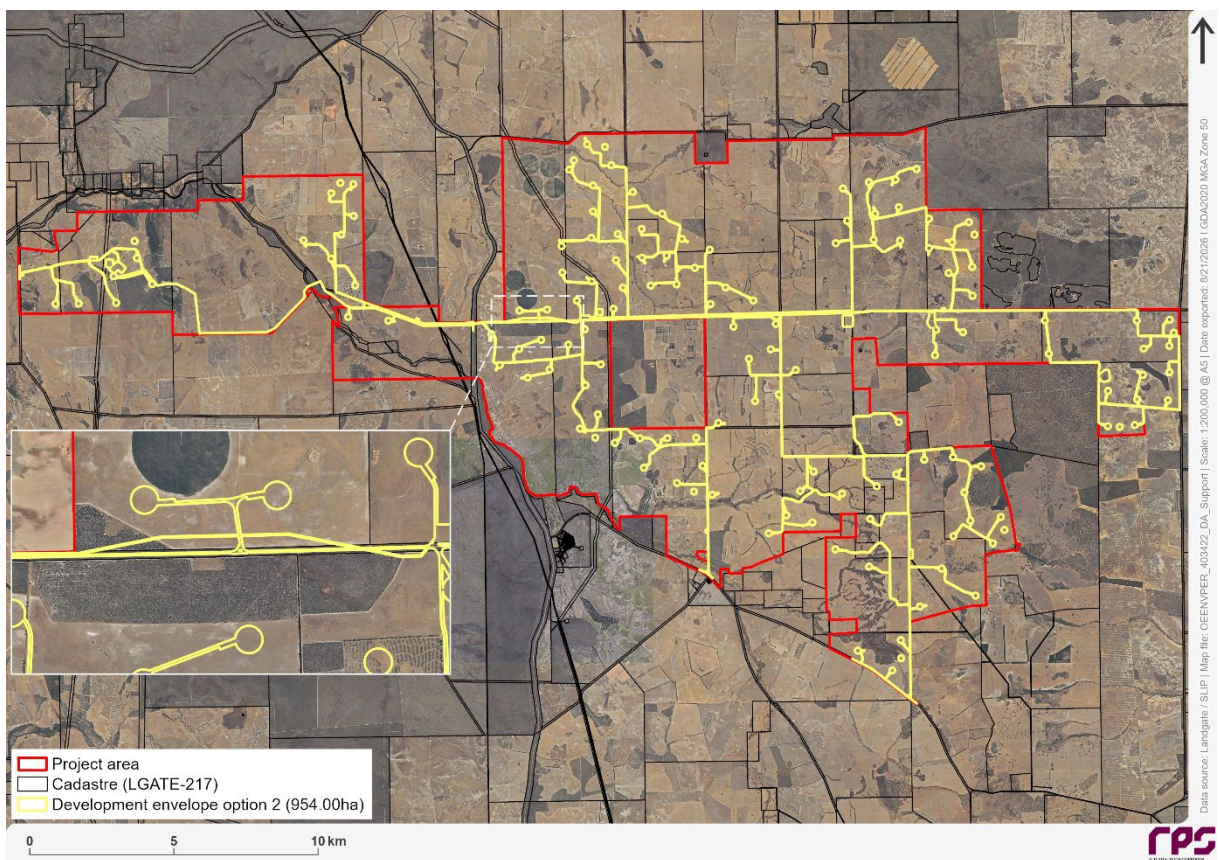


Figure 3: Development Footprint layout option 2

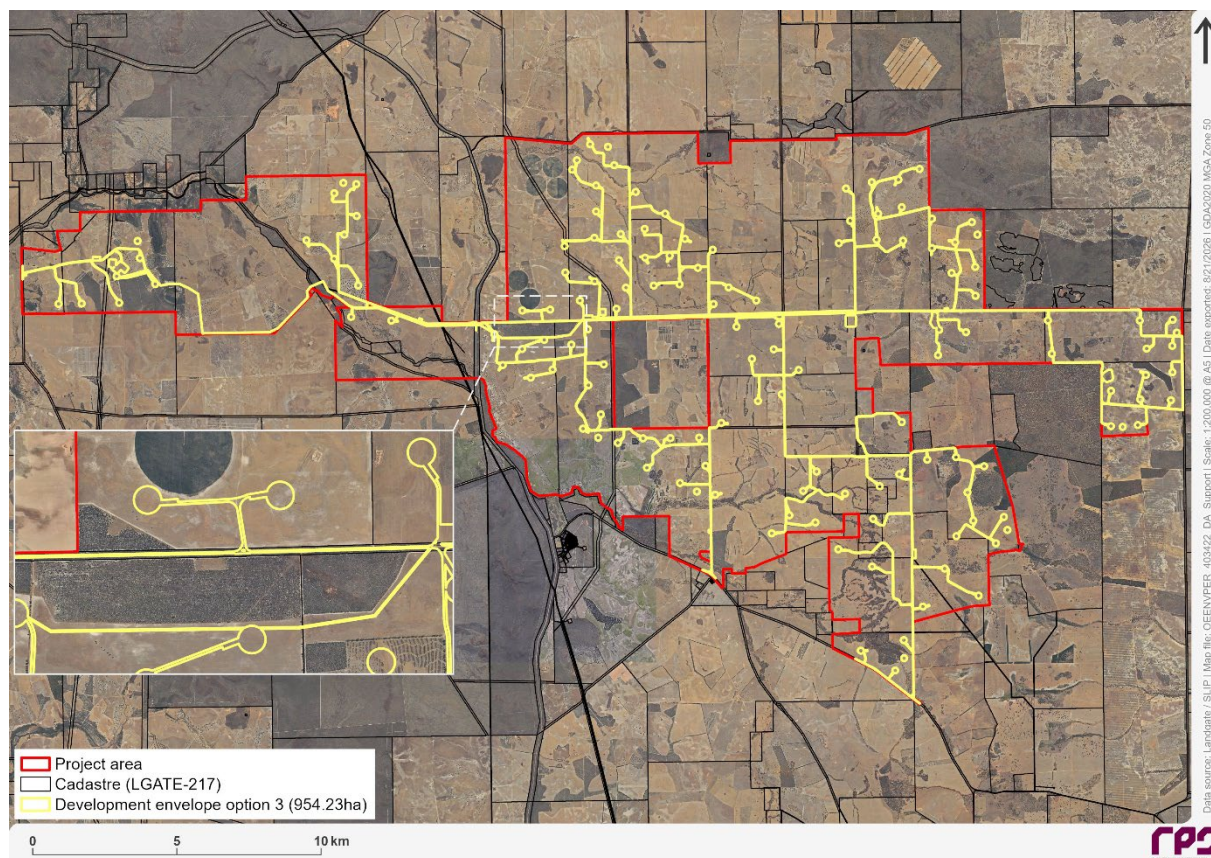


Figure 4: Development Footprint layout option 3

2.2.2 Project infrastructure description

The Project has been conceptually designed to generate up to 943 MW of electricity for transmission into the SWIS which will be dependent on final turbine model and numbers. The Project Area is currently anticipated to support a wind farm, transmission line, and other proposed ancillary infrastructure including a BESS.

The permanent and temporary infrastructure proposed to be developed to support the Project is outlined in Table 1 and Table 2, respectively. All temporary infrastructure will be removed and the land reinstated to its pre-existing use once construction is completed. The Project infrastructure may be subject to change based on the final design / detailed design.

As a conservative approach, the maximum extent and all proposed layout options for the permanent and temporary infrastructure have been considered in the PBBAMP. The PBBAMP will be updated to reflect the Project's detailed design when available and prior to the commencement of construction, for submission to Council for review and endorsement.

Table 1: Permanent infrastructure to support the Project

Permanent infrastructure	Key parameter	Description	Final design / detailed design notes
Turbines	Quantity	Up to 131 WTGs	- Final design, including hub height, blade length and maximum tip height is dependent upon outcomes of commercial tender. - All turbines will be the same equipment model, size, and will spin in the same direction.
	Maximum hub height	Up to 168 m AGL	
	Maximum turbine blade length	Up to 92 m AGL	
	Maximum turbine blade tip height	270 m AGL	
	Minimum turbine blade ground clearance	60 m AGL	
	Generation capacity	Up to 943 MW	
Turbine hardstands	Quantity	Up to 131 permanent turbine hardstands	Final design based on turbine model selected and topography at turbine location.
	Area of hardstand	Approximately 0.5 ha	
Transmission line and poles	Length of overhead line	Approximately 30 km, which will connect to a substation and then cut into the existing Western Power 330 kV double circuit transmission line located within the Project Area.	- Each of the Development Footprint options comprises one of three overhead transmission line options. - Only one transmission corridor option will be required, and this will be determined during detailed design.
	Tower structures	The overhead line will be supported on either lattice and/or pole tower structures.	
	Easement width of tower structures	- Up to 60 m, subject to further consultation with Western Power. - Reduced spans between towers may be required near crossings of rivers and roads, or where there is a change in direction.	
	Maximum height of tower structures	Up to 50 m	
	Minimum conductor ground clearance	Approximately 10 m	
Underground turbine reticulation	-	- Power and communication cables will be installed underground (up to 950 millimetres (mm)) along the same alignment as access tracks between the turbines and will connect back to the substation. - The cables will be laid in cable trenches to allow for continued agricultural activities.	-
Main Facility	-	The main facility will comprise the main substation, switching yard, BESS, O&M building and temporary construction laydown.	-
O&M Building	Height	Up to 4 m	-
	Length	Up to 24 m	

Permanent infrastructure	Key parameter	Description	Final design / detailed design notes
	Width	Up to 9 m	
	-	- An O&M building will be constructed on site. The building will be a transportable, modular or field erected office building including offices, IT servers, first aid room and facilities. - Potable water will be trucked to site and stored in tanks.	
Main substation	-	- One main substation will be located in the western portion of the Project Area and occupy an area of approximately 3.5 ha, and consist of: - High Voltage switching and metering equipment - High Voltage step-up transformer(s) - Harmonic filters - Capacitor banks - Western Power relay equipment - Medium Voltage Switchgear - Low Voltage ancillary equipment - Lightning protection masts - Control equipment - Security fencing and lighting.	-
BESS	Capacity	Up to 300 MW / 2,400 MWh	- The final configuration and footprint of the BESS will depend on the equipment supplier selected. - Firewater tank sizing will be determined as part of final design to ensure compliance with all applicable laws and guidelines.
	Area	Up to 5.8 ha	
	-	- The BESS may consist of: - Battery containers - Inverters - MV transformers - Control and switchgear equipment - Lightning protection masts - Security fencing. - Co-located with the BESS will firewater tanks.	
Switching Yard	Area	Up to 4.5 ha	-
	-	- The Switching yard will include: - High-voltage power transformers - Air-insulated switchgear and associated switching equipment - Reactors and other high-voltage plant	

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Permanent infrastructure	Key parameter	Description	Final design / detailed design notes
		– Busbars and connection equipment linking transmission lines to transformers and switchgear – Western Power relay equipment – Lightning protection masts – Communication tower – Security fencing and lighting.	
Satellite substation	Area	Approximately 8 ha	-
	-	• One satellite substation is located in the eastern portion of the Project Area and will consist of: – High Voltage switching and metering equipment – High Voltage step-up transformer(s) – Harmonic filters – Capacitor banks – Western Power relay equipment – Medium Voltage Switchgear – Low Voltage ancillary equipment – Lightning protection masts – Control equipment – Security fencing and lighting.	
Access tracks	-	• Access tracks will be constructed, up to 10 m wide, to connect infrastructure within the Project Area. Access tracks will be located on existing farm tracks where possible. • Regular passing places and turning areas will be installed.	-
Permanent Met Masts	Quantity	Up to four permanent met masts	Only four locations will be required, and the final locations this will be determined during detailed design and confirmed to Council prior to the commencement of construction.
	Height	Up to 168 m	
Water Supply	-	Investigations ongoing	To be confirmed during detailed design.

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Table 2: Temporary infrastructure to support the Project

Temporary infrastructure	Key parameter	Description	Final design / detailed design notes
Construction compounds	Quantity	Five compounds	-
	Area	Ranging from 0.6 ha to 3 ha	
	-	- Construction compounds will be used to accommodate temporary office and storage buildings or containers, as well as parking areas for workers. - Power will be supplied by temporary generators, and water supply and wastewater removal will be managed via tanker trucks. - Each compound may also include a graded hardstand area enclosed with cyclone-style fencing, designed for the safe storage of oversized equipment and materials, including wind turbine blades and tower sections.	
Storage Area	Quantity	One storage area	-
	Area	Approximately 3.6 ha	
	-	- To be located in the centre of the site and will comprise a graded hardstand area secured with cyclone style fencing for the safe storage of equipment and materials. - These areas may also accommodate temporary transportable toilet facilities and shaded or refuge areas for workers.	
Quarries	Quantity	Three quarry locations	-
	-	- Identified across the Project Area. - Quarries may be utilised during construction for the winning of materials required for construction of the Project. Aggregates (sand and gravel) would be extracted from these quarries then refined for use in road and hardstand construction, and potentially cable trenching).	
Concrete batching plant	Capacity	Up to 240 m ³ per hour	The final design, layout, and arrangement will be confirmed during detailed design and construction planning.
	-	- Mobile concrete batching plant units are proposed within the quarry footprints, each with a total capacity of up to 240 m³ per hour. - Each plant will comprise the following components: - Concrete truck loading hardstands - Loading bays - Hoppers - Cement and admixture silos - Water tanks - Aggregate and sand stockpiles - In-ground water recycling and first-flush pits.	

REPORT

Temporary infrastructure	Key parameter	Description	Final design / detailed design notes
Construction water supply	-	- It is expected that, where practicable, construction water will be sourced from existing onsite bores. - Should the existing bore be unable to meet project demand requirements, additional bores may be installed, subject to obtaining the necessary approvals under the <i>Rights in Water and Irrigation Act 1914</i>.	-
Stock fencing and gates	Height	Up to 1.5 m	The extent and design of fencing will be determined in consultation with project landowners and existing fencing will be retained where possible.
	-	Stock fencing is proposed, including associated gates and cattle grids where required.	
Wastewater management	-	- Wastewater effluent generated during construction will be managed via: - Collection in holding tanks with subsequent transport offsite for treatment and/or disposal at an appropriately licensed facility; and/or - Treatment and disposal via an onsite wastewater treatment system (most likely leach drains), implemented in accordance with relevant permits and licences.	-

2.3 Project timeframes and activities

The implementation of the Project is subject to being granted all planning and environmental approvals, permits and consents. There are four key phases of the Project, including:

1. Pre-construction: Pre-construction activities may commence in 2028
2. Construction: Commence in 2029
3. Operation: Commissioning of the Project in 2032
4. Decommissioning: It is anticipated the Project would have an operational life of 30 years. At the end of the Project's operational life, the Project would either extend its operational period, the Project would be re-powered or be decommissioned.

The proposed activities to be undertaken during the Project's four key phases are outlined in Table 3.

Table 3: Key phases and activities

Phase	Activities
Pre-construction	• Minor early works after Project approval but prior to construction commencement. This would include: – Detailed site investigations to inform micro-siting. – Securing all secondary permits and approvals as informed by Development Application approval conditions.
Construction	• The Engineering, Procurement and Construction (EPC) contractor will develop a detailed construction methodology. The Proponent will select the EPC contractor. • Construction is anticipated to extend over a period of up to approximately 36 months. In the event that construction commences in 2029, construction will conclude by 2032. • Construction of the Project will likely include the following activities: – Establishment of temporary construction facilities, including site offices, laydown and storage areas, equipment and materials. – Upgrading and improvement of existing access roads and construction of new access tracks. – Earthworks associated with access roads and turbine hardstand areas. – Excavation works for wind turbine, substation and ancillary infrastructure foundations. – Construction of wind turbine foundations, including installation of bolt cages, reinforcement and concrete pours. – Construction of the BESS, substation and associated ancillary infrastructure. – Installation of electrical and communications infrastructure, including underground cabling and overhead connections between cable marshalling points and the substation. – Installation of wind turbine transformers, conducted in parallel with electrical reticulation works. – Delivery, assembly and installation of wind turbine components, including tower sections. – Erection of wind turbines using large mobile cranes. – Installation of the permanent met masts. – Installation of overhead powerlines and associated support structures. – Commissioning of wind turbines and associated electrical infrastructure, followed by testing and verification.
Operations	• Operation is anticipated to commence in 2032 following the construction phase. Operational activities will be limited in scale and largely confined to routine operation and maintenance. • Operation of the Project will likely include the following activities: – Routine inspection, servicing and maintenance of wind turbines and associated infrastructure. – Implementation of safety management procedures. – Compliance with environmental conditions of approval. – Ongoing liaison with landowners, as required.
Decommissioning	• At the end of the Project's lease term, it will be determined if the Project is to be permanently decommissioned or re-powered by replacing existing turbines with newer upgraded units.

Phase	Activities
	• If the Project is permanently decommissioned, the Proponent will be fully responsible for all decommissioning and rehabilitation activities. Decommissioning activities are expected to include: – De-energising plant and equipment. – Dismantling and removal of wind turbines, transmission lines, and all other above-ground structures, foundations and equipment. – Rehabilitation of areas disturbed by Project infrastructure. – Recycling of materials where practicable, including batteries. • Consistent with established industry practice, decommissioning will not involve the removal of infrastructure located more than 300 mm below ground level. Removing such infrastructure would result in unnecessary soil and vegetation disturbance, and when left in situ it does not pose environmental risk or interfere with ongoing agricultural land use.

2.4 Regional context

The Project is proximate to other wind farms that are operating, under construction or proposed. The wind farms located within 20 km of the Project, and associated WTG details, are presented in Table 4 and illustrated in Figure 5.

Table 4: Regional context of wind farms

Wind farm name	Status	Proximity to the Project	WTG details			
			Quantity	Capacity per WTG	Minimum turbine blade ground clearance	Maximum turbine blade tip height
Parron Wind Farm	Proposed	Adjacent to southern boundary	79	6.2 MW	69.65 m AGL	230 m AGL
Badgingarra Wind Farm	Operational	Approximately 5 km south	37	3.6 MW	Not listed	150 m AGL
Waddi Wind Farm	Under construction	Approximately 10 km to the south-west	18	6 MW	58 m AGL	220 m AGL
Emu Downs Wind Farm	Operational	Approximately 15 km south	48	1.65 MW	27.5 m AGL	Not listed

(source: DCCEEW 2026b, APA 2025a, Tilt Renewables 2025, APA 2025b)

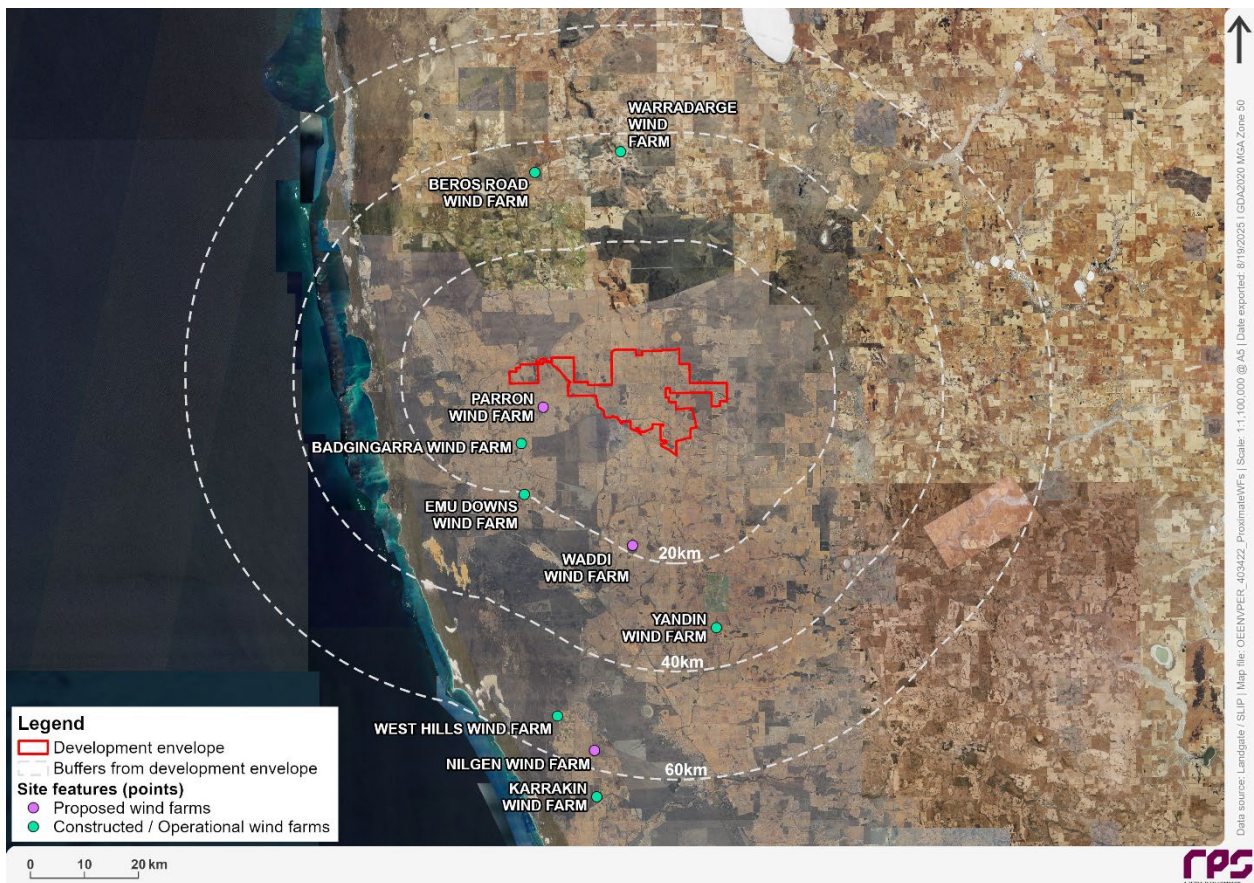


Figure 5: Regional context of wind farms proximate to the Project

3 EXISTING ENVIRONMENT

3.1 Key landscape features

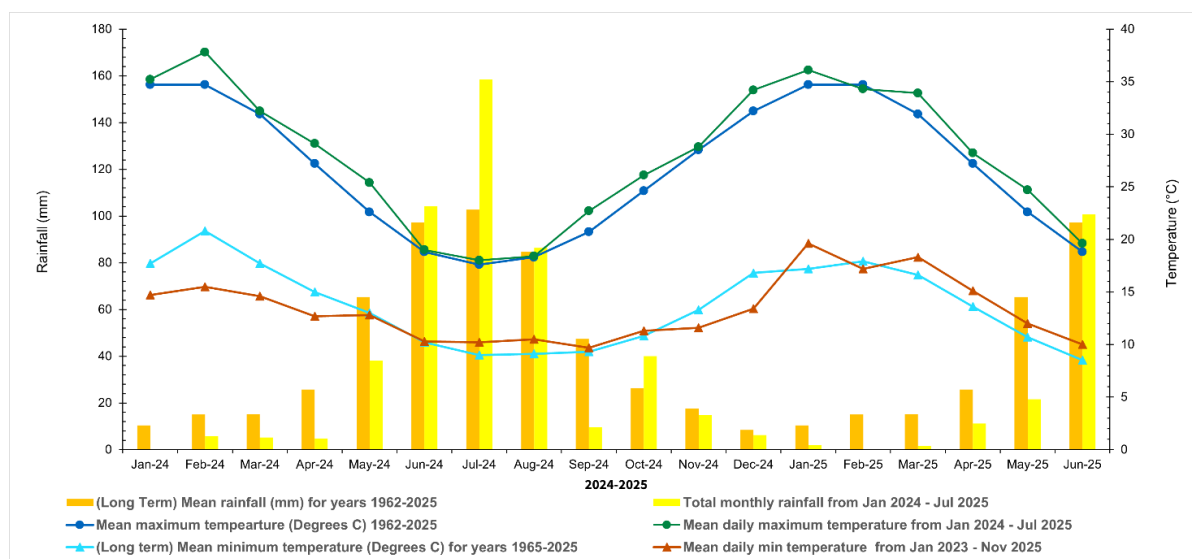
3.1.1 Climate

Badgingarra Research Station (009037) is the nearest Bureau of Meteorology (BoM) weather station to record all climatic variables. Graph 1 shows the mean temperatures and rainfall for the weather station since it opened in 1962 and, for comparison, mean temperatures and total rainfall for months preceding the time of the supplementary and primary flora and vegetation surveys (BoM 2025).

Long term maximum temperature in Badgingarra ranged between 17.6°C to 34.7 °C, whilst the mean minimum temperature ranged between 9 °C to 17.7 °C (1962 to 2025) (Graph 1).

Rainfall and temperature during the ecological surveys undertaken to support the Project deviated from the long-term averages recorded in Badgingarra. Pre-survey climate conditions were favourable during the supplementary survey conducted in October 2024, with above-average rainfall observed in June and July 2024. In contrast, weather conditions preceding the primary survey period in March and May 2025 were characterised by a drier and warmer climate from January to May 2025 (Graph 1).

Prevailing wind conditions in the morning (9am) are characterised by strong westerly winds in winter and calmer southerly and easterly winds in summer. Prevailing wind conditions in the afternoon (3pm) are characterised by strong southerly and westerly in winter and strong easterly winds in summer (BoM 2025).



(source: BoM 2025)

Graph 1: Climate averages and records over and prior to survey periods, BoM Station 009037

3.1.2 Surface water features

The Hill River flows along the northwestern boundary of the Project Area, crossing through the Project Area as shown in Figure 6. Boothendara Creek flows along the central northern boundary of the Project Area.

No Ramsar or nationally important wetlands are mapped within the Project Area (Landgate 2026). A search of the DBCA's Geomorphic Wetlands from Cervantes to Eneabba dataset indicates that the Development Footprint intersects the following wetlands (Figure 6):

- Paluslope; seasonally waterlogged slopes
- Palusplain; seasonally waterlogged flats
- Barlkarra; intermittently inundated flats.

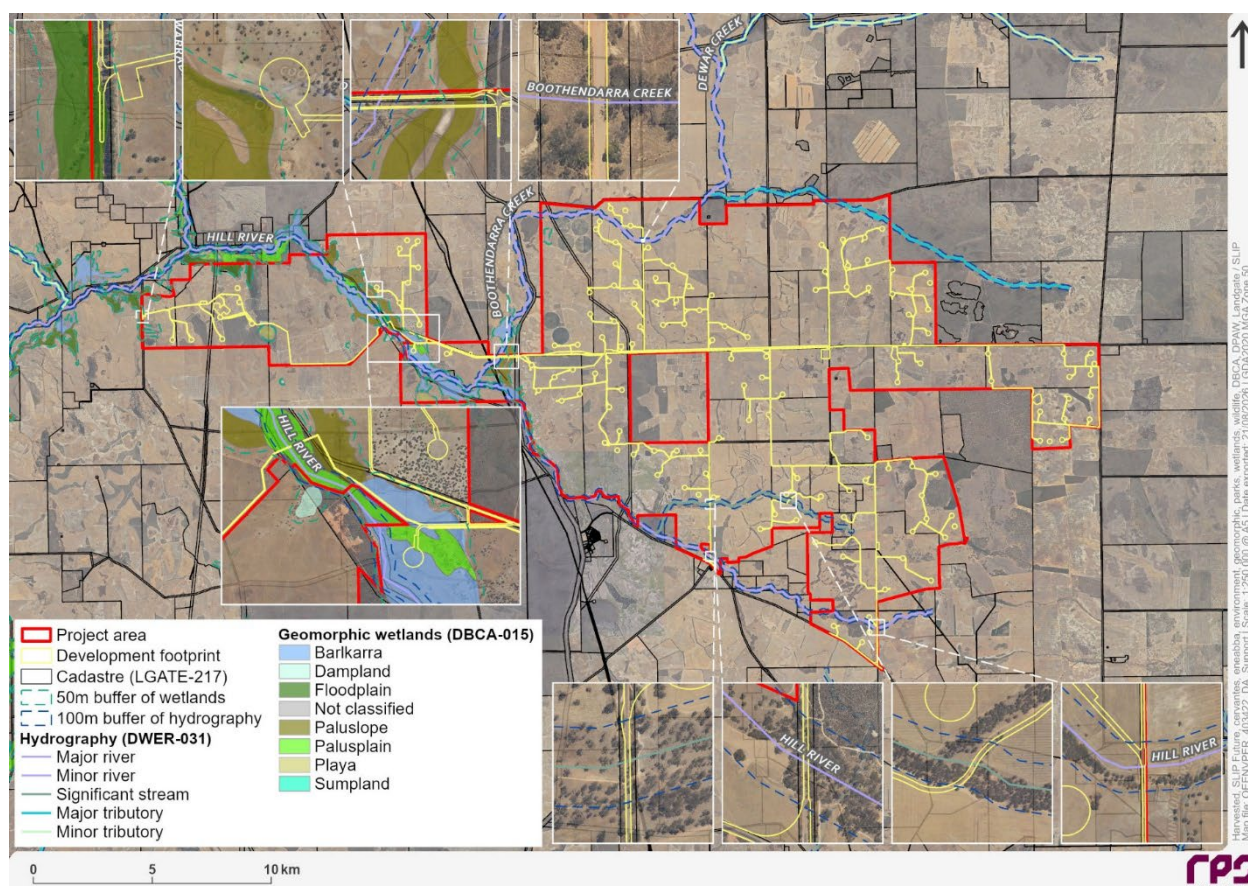


Figure 6: Surface water and geomorphic wetlands

3.2 Terrestrial fauna

3.2.1 Habitat for birds and bats

3.2.1.1 Important Bird Areas

Important Bird and Biodiversity Areas (IBAs) are important sites for the conservation of birds, identified using standard scientific criteria. BirdLife has documented over 13,000 IBAs across the world, which are the focus of the IBA programme (BirdLife International 2025).

A total of 13 IBAs have been designated for the Carnaby's cockatoo. The criteria used for the designation of IBAs for Carnaby's cockatoos are sites supporting at least 20 breeding pairs, or 1% of the population regularly utilising an area in the non-breeding part of the range. The Coomallo Nature Reserve, located approximately 5 km north of the Project Area, has been designated an IBA for Carnaby's cockatoos (Figure 7). The IBA supports up to 40 breeding pairs which nest in woodland remnants and isolated paddock trees and feed in native shrublands (Department of Parks and Wildlife 2013).

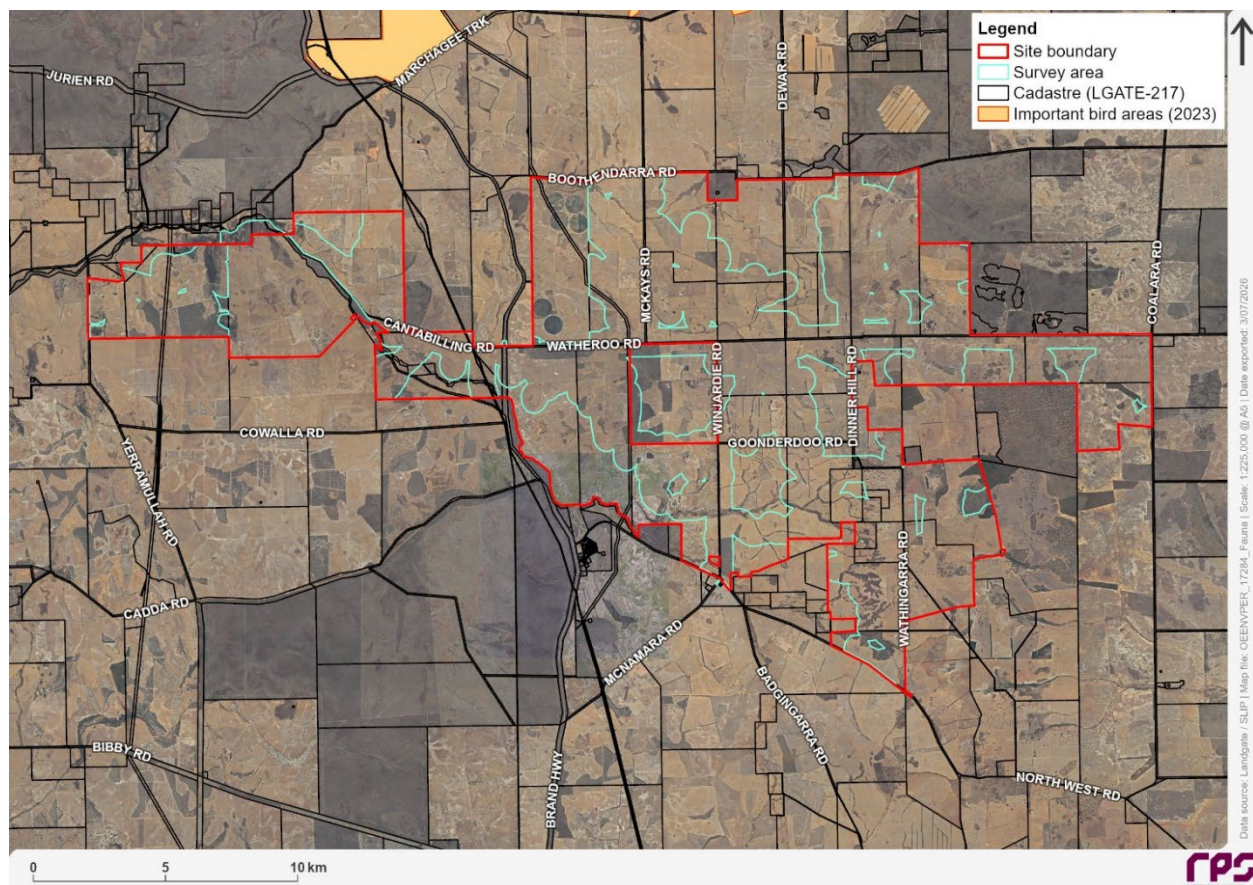


Figure 7: Important bird areas

3.2.1.2 Fauna habitat recorded within the survey area

Fourteen fauna habitat types were identified within the survey area as described in Table 5 (RPS 2026a). Table 5 also provides an indication of the expected fauna richness of each habitat type recorded and the conservation significant bird species with potential to occur within the habitat types.

The extent of the mapped fauna habitat is provided in Figure 8.

Table 5: Fauna habitat recorded within the survey area

Fauna habitat	Description	Extent within survey area (ha)	Vegetation condition	Expected fauna species richness	Suitability for conservation significant bird species
Mixed Eucalyptus / Casuarina / Melaleuca Open Woodland beside drainage / creek line	<i>Eucalyptus camaldulensis</i> , <i>Eucalyptus rudis</i> , <i>Casuarina obesa</i> , <i>Melaleuca raphiophylla</i> woodland / open woodland over <i>Scholtzia laxiflora</i> , <i>Heliotropium curassavicum</i> forbland over <i>Ficinia nodosa</i> open rushland.	32.44	Degraded – Good	- This fauna habitat type connects to areas of vegetation within and outside the site, including vegetation to the north and riparian vegetation associated with the Hill River. As such, this habitat type is one of the less fragmented fauna habitat types within the site. - It is located along a portion of the Hill River, which is seasonally inundated and may provide suitable habitat for wetland bird species. - Dense tree cover is located along the creek / drainage lines and is suitable for birds and other tree-dwelling species. - Leaf litter / ground cover is available for reptiles and invertebrates to utilise. - This fauna habitat is expected to have the highest species richness.	- This fauna habitat may support the following conservation significant fauna: - Bird species: <i>Falco peregrinus</i> (Peregrine falcon) <i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo). This habitat may provide potential foraging, roosting or breeding habitat for Carnaby's cockatoo. Eucalyptus trees over 300 mm diameter at breast height (DBH) may form hollows able to provide black cockatoo breeding habitat. - Migratory / wetland bird species (likely as vagrants): <i>Rostratula australis</i> (Australian painted snipe) <i>Tringa nebularia</i> (Common greenshank).
Sedgeland / rushland	Scattered <i>Banksia littoralis</i> , <i>Melaleuca preissiana</i> very open woodland over dense <i>Schoenus subfascicularis</i> , <i>Machaerina rubiginosa</i> sedgeland / rushland. This fauna habitat type has been affected by fire in the last five years.	80.50	Good – Degraded to Very Good – Excellent	- This fauna habitat type connects to areas of vegetation within and outside the site, including vegetation to the north and riparian vegetation associated with the Hill River. As such, this habitat type is one of the less fragmented fauna habitat types within the site. - As this habitat type is associated with the wetland areas, fauna richness is anticipated to be moderate to high.	- Other species, such as migratory / wetland bird species may utilise this habitat type on an opportunistic basis when the sedgeland/rushland or adjacent areas are inundated. - The habitat type provides potential foraging habitat for Carnaby's cockatoo.
Mixed Open low shrubland	<i>Borya sphaerocephala</i> , <i>Regelia inops</i> , <i>Thryptomene mucronulata</i> mixed close to open shrubland.	6.44	Good – Very Good	- This fauna habitat is connected to larger portions of native vegetation within and adjacent to the site. - Macropods and some reptiles and invertebrates may utilise the area.	- It is unlikely to provide significant habitat for other conservation significant species. - This habitat may be suitable for the Malleefowl, which is found in semi-arid to arid shrublands.
Banksia / Eucalyptus woodland over shrubland	<i>Eucalyptus tottiana</i> , <i>Banksia menziesii</i> , <i>Banksia attenuata</i> woodland/open woodland over <i>Acacia blakelyi</i> , <i>Acacia pulchella</i> tall shrubland over <i>Jacksonia hakeoides</i> low shrubland over <i>Ehrharta calycina</i> * sparse grassland. This fauna habitat type has been affected by fire in the last five to ten years.	64.38	Completely Degraded to Degraded	- This fauna habitat is highly fragmented within the site and in heavily degraded condition. - Volant fauna may use the trees as refuge / perching habitat. - Macropods and some reptiles and invertebrates may utilise the area. Dead logs may provide refuge for reptiles and invertebrates.	- This habitat would provide suitable foraging habitat for Carnaby's cockatoo. - No other conservation significant species are expected to utilise this habitat.
<i>Eucalyptus gittinsii</i> subsp. <i>illucida</i> mallee woodland over <i>Allocasuarina campestris</i> shrubland	<i>Eucalyptus gittinsii</i> subsp. <i>illucida</i> mallee woodland over <i>Allocasuarina campestris</i> , <i>Hakea meisneriana</i> shrubland over <i>Avena barbata</i> *, <i>Ehrharta calycina</i> * grassland.	11.49	Good – Very Good	- While the tammar scrub was surrounded by cleared land, non-volant native fauna and invertebrates may utilise this habitat. - Notwithstanding the location of these remnants and that non-native fauna are also likely to utilise this habitat, species richness would not be high.	- This habitat may provide potential foraging habitat for Carnaby's cockatoo. - This habitat may be suitable for the Malleefowl, which is known to inhabit mallee woodland habitats (Department of the Environment 2026). - No other conservation significant species are expected to utilise this habitat.
Kwongan mixed shrubland dominated by Proteaceae spp.	(Kwongan)-Mixed <i>Allocasuarina</i> , <i>Calothamnus</i> , <i>Banksia</i> , <i>Hakea</i> close to open heathland over <i>Mesomelaena pseudostygia</i> , <i>Lyginia barbata</i> , <i>Ecdeiocolea monostachya</i> , <i>Alexgeorgea nitens</i> open sedge / grass / herbland.	1,023.59	Good – Degraded to Good – Very Good	- This is the second largest fauna habitat type and has the greatest connectivity throughout the site. - While birds, macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to exploit this habitat. The fauna species richness is, therefore, low.	- This habitat may provide potential foraging habitat for Carnaby's cockatoo - This habitat may be suitable for the Malleefowl, which is found in semi-arid to arid shrublands - No other conservation significant species are expected to utilise this habitat.
Areas of mixed Eucalyptus, e.g. Shelterbelts, windbreaks, interceptor drains	Plantings of non-endemic <i>Eucalyptus</i> along the driveways for Shelterbelts, windbreaks, interceptor drains purposes.	237.87	Completely Degraded	- Given the lack of native understory, there would be limited use of this habitat by non-volant native fauna. - Volant fauna may use the trees as refuge / perching habitat. - This habitat is highly fragmented and surrounded by cleared areas / paddocks. - While macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to exploit this habitat. The fauna species richness is, therefore, low.	- This habitat may provide potential foraging habitat for Carnaby's cockatoo. Eucalyptus trees over 300 mm DBH may form hollows able to provide black cockatoo breeding habitat. - No other conservation significant species are expected to utilise this habitat.
Tagasaste (<i>Chamaecytisus palmensis</i>) plantations	Remnant and current <i>Chamaecytisus palmensis</i> plantings that are non-endemic to	495.25	Completely Degraded	Areas of Tagasaste were not surveyed. However, given the lack of floral diversity, lack of understorey, and being	No conservation significant species are expected to utilise this habitat.

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Fauna habitat	Description	Extent within survey area (ha)	Vegetation condition	Expected fauna species richness	Suitability for conservation significant bird species
	WA. The understories is predominantly made up of alien species.			surrounded by cleared land, species richness is assumed to be low. This habitat is highly fragmented and surrounded by cleared areas / paddocks.	
Mixed planting of Eucalypt species	A mixed planting of species of <i>Eucalyptus</i> spp. (<i>E. wandoo</i> , <i>E. rudis</i>) with some Marri (<i>Corymbia calophylla</i>) plantings over <i>*Oxalis pes-caprae</i> forbland, <i>*Ehrharta</i> spp. grassland/sparse grassland.	28.18	Completely Degraded	- Given the lack of native understory, there would be limited use of this habitat by non-volant native fauna. Volant fauna are likely to utilise this site. - Volant fauna may use the trees as refuge / perching habitat. - While birds, macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to exploit this habitat. The fauna species richness is, therefore, low.	- This habitat may provide suitable foraging, roosting and breeding habitat for Carnaby's cockatoos. Wandoo and Marri trees are common foraging plants for this species (Bamford Consulting Ecologists (BCE) 2020). One Carnaby's cockatoo was observed within this habitat type. Eucalyptus trees with a DBH over 300 mm may form hollows able to provide potential black cockatoo breeding habitat - No other conservation significant species are expected to utilise this habitat.
Parkland cleared Marri (<i>Corymbia calophylla</i>)	Remnant trees of <i>Corymbia calophylla</i> and occasional <i>Eucalyptus wandoo</i> with ground layer removed.	425.20	Completely Degraded	- Given the lack of native understory, there would be limited use of this habitat by non-volant native fauna. - Volant fauna may use the trees as refuge / perching habitat. - While macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to exploit this habitat. The fauna species richness is, therefore, low.	- This habitat may provide suitable roosting, breeding or foraging habitat for Carnaby's cockatoo due to the presence of <i>Corymbia calophylla</i>, a common foraging plant for this species (BCE 2020). Eucalyptus trees over 300 mm DBH may form hollows able to provide black cockatoo breeding habitat. - No other conservation significant species are expected to utilise this habitat.
Parkland cleared Prickly bark (<i>Eucalyptus tottiana</i>)	Remnant trees of <i>Eucalyptus tottiana</i> with ground layer removed.	501.49	Completely Degraded	- Given the lack of native understory, there would be limited use of this habitat by non-volant native fauna. - Volant fauna may use the trees as refuge / perching habitat. - While macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to exploit this habitat. The fauna species richness is, therefore, low.	- This habitat may be suitable foraging habitat for Carnaby's cockatoo. - No other conservation significant species are expected to utilise this habitat.
Parkland cleared Wandoo (<i>Eucalyptus wandoo</i>)	Remnant trees of Wandoo with ground layer removed.	51.83	Completely Degraded	- Given the lack of native understory, there would be limited use of this habitat by non-volant native fauna. - Volant fauna may use the trees as refuge / perching habitat. - While macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to exploit this habitat. The fauna species richness is, therefore, low.	- This habitat may provide suitable breeding, roosting and foraging habitat for Carnaby's cockatoo due to the presence of <i>Eucalyptus wandoo</i>. Eucalyptus trees over 300 mm DBH may form hollows over time to support black cockatoo breeding habitat. - No other conservation significant species are expected to utilise this habitat.
Pine plantations	Remnant and current pine plantings (greater than ten years old) that are non-endemic to WA. Understories are predominantly made up of alien species.	124.40	Completely Degraded	- Considering the condition of the vegetation, the acidity of the substrate and the upper storey of pines, the use of this habitat by non-volant native fauna is limited. - Volant fauna may utilise this habitat for perching in trees but is unlikely to provide suitable foraging habitat. - While macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to be present in this depauperate habitat. The fauna species richness is, therefore, low.	- This habitat may provide suitable foraging habitat for Carnaby's cockatoos. Carnaby's cockatoo are known to forage on pine plantations with trees greater than 10 years old (BCE 2020). One Carnaby's cockatoo was observed within this habitat type. - No other conservation significant species are expected to utilise this habitat.
Cleared	Areas that are generally made up of agricultural paddocks, devoid of native vegetation and colonised by introduced species.	12,219.58	Completely Degraded	- While macropods and some reptiles and invertebrates may utilise the area, non-native fauna are more likely to be present in this depauperate habitat. - Volant fauna are highly unlikely to use this area as there is no native canopy to take refuge in and foraging value is extremely low. - The fauna species richness is, therefore, low.	This fauna habitat type does not comprise any habitat for any conservation significant species. Although, conservation significant volant fauna (i.e. Carnaby's cockatoo, Peregrine falcon) may fly over this habitat while flying between more suitable habitat types.

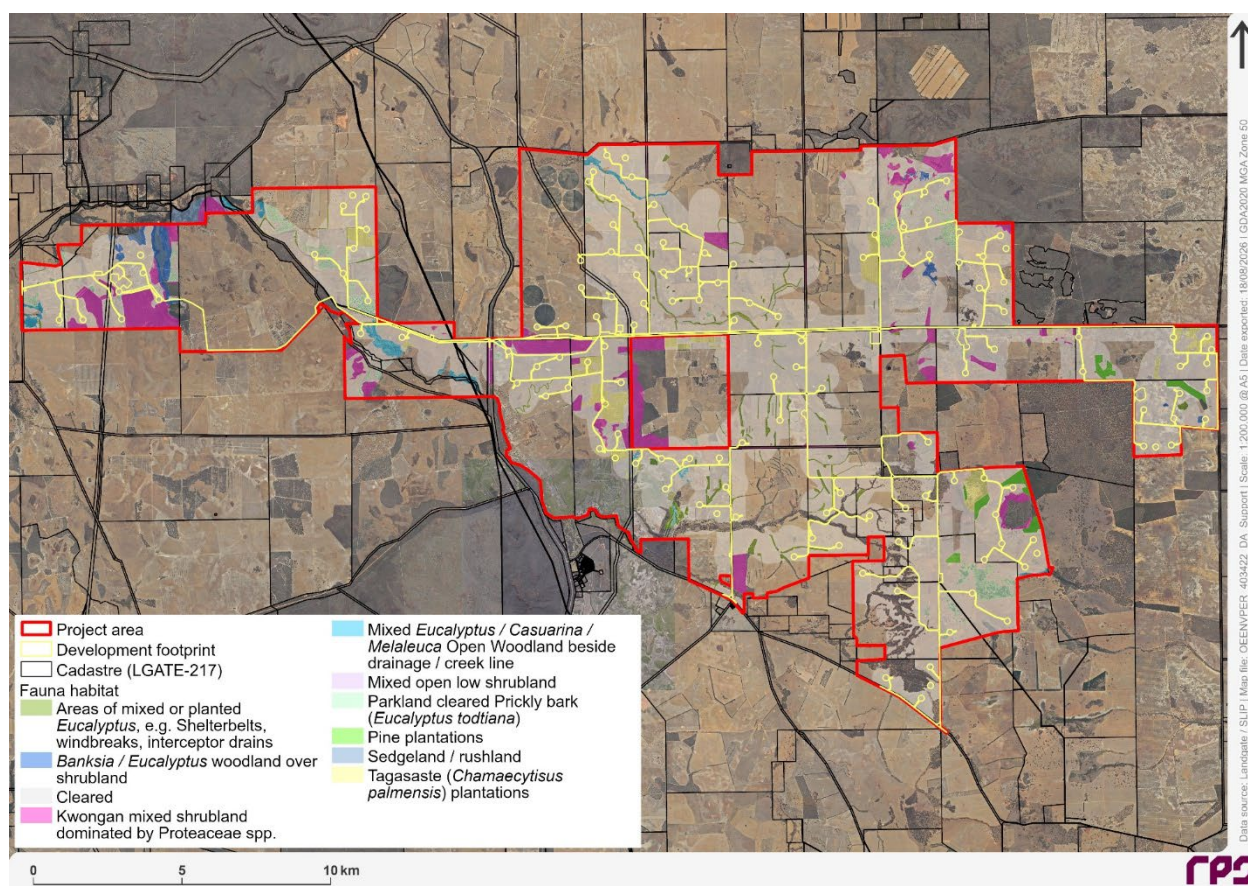


Figure 8: Fauna habitat within the survey area

3.2.1.3 Black cockatoo habitat

3.2.1.3.1 Regional black cockatoo habitat

The Project Area is within the buffer of known black cockatoo roosting and breeding sites. A review of National Parks and reserves within the area indicates that there is approximately 23,500 ha of native vegetation protected in reserves within 12 km of the Project Area which may provide foraging, roosting, and breeding habitat for black cockatoos.

3.2.1.3.2 Potential foraging habitat within the survey area

The foraging potential of vegetation for black cockatoo species depends on the type, density and condition of trees and shrubs within the vegetation. RPS has adopted the BCE (2020) scoring system for black cockatoo species to describe and categorise the potential foraging habitat within the survey area. RPS adopted a conservative approach in determining the foliage cover, where less than 1% of species cover was recorded, a value of 1% was adopted.

Based on this assessment, approximately 3,802.03 ha (18.3% of the survey area; 20,739.99 ha) of potential foraging habitat was recorded within the survey area, including:

- 6.44 ha (or 0.17%) of vegetation with a low foraging value
- 3,506.04 ha (or 92.2%) of vegetation with a low to moderate foraging value
- 138.93 ha (or 3.7%) of vegetation with a moderate foraging value
- 150.62 ha (or 4.0%) of vegetation with a moderate to high foraging value.

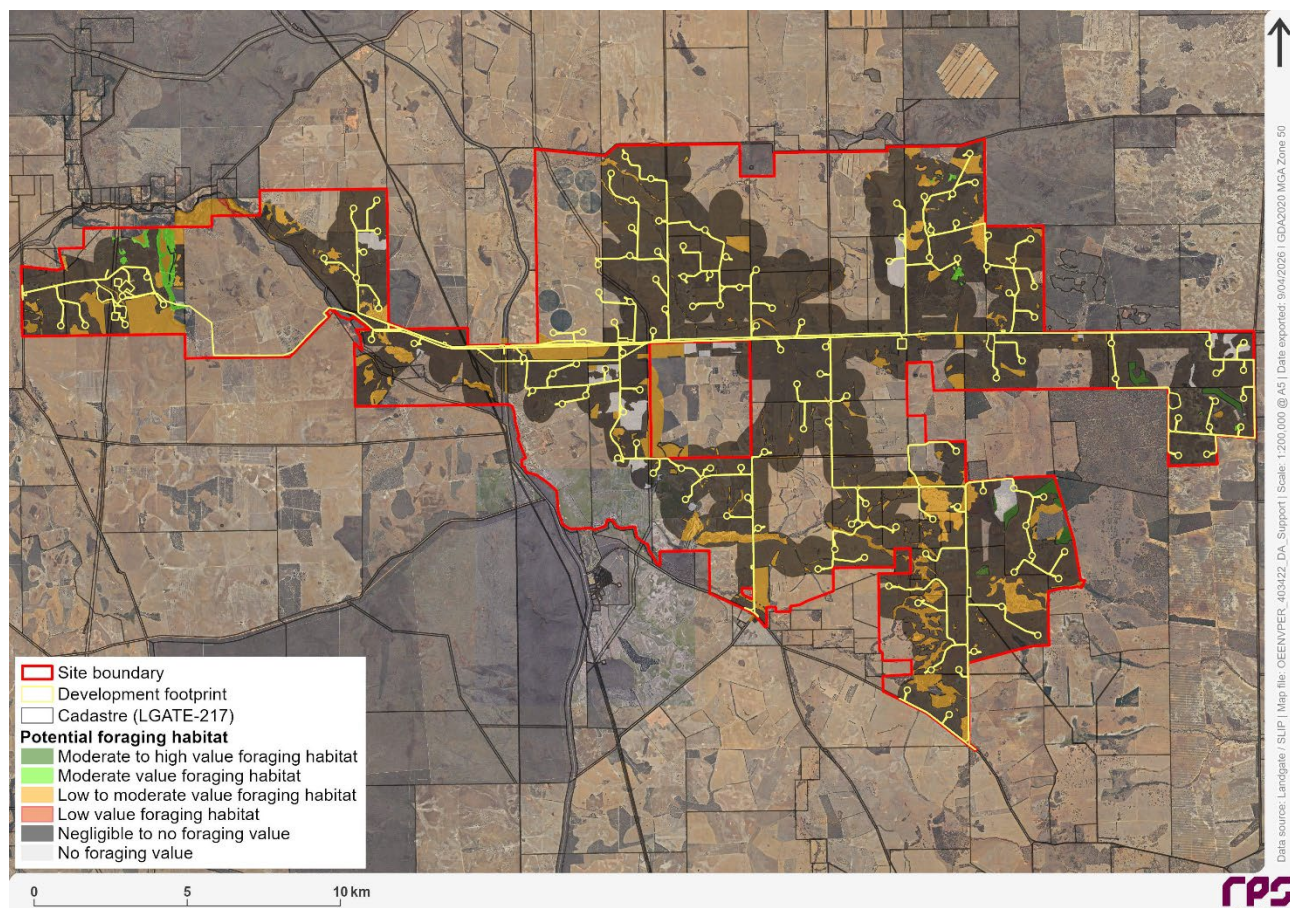


Figure 9: Black cockatoo potential foraging habitat

3.2.1.3.3 Potential breeding and roosting habitat

A targeted black cockatoo breeding habitat assessment was undertaken by Terrestrial Ecosystems to identify potential black cockatoo breeding trees within the targeted survey area. During the bird and bat utilisation surveys, BCE (Shepherd and Bamford 2026a) recorded trees used by black cockatoos within the Project Area as roosting or breeding habitat. Each potential breeding tree has been ranked using BCE's ranking system for the assessment of recorded and potential nest trees. Breeding trees recorded by BCE are shown in Figure 10 and potential breeding trees recorded by Terrestrial Ecosystems are shown in Figure 11.

Roosting habitat is generally in or near riparian environments or other water sources. Any tall trees may provide roosting habitat, but particularly Flat-topped Yate, Salmon Gum, Wandoo, Marri, Karri, Blackbutt, Tuart, introduced eucalypts and introduced pines. During the two year BBUS, BCE recorded roost sites within the Project Area as shown in Figure 12.

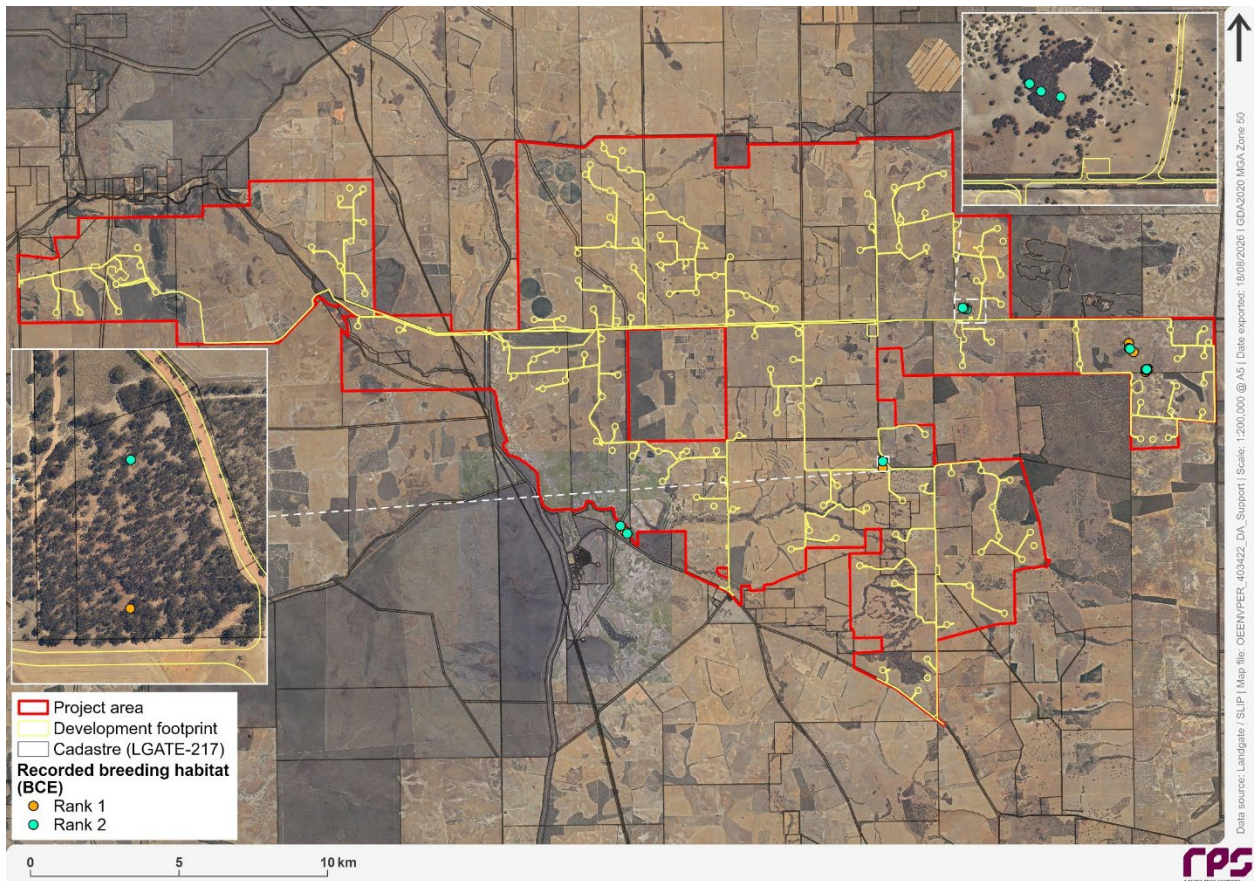


Figure 10: Recorded breeding trees within the Project Area (BCE 2026)

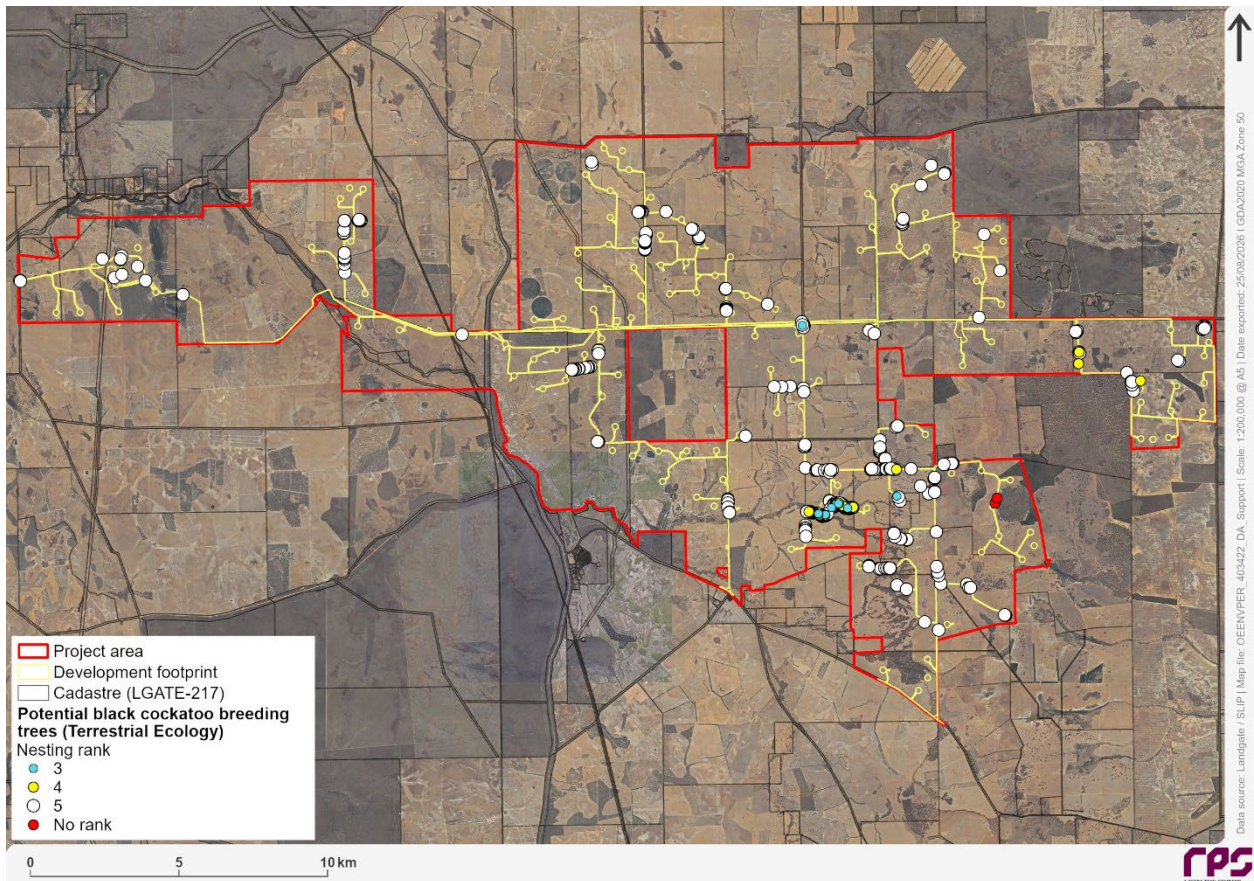


Figure 11: Potential breeding trees (Terrestrial Ecosystems 2026)

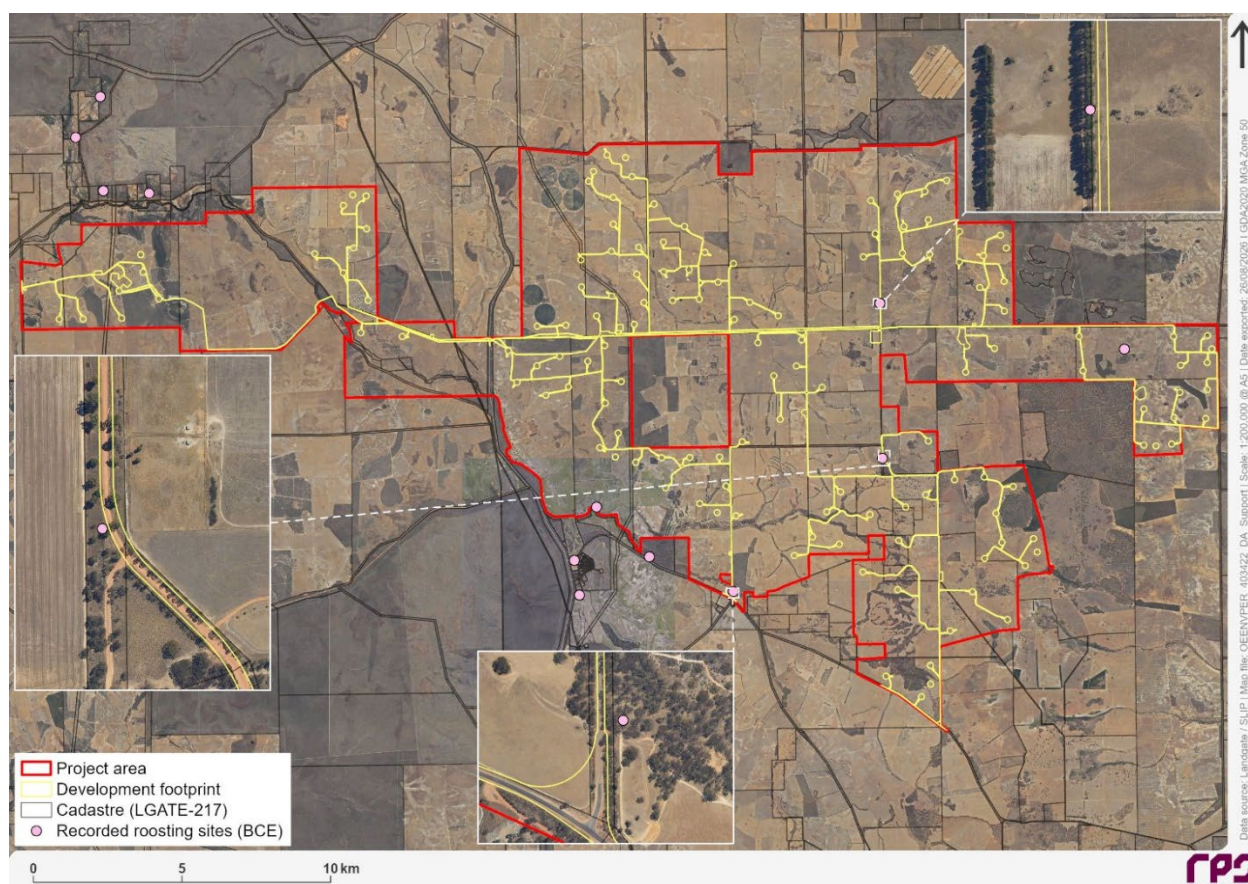


Figure 12: Roost sites recorded by BCE

3.2.2 Conservation significant vertebrate fauna

Database searches and the literature review reported a total of 32 conservation significant fauna within a 20 km radius of the survey area. A summary of the conservation significant fauna species and their likelihood of occurrence within the survey area is provided in Appendix E. Migratory marine birds, shoreline birds, and waders have been excluded from the assessment because the Project Area is inland and does not comprise coastal habitat suitable for these species.

Most conservation significant species listed in the database searches were determined to either be unlikely to be present within the survey area or expected as irregular visitors or vagrants. The bird species with potential to occur within the Project Area, either as a seasonal, regular or irregular visitor are described in Table 6.

Table 6: Vertebrate fauna species with potential to occur within the Project Area

Species name	Conservation status BC Act / DBCA listed	EPBC Act	Likelihood of occurrence with the Project Area
<i>Falco peregrinus</i> Peregrine falcon	Other specially protected	-	Irregular visitor - The Peregrine falcon prefers cliffs, watercourse, cliff ledges, wooded watercourses and granite outcrops (Birdlife Australia 2023). - BCE (Shepherd and Bamford 2026a) recorded six encounters over two BBUS campaigns. The Project Area is likely within the home range of a pair, but breeding habitat is limited. This species may occur opportunistically within the survey area.

Species name	Conservation status		Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act	
			- No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present for this species. - The species may opportunistically fly over or forage in the Project Area.
<i>Leipoa ocellata</i> Malleefowl	Vulnerable	Vulnerable	Irregular visitor - Malleefowl occur in a wide range of habitat types; common elements include a sandy substrate with trees (i.e. eucalypt species) 3–8 m in height and a shrub layer providing horizontal cover. - An anecdotal record was provided by a landowner for a single Malleefowl crossing Watheroo Road in June 2025 (Shepherd and Bamford 2026a). - Potential habitat within the site comprises: <i>Eucalyptus gittinsii</i> subsp. <i>illucida</i> mallee woodland over <i>Allocasuarina campestris</i> shrubland - Kwongan mixed shrubland dominated by <i>Proteaceae</i> spp. - Mixed Open low shrubland. - Malleefowl is unlikely to persist within the site due to the highly fragmented nature and limited extent of this potential habitat, however based on one anecdotal record it may be a very irregular visitor.
<i>Zanda latirostris</i> Carnaby's cockatoo	Endangered	Endangered	Regular visitor/Resident - There are known roosting trees present to the north of the Project Area directly adjacent to the Hill River, which would provide a seasonal water source for breeding / roosting Carnaby's cockatoos. - Based on this, it is likely that the Carnaby's cockatoo may opportunistically forage on native vegetation, canola / lupin crops (if under rotation) / wild radish and could use taller trees for roosting / breeding (if hollows are present) within the Project Area. - Potential habitat within the Project Area is discussed further in Section 3.2.1.3.
<i>Calyptrorhynchus banksia</i> Forest Red-tailed black cockatoo	Vulnerable	Vulnerable	Vagrant / irregular visitor - Although outside the known range of this species, BCE (Shepherd and Bamford 2026a) recorded this species on two campaigns in low numbers. This species may occur as an irregular, non-breeding visitor. - The species has been recorded within 30 km of the Project Area. - Based on this, it is possible that the Forest Red-tailed black cockatoo may opportunistically forage on native vegetation, canola / lupin crops (if under rotation) / wild radish and could use taller trees for roosting / breeding (if hollows are present) within the Project Area.

3.3 Bird and bat assemblage

3.3.1 BBUS approach

The BBUS was designed and undertaken by BCE, a specialist fauna consultancy with extensive experience in conducting field surveys for fauna and habitat assessments, and training for bird and bat utilisation surveys within Western Australia (Shepherd and Bamford 2026a).

BCE has been actively engaged in fauna studies in Cooljarloo for three decades and is very familiar with the bird and bat ecology of the region. Table 7 outlines the qualifications, years of environmental impact assessment / wildlife survey experience and involvement in field investigations and / or report preparation of the BCE personnel (Shepherd and Bamford 2026a).

Table 7: BCE personnel involved in BBUS and report preparation

Personnel	EIA / Wildlife survey experience	BBUS field investigations	Report preparation
Dr Mike Bamford BSc (Biology), Hons (Biology), PhD (Biology)	41 years	+	+
Sonya Bateman BSc (Biology)	16 years	+	
Anthony Bougher BSc (Env. Sci.)	28 years	+	
Cath Chuk BSc Hons. (Zool.)	15 years	+	
Anais Demarais	1 year		+
Tracy De Vetter BSc (Cons & Wildlife Biol.)	3 years	+	
Nathan Ducker BEd (Phys Ed. Sci.)	26 years	+	
Tim Gamblin BSc (Zool.), Cert. (Env. Mngmt.)	12 years	+	
Mike Griffiths BSc (Env. Biol.)	10 years	+	
Natalia Huang BSc (Env. Sci.), Hons (Biol. Sci.), MBA	18 years	+	
Dr Amanda Kristancic BSc (Zool/Biochem), Hons (Zool), PhD (Paras)	8 years		+
Dr Michael Lohr BSc (Wildl & Fish Sci), MSc (Wildl Ecol), PhD (Nat Sci)	23 years	+	
Samantha Lostrom BSc Hons (Zool. & Mar. Biol.)	13 years	+	
Andy McCreery BSc Hons (Env. Sci. & Cons. Biol.)	13 years	+	
Eliza-Joyce Melersh BSc (Cons. & Wildl. Biol.)	10 years	+	
Brenden Metcalf BSc Hons (Env. Sci.)	25 years	+	+
Alice Reaveley BSc. (Zool. & Psych.)	22 years	+	
Dr Barry Shepherd BSc Hons. (Env. Biol.), PhD (Ecology)	32 years	+	+
Peter Smith Assoc. Dip. Agric. (Farm Management)	35 years	+	
Steven Spragg BSc (Cons. Wildl. Sci.)	11 years	+	

In 2024, BCE undertook a high-level regional risk assessment for birds and bats at risk of wind-farm specific risks (e.g. collision with turbine blades). Species considered most at risk from significant impacts were identified in the bird and bat utilisation survey plan (BCE 2024) as target species and included those listed in Commonwealth and state legislation, as well as those considered locally important. These are listed below:

- Primary target species:
 - Carnaby's cockatoo (*Zanda latirostris*) and (potentially) Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)
 - Migratory birds including waders (autumn, summer and spring)
 - Fork-tailed Swift (*Apus pacificus*) (November – April but highest likelihood March and April)
 - Peregrine Falcon (*Falco peregrinus*)

- Secondary target species:
 - All other raptors
 - Non-migrant waterfowl including ibis, ducks, swans and waders
 - High-flying bat species such as Gould's Wattled Bat (*Chalinolobus gouldii*) and the White-striped Free-tail Bat (*Austronomus australis*).

Other bird species encountered were recorded formally during the bird census sampling or as opportunistic records.

The bird and bat utilisation surveys (BBUS) included the following methods:

- Vantage point (VP) sampling
- Focal follows (FF)
- Bird census (BC) sampling
- Acoustic recording.

Thirteen VPs and four BC sampling locations were installed across the Project Area, with a further six BC locations added in March 2025. Sampling locations were located to ensure all representative landscapes across the Development Footprint were sampled. Three control sites were established in the region and deemed adequately distant from the Project Area to be independent of potential impacts from the Project.

The field campaign schedule, showing the number of and extent of surveys is provided in Table 8 and the location of sampling sites is provided in Figure 14. A total of 1,537.2 hours was spent on formal bird sampling, with 997.6 hrs on VP within the Project Area and 181.6 hours on control VP sites. A total of 358 hours was spent on FF and approximately 16 hours on BC. Time spent within the Project Area taking opportunistic sightings also adds a significant contribution to the project but cannot be quantified.

Table 8: Bird and bat survey schedule

Campaign	Dates	Personnel
2024		
Reconnaissance survey	23 October	2
1. Spring	23 - 25 October	4
2. Summer	4 - 6 December	5
3. Summer	18 - 20 December	4
2025		
4. Summer	7-10 January	6
5. Summer	17-19 February	5
6. Autumn	17-19 March	5
7. Autumn	5 - 9 May	4
8. Winter	17- 20 June	5
9. Winter	15 -18 July	5
10. Spring	11 - 14 August	4
11. Spring	16 - 19 September	4
12. Spring	11-14 November	4
2026		
13. Summer	13 - 16 January	4
14. Autumn	4 - 8 May	4
15. Winter	20-23 July	4

3.3.1.1 Vantage Point Sampling

The VP sampling method was included in the BBUS to sample the birds that fly through the airshed of the wind farm at the height of the rotor swept path (RSP) and thus are potentially at risk of being struck by the

blades. The VP survey approach is widely used overseas and is suggested as a method in the DCCEEW draft Onshore Wind Farm Guidance (DCCEEW 2024a). Its use was promoted and developed by Scottish Natural Heritage (SNH) (2017) in parallel development with the Collision Risk Modelling (CRM) (Bamford Consulting Ecologist, 2026).

During the reconnaissance visit, a series of 13 VPs was identified inside the project area and three control VPs off-site (Figure 14). All on-site VPs were confirmed during the first campaign but finding suitable control sites took more time and were not properly established until campaign 3. All bird activity at each VP was monitored out to 2 km by surveyors. Binoculars and spotting scopes or long-focal length mirrorless cameras were used to aid species identification. Tall, fixed objects in the area were measured early in the programme and plotted in QField. The surveyors prioritised the detection of target (primary and secondary) bird species as listed above. Non-target species were recorded during the VP only if they represented extraordinary events. Otherwise, they were recorded after the VP was concluded as opportunistic sightings. All records are allocated a maximum flight height.

The primary intention of VP sampling is to target Conservation Significant 1 (CS1) bird species listed under the EPBC Act as Threatened or Migratory or under the BC Act as these are deemed “primary targets”. If spotted wherever they are, birds considered primary targets are tracked for as long as they are in view, and records of their height, number of individuals and behaviour made. Primary targets must be recorded whenever they are observed and not just within the VP buffer.

Secondary targets include all other raptors and water birds. Other species observed during VP sampling are listed with their upper flight heights only after the VP has been completed.

VPs were established at locations that provide a good platform to view the surrounding landscape and were generally on higher ground to minimise the amount of ‘dead’ ground obscuring the observer’s ability to spot birds. Tall landscape features such as transmission and communications towers were measured using laser-rangefinders and used to help train and calibrate surveyors’ estimation of flight height.

3.3.1.2 Focal Follows

Focal Follow sampling was devised to intensively sample the behaviour, distribution and flight activities of the Carnaby’s cockatoo, and to ensure a broad and complete understanding of their use of the Project Area. VP sampling alone was not expected to deliver adequate data on Carnaby’s cockatoo by being limited to sampling periods only and at a series of fixed locations. Instead, groups of Carnaby’s cockatoo were followed from a distance and all activities recorded throughout the day. In this way, particularly important aspects of their ecology could be identified and recorded, including roosting and nesting locations, and a broad understanding of their flight behaviours throughout the day could be gathered. Conversely, VP sampling provides a formal spatial dataset across the extent of the wind farm and is the only means of informing the collision risk modelling (CRM) process.

FF sampling initially focused on previously known roosts and habitat features in and around the Project Area. Once observers became familiar for a given project area, they were better able to predict where the birds may be at any one time. Observers tracked black-cockatoo movements from a respectful distance through the landscape on foot, from vehicles and from higher ground. Disturbance from this approach is considered no different than the existing personnel and vehicular movements throughout the area, to which Carnaby’s are accustomed.

3.3.1.3 Bird census

Ten bird census (BC) sites were established within the Project Area, with three control sites established outside the Project Area to acquire a sample that is independent of influence from the Project. Data acquired from BC sampling captures all species encountered and maximum flight heights of common species, which is used to help identify which birds are at risk from blade-strike. The focus was on acquiring a quantitative dataset so that before, after, control, impact (BACI) analysis can be conducted during construction and operation of the Project to identify whether any changes occur that may be attributed to disturbance or losses.

BC sampling was carried out early to mid-morning once every campaign, depending on season. The method used was a 15 to 20 minute survey across a 2 ha area, as recommended by Birdlife (2025) (100 x 200 m quadrats in native vegetation, or 500 m long by 40 m wide transects in cleared areas). All species present

were recorded. BC locations were selected to be representative of the ecological landscape within the Project Area for all groups of birds.

3.3.1.4 Water bird counts

The nearest major wetlands to the project area lie 35 km (Emu Lakes) and 45 km (Lake Guraga) to the south: The lakes were visited with a focus on spring, summer and autumn to obtain counts of waterbirds to identify what migrant waders and other waterbirds were in the region, however may remain undetected as they fly only occasionally or at night.

Observers visited each of the lakes in the early morning and counted birds from a given sample point. All species observed on or around each lake were recorded together with the estimate of numbers, broad behaviours and maximum flight height if observed in the air. It is to be noted that the birds recorded on the lakes do not necessarily use the airspace within the Project Area.

The location of regional lakes included in the surveys, in relation to the Project location, is provided in Figure 13.

Table 9: Regional water bird monitoring timing

Waterbird count reference	Date	Lakes visited
1	19 October 2024	Emu Lakes
2	20 May 2025	Emu Lakes, Guraga Lake
3	8 October 2025	Emu Lakes, Guraga Lake
4	14 November 2025	Guraga Lake
5	30 January 2026	Emu Lakes, Guraga Lake
6	3 March 2026	Guraga Lake
7	8 May 2026	Emu Lakes, Guraga Lake

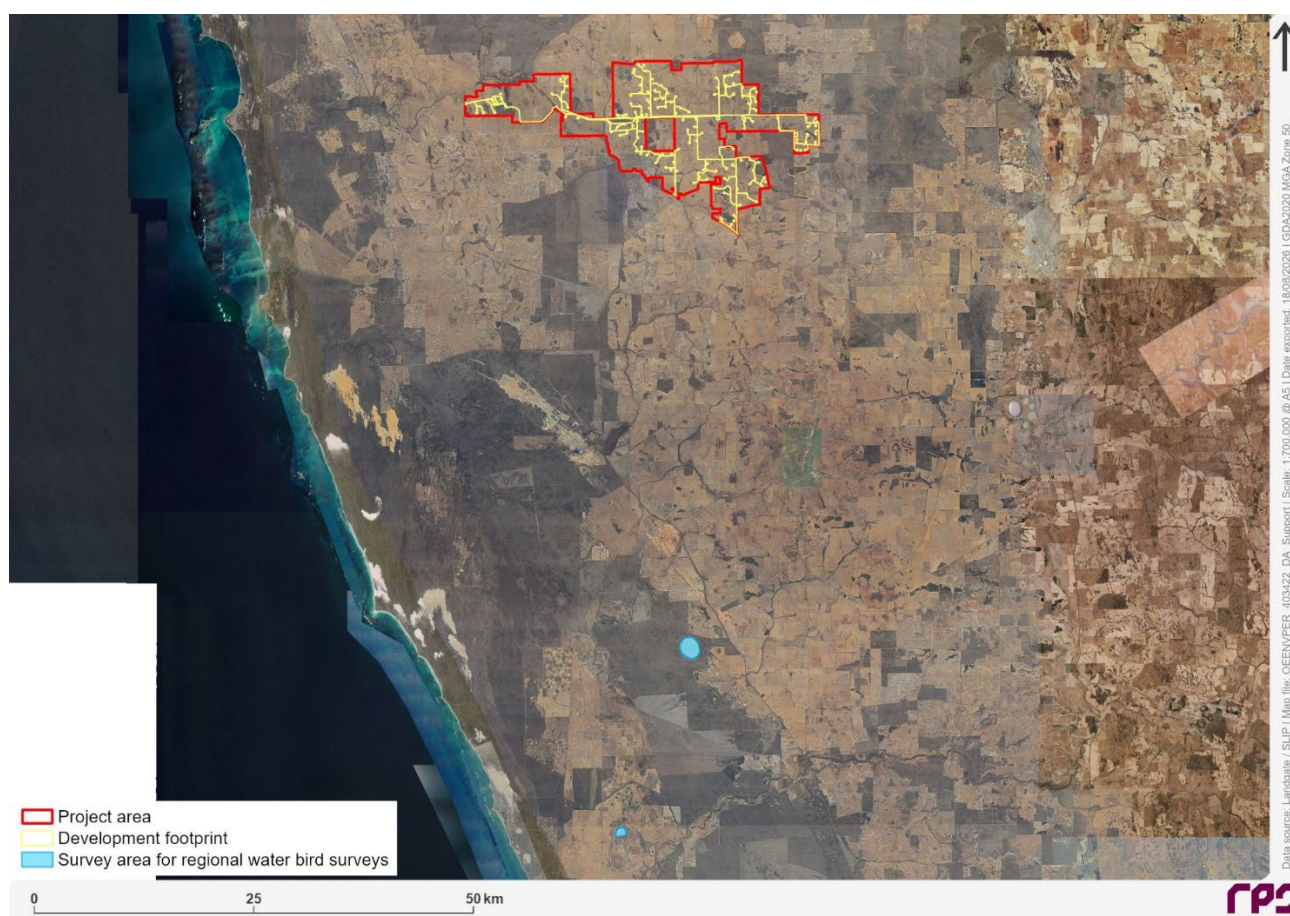


Figure 13: Regional lakes included in BBUS

3.3.2 Acoustic recording

Five Titley Scientific “Chorus” Acoustic recording units (ARUs) were deployed in October 2024, with an additional (fifth) unit installed on 17th December 2024 to record ultrasonic sounds (up to 160 kHz) for bats and audible sounds (up to 20 kHz) for all other fauna.

The ARUs were maintained during subsequent sampling campaigns by changing batteries and downloading data. Several ARUs were relocated over time to sample a wider range of environments and increase spatial sampling, or because the original location was disturbed. The ARUs performed well and collected a large quantity of data that captured any changes in bat assemblages that occurred through the seasons. Two recorders had technical issues between December 2024 and February 2025 and had limited recording time, but these were later resolved.

The ultrasonic settings (and locations of the ARUs) were selected according to the species of bats expected in the Project Area. Sampling in the audible range (for other fauna) was used to augment visual sampling if required and obtain a suite of data that could satisfy the following:

- over a longer period than ecologists could attend the site
- when hot weather may be a risk to surveyors
- nocturnal species
- rarer events that have very low likelihood of being detected by surveyor alone
- bioacoustics soundscape as a representation of biodiversity to support long term monitoring.

Table 10: Deployment schedule for ARUs

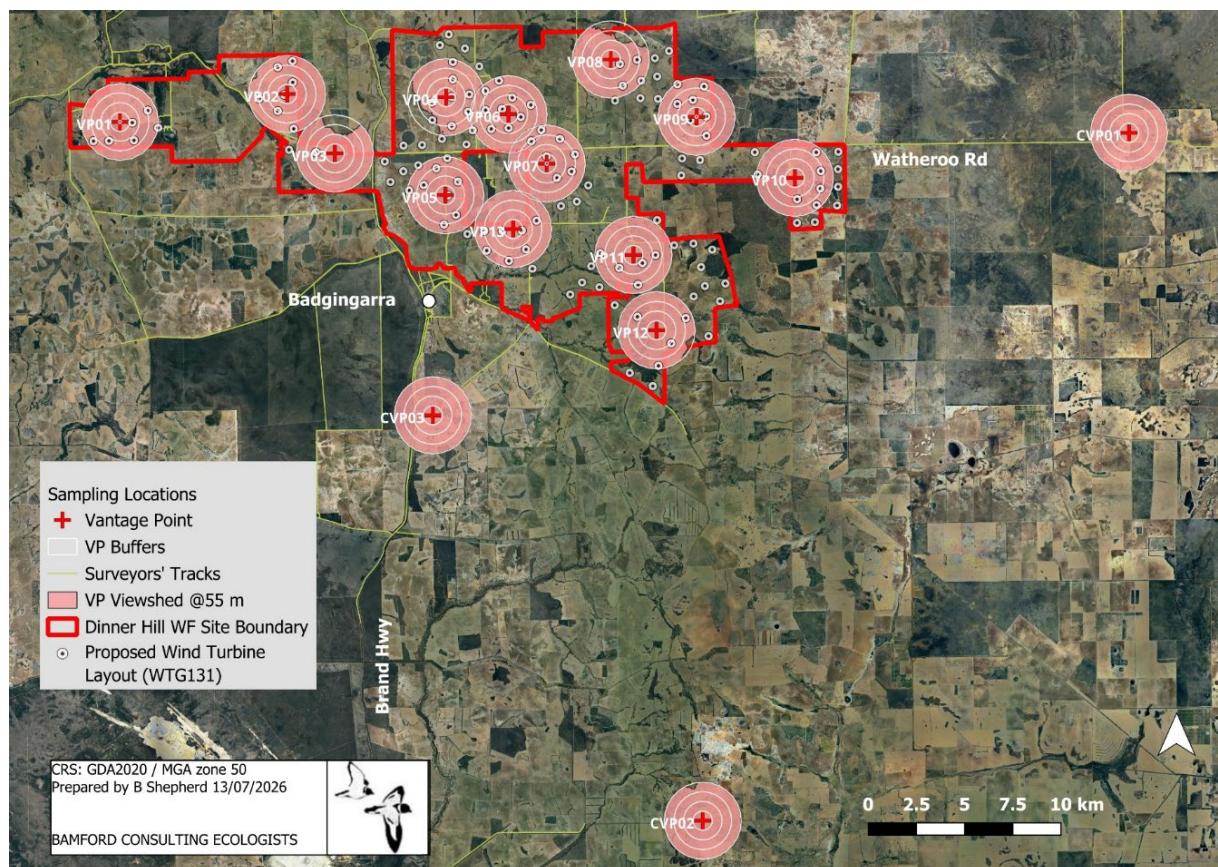
ARU	Deployment and survey effort			Location	
	Deployed	Retrieved	Nights / days active	Easting	Northing
ARU32	25/10/2024	18/03/2025	24	357819	6648935
ARU32	18/03/2025	23/07/2026	71	356815	6647764
ARU36*	25/10/2024	18/03/2025	28	369757	6646595
ARU40	17/12/2025	16/07/2025	36	375692	6645255
ARU40	16/07/2025	23/07/2026	34	368161	6632110
ARU41*	25/10/2024	23/07/2026	66	340447	6646406
ARU42	25/10/2024	23/07/2026	73	363630	6645530
ARU43	25/10/2024	15/07/2025	32	361125	6638479
ARU43	15/07/2025	23/07/2026	42	356805	6642690
ARU44	18/03/2025	23/07/2026	28	369745	6646595

BCE (2026)

Table 11: Sampling schedules

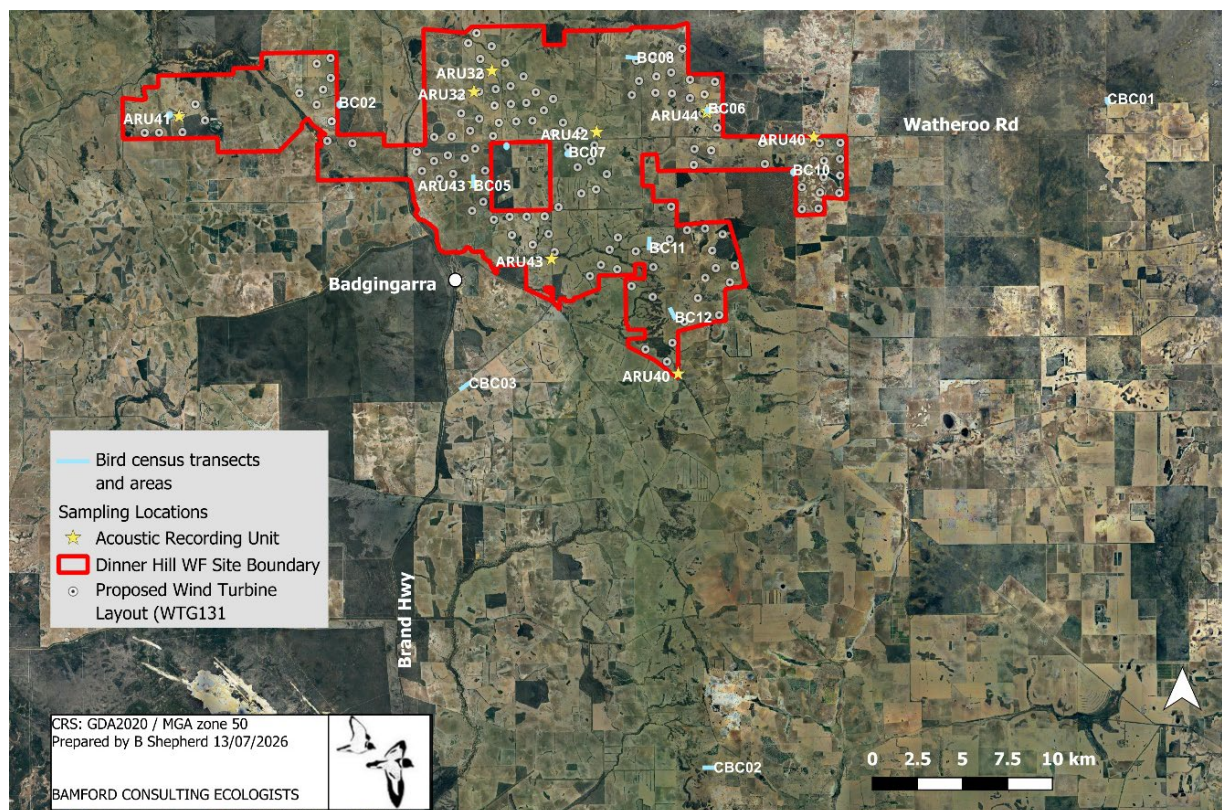
Target taxa	From	To	Mode	Days per week
Diurnal Birds	75 min after sunrise	1 hr before sunset	30 min on, 60 min off	1
Nocturnal Birds	1 hr after sunset	1 hr before sunrise	30 min on, 60 min off	1
Bats	30 min before sunset	30 min after sunrise	Triggered	2

BCE (2026)



(Source: Shepherd and Bamford 2026a)

Figure 14: Locations of vantage points and results of the viewshed analysis (at 55 m) for the BBUS



(Source: Shepherd and Bamford 2026a)

Figure 15: Bird census locations and placement of acoustic recording units

3.3.3 Findings

The BBUS undertaken by BCE identified the following bird and bat assemblage within the Project Area (Shepherd and Bamford 2026a):

- That 185 bird species could occur in the Project Area, of which 96 bird species have been confirmed present through the field investigations.
- That eight bat species could occur in the Project Area, of which 6 bat species have been confirmed present through the field investigations. None of these species are considered conservation significant through the state and Commonwealth legislation.
- This assemblage is considered to be typical of a landscape dominated by agriculture but is likely enriched due to the presence of several stands of native vegetation. Introduced European Red Fox and Feral Cats were also confirmed present throughout the project area and are known to prey upon native fauna including birds and bats.

The following sections address the primary and secondary target species recorded during the BBUS, including observations on group size and flight heights. Additional information on these species is presented in the BBUS reports (Kristancic, Shepherd and Bamford 2025, Shepherd and Bamford 2026a).

3.3.3.1 Primary target species

Bird species of conservation significance recorded by BCE during the BBUS are summarised in Table 12.

No bat species of conservation significance were recorded during the BBUS.

Although a target species during the BBUS, the Fork-tailed swift (*Apus pacificus*) was not recorded. This species is a migrant, aerial insectivore that visits Australia between October and April, with records peaking in southwestern WA between February and April. Known to follow storm-fronts, it is conspicuous by sight and by its call so can be readily detected even at height. No Fork-tailed Swifts were recorded during the BBUS, and none have been encountered by BCE during 30 years of monitoring at a nearby vegetation restoration programme (Shepherd and Bamford 2026a).

Only two migratory waders were recorded during the regional lake surveys undertaken as part of the BBUS; Red-necked stint (*Calidris ruficollis*) and Common Greenshank (*Tringa nebularia*). These species were not recorded within the Project Area but were recorded at Guraga Lake (approximately 45 km south of the Project Area) and Emu Lake (approximately 35 km south of the Project Area).

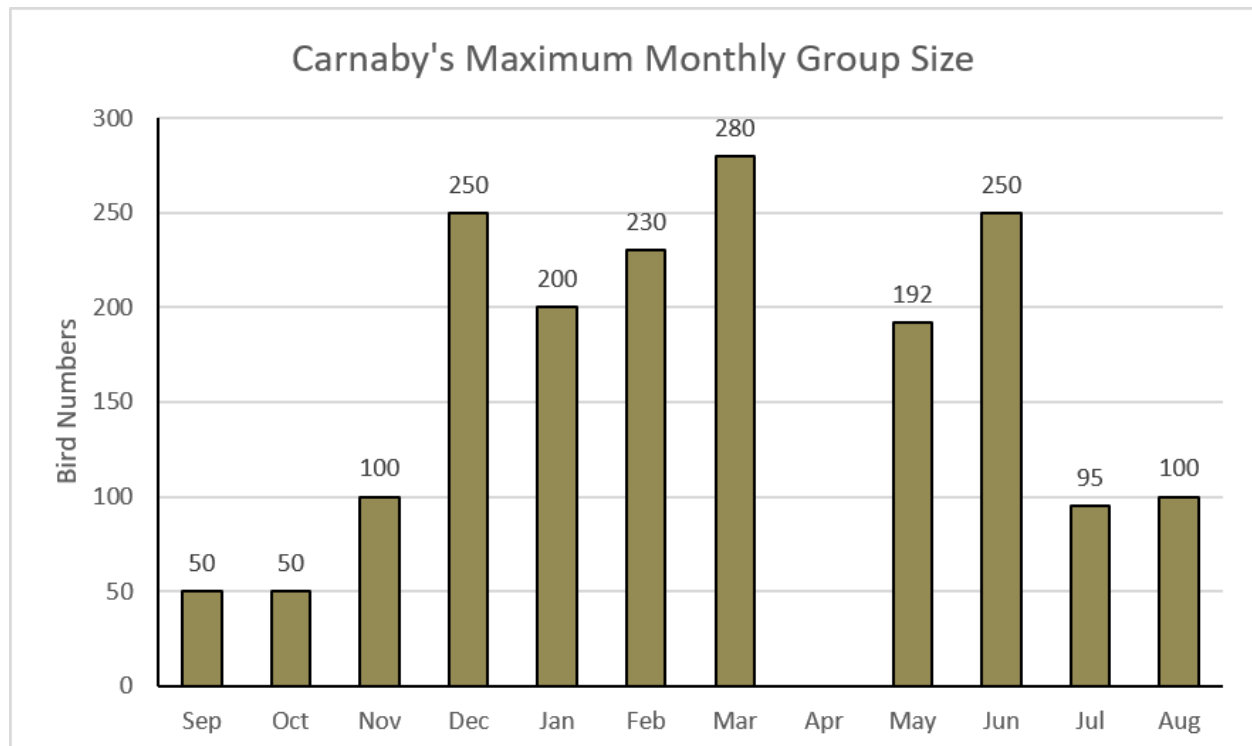
Table 12: Conservation significant species recorded during BBUS

Species	BCE code	Expected occurrence	Comment
Peregrine Falcon <i>Falco peregrinus</i>	CS1	Irregular visitor	Four sightings of single birds generally flying fast and not soaring, suggesting in transit only. Approximate half time >50m. Only six encounters with Peregrine Falcons were recorded over two campaigns (winter 2025 and autumn 2026). It is therefore considered an irregular visitor. Two encounters were recorded at CVP03 while the others were within the project area.
Forest Red-tailed Black Cockatoo <i>Calyptrorhynchus banksii naso</i>	CS1	Regular visitor	Sub-species recorded uncertain. A pair seen in October 2024 in central north. Landowner confirms Forest Red-tailed Black Cockatoo occasionally feeding in Cape Lilac tree. Feeding on Cape Lilac is a feature of the Forest sub-species. One flock of five birds in March 2025 near VP10 and a group of 5 birds in August 2025 near CVP02 south.
Carnaby's cockatoo <i>Zanda latirostris</i>	CS1	Resident	Regularly encountered throughout southern and eastern sites, large groups foraging in Banksia scrub, canola and around field dams. Observed breeding near VP09, VP10 and VP11. Recorded on all campaigns across southern half of project area in particular. Low numbers in autumn and early winter rising to several roosting groups of up to 280 individuals in late winter, spring and summer. New night roosts identified and two previously unknown active nests confirmed. Monthly group sizes recorded by BCE during the BBUS are shown in Graph 2.

Species	BCE code	Expected occurrence	Comment
Migratory waders			
Red-necked Stint <i>Calidris ruficollis</i>	CS1	Irregular visitor	Recorded on the relatively dry lake-bed of Emu Lake in the late autumn of 2025 and around the margins of Guraga Lakes in the spring of 2025. Approximately 400 were recorded on the margins of western Guraga Lake in March 2026 and is a significant occurrence. Seen foraging on the local lakes where they would also roost at night in the shallows.
Common Greenshank <i>Tringa nebularia</i>	CS1	Irregular visitor	Recorded on two campaigns around the margins of Guraga Lake in the spring of 2025 and summer of 2026. Seen foraging on the local lakes where they would also roost at night in the shallows.

Conservation Significance (CS) 1: Species listed under State or Commonwealth Acts such as the EPBC Act and the BC Act

(source: Shepherd and Bamford 2026a)



(source: Shepherd and Bamford 2026a)

Graph 2: Carnaby's cockatoo maximum group size using data pooled from each month

3.3.3.2 Secondary target species

3.3.3.2.1 Raptors

All raptor species were targeted during the VP surveys due to their flight behaviours, relatively low densities in the landscape and representation in mortality studies on operational wind farms. Twelve raptor species were recorded during the BBUS as outlined in Table 13. One species (Peregrine falcon) was of conservation significance, as discussed in Section 3.3.3.1.

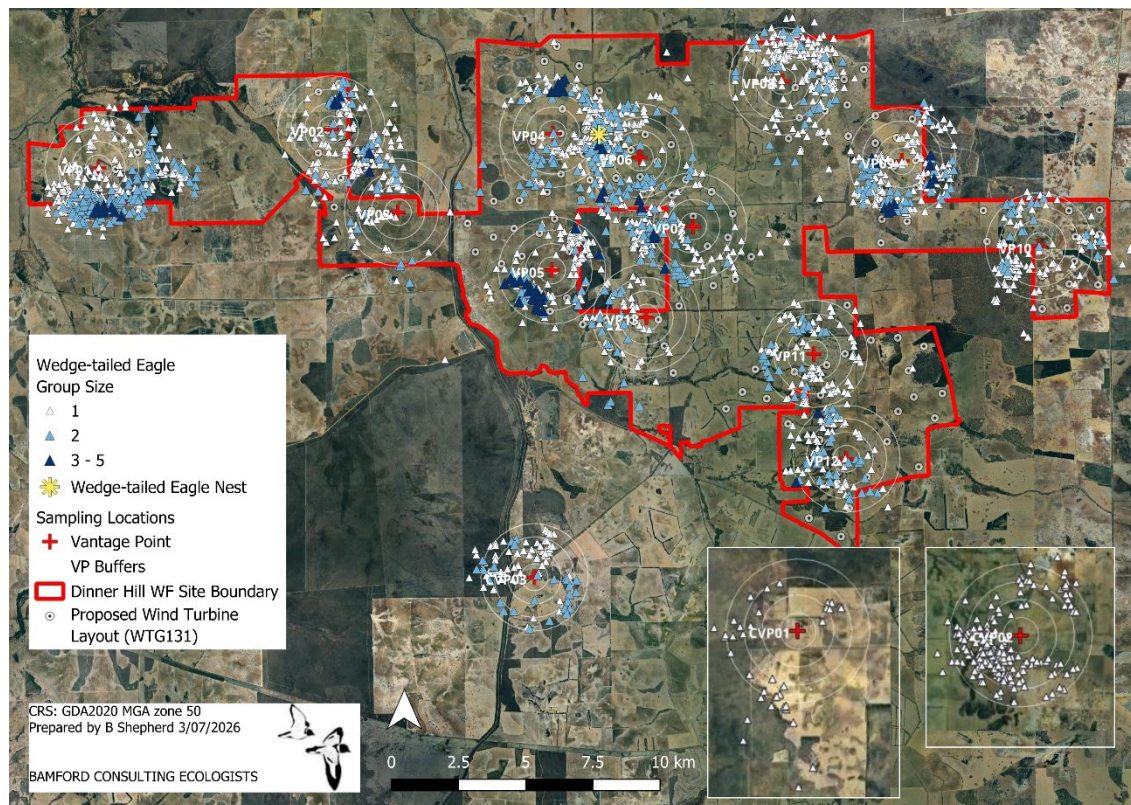
The location of raptor records made during the BBUS is provided in Figure 16 to Figure 20.

REPORT

Table 13: Non conservation significant raptors and Peregrine Falcon recorded during BBUS

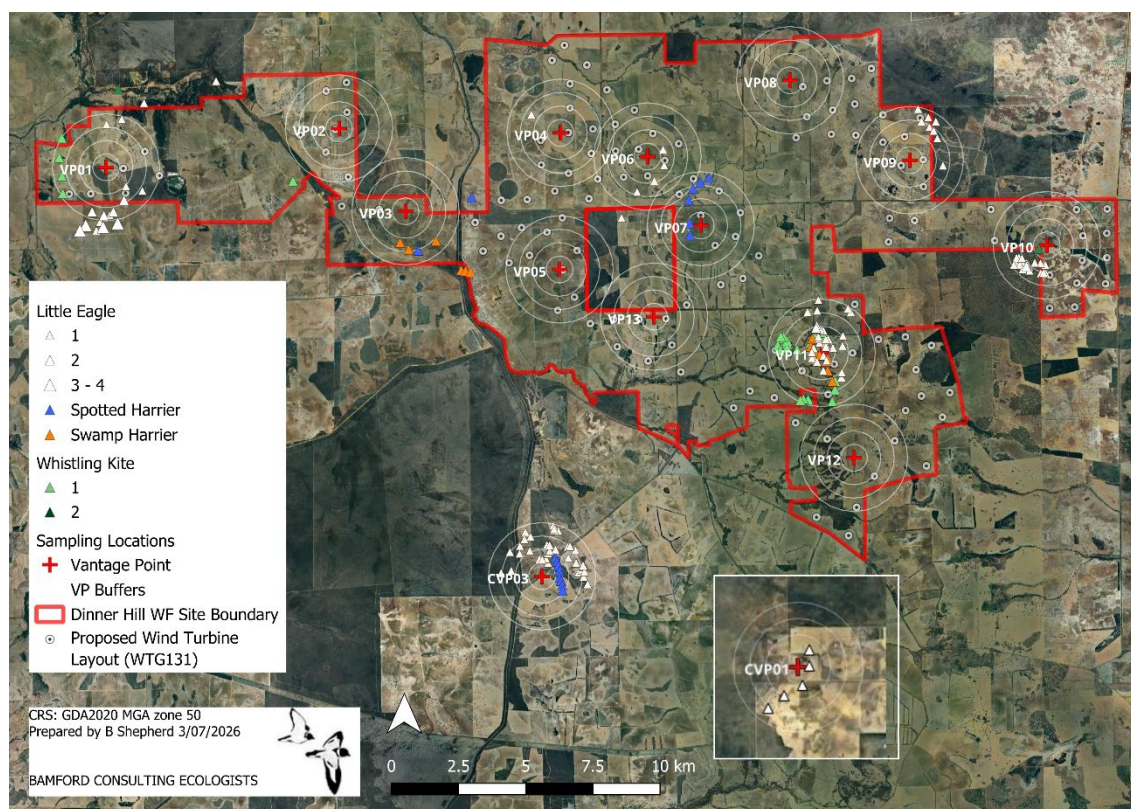
Scientific name	Common name	Group size range	Flight height range (m)	Number of encounters	Location of records	Comments
<i>Aquila audax</i>	Wedge-tailed Eagle	1-5	0-1500	538	Figure 16	Several seen each campaign from all VPs and mostly above 50 m. Singles, pairs and family groups of up to 4. Regularly soaring between 100 and 300 m and up to 1,500m. Uses updrafts formed off rising ground to gain height and can remain almost motionless at fixed height for long periods of time above 50 m.
<i>Hieraaetus morphnoides</i>	Little Eagle	1-4	6-300	29	Figure 17	Recorded as single birds, pairs and family groups of 4. Regularly spotted on most campaigns and mostly >50 m.
<i>Haliastur sphenurus</i>	Whistling Kite	1-2	15-70	8		Several encounters through the year mostly in singles, but one pair in July and September 2025 calling. Often close to woodland.
<i>Circus approximans</i>	Swamp Harrier	1	5-30	4		Three encounters involving single birds January, May and November 2024 at VP03, VP11 and next to Brand Hwy.
<i>Circus assimilis</i>	Spotted Harrier	1	2-50	3		Three sightings of individual birds in December 2024 over paddocks near VP03 and two separate sightings in Nov 25 over paddocks near VP07 and CVP03
<i>Tachyspiza cirrocephalus</i>	Collared Sparrowhawk	1	25-30	2	Figure 18	Two sightings in May 2025 over eastern end of project area close to woodland.
<i>Tachyspiza fasciatus</i>	Brown Goshawk	1	10-125	2		Observed on two occasions in March and November 2025 over same area near woodland from VP12.
<i>Elanus axillaris</i>	Black-shouldered Kite	1	0-140	25		Several encounters with single birds occasionally through the year near VP07, VP11 and CVP01. Once seen being mobbed by a Kestrel and Raven.
<i>Falco berigora</i>	Brown Falcon	1-3	0-250	32	Figure 19	Recorded regularly in relatively low numbers, mostly in winter and spring across entire area in singles, pairs and threes. Regularly recorded above 50 m.
<i>Falco cenchroides</i>	Nankeen Kestrel	1-5	0-200	641	Figure 20	Most numerous raptor. Observed on every campaign and across entire project area where there is a short sward including along boundaries of native veg. Mostly individuals but occasionally pairs and family groups of up to five. Regularly above 50m.
<i>Falco longipennis</i>	Australian Hobby	1-2	1-60	6	Figure 18	Occasional throughout in singles with one sighting of a pair. Mostly over paddocks.
<i>Falco peregrinus</i>	Peregrine Falcon	1	5-100	6	-	Four sightings of single birds generally flying fast and not soaring, suggesting in transit only. Approximate half time >50m. Only six encounters with Peregrine Falcons were recorded over two campaigns (winter 2025 and autumn 2026). It is therefore considered an irregular visitor. Two encounters were recorded at CVP03 while the others were within the project area.

(Source: Shepherd and Bamford 2026a)



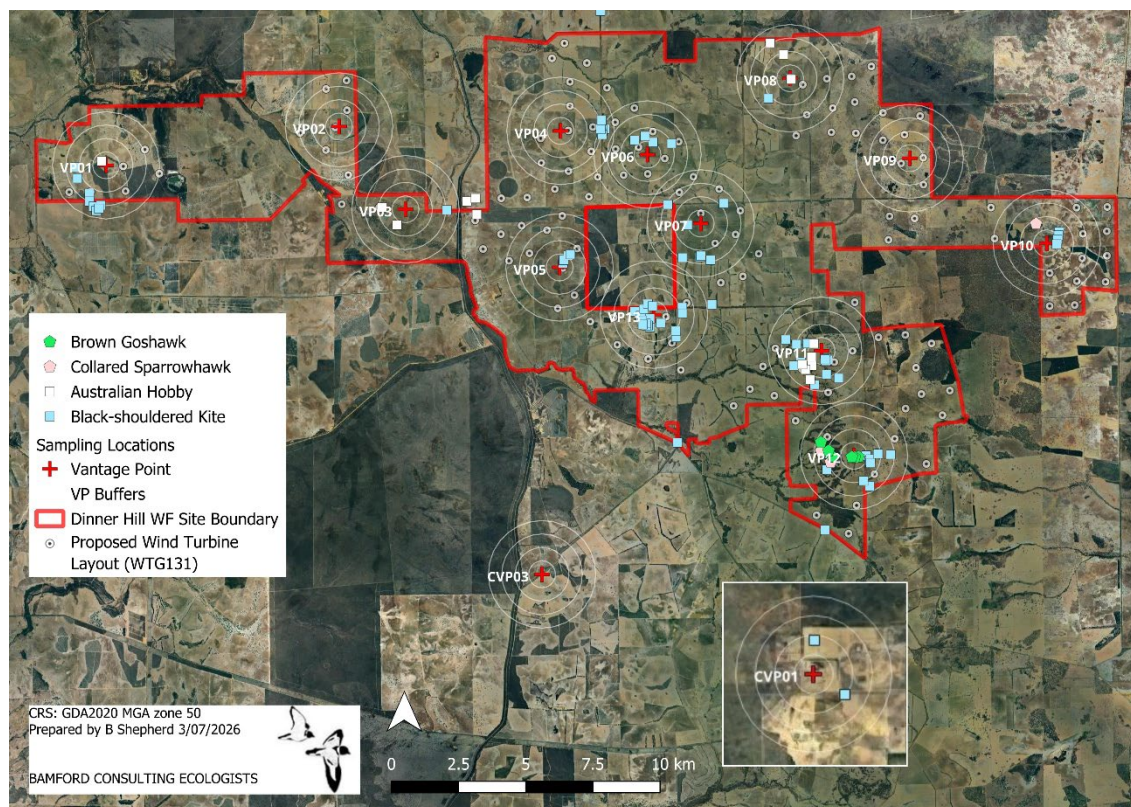
(Source: Shepherd and Bamford 2026a)

Figure 16: Records of Wedge-tailed Eagle taken throughout the BBUS plotted as group size



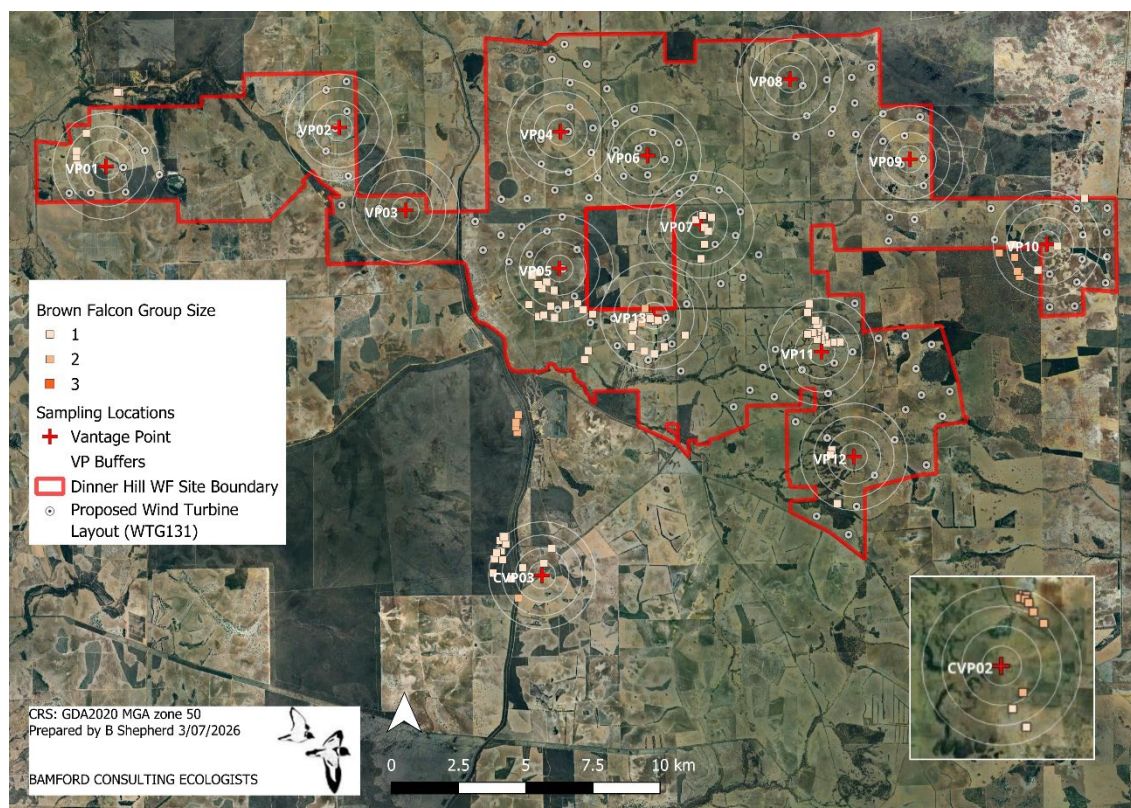
(Source: Shepherd and Bamford 2026a)

Figure 17: Records of Little Eagle, Spotted Harrier, Swamp Harrier and Whistling Kite taken throughout the BBUS plotted as group size



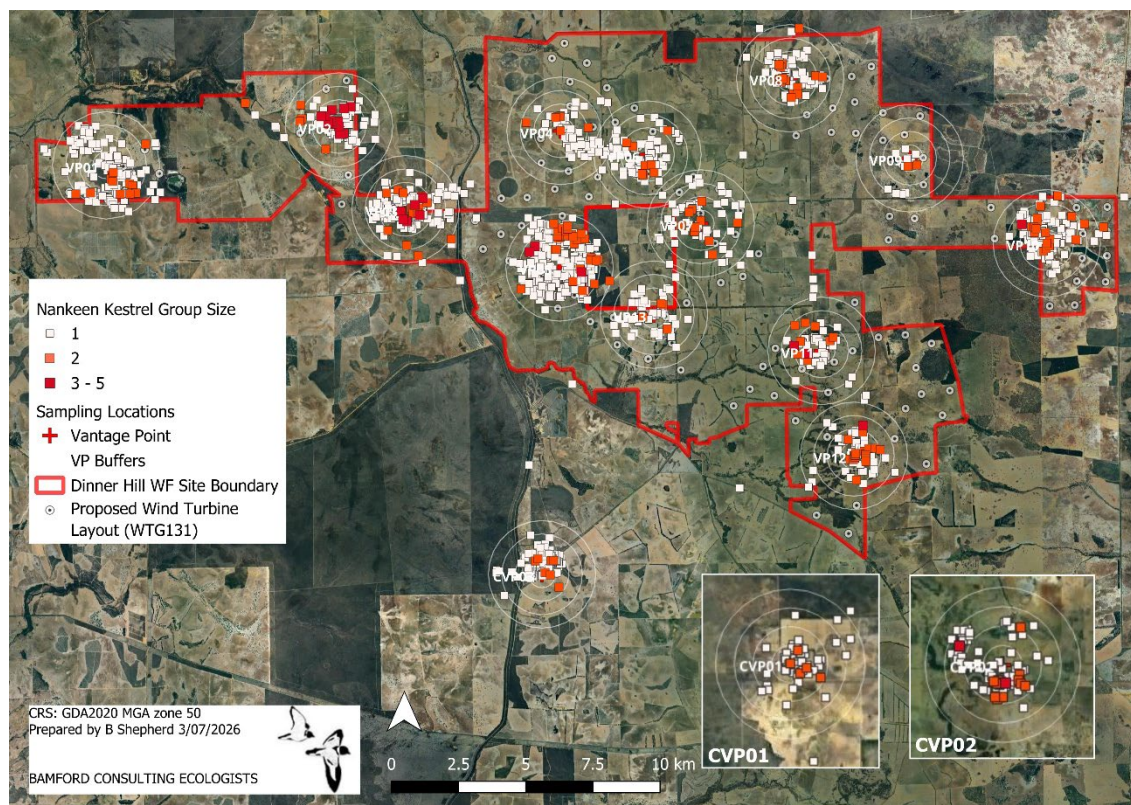
(Source: Shepherd and Bamford 2026a)

Figure 18: Records of Australian Hobby, Black-shouldered Kite, Brown Goshawk and Collared Sparrowhawk taken throughout the BBUS plotted as group size



(Source: Shepherd and Bamford 2026a)

Figure 19: Records of Brown Falcon taken throughout the BBUS plotted as group size



(Source: Shepherd and Bamford 2026a)

Figure 20: Records of Nankeen Kestrel taken throughout the BBUS plotted as group size

3.3.3.2.2 Water birds

No conservation significant water bird species were recorded by BCE within the Project Area or control sites during the BBUS.

A total of 16 non-conservation significant water birds were recorded during the BBUS within the Project Area or at control sites. Of those, 14 species were observed within the Project Area and five were observed from control sites (some species observed at both).

During regional water bird surveys, eleven waterbird species were observed on or around Emu Lake (approximately 35 km south of the Project Area) and 29 waterbird species were observed on or around Guraga Lakes (approximately 45 km south of the Project Area). The Blue-billed duck (*Oxyura australis*) (Priority 4 species) was encountered on Guraga Lakes and were not observed in flight. It is feasible that any of the bird species using the nearby lakes may fly through the Project Area. However, the Blue-billed duck was not recorded within the Project Area.

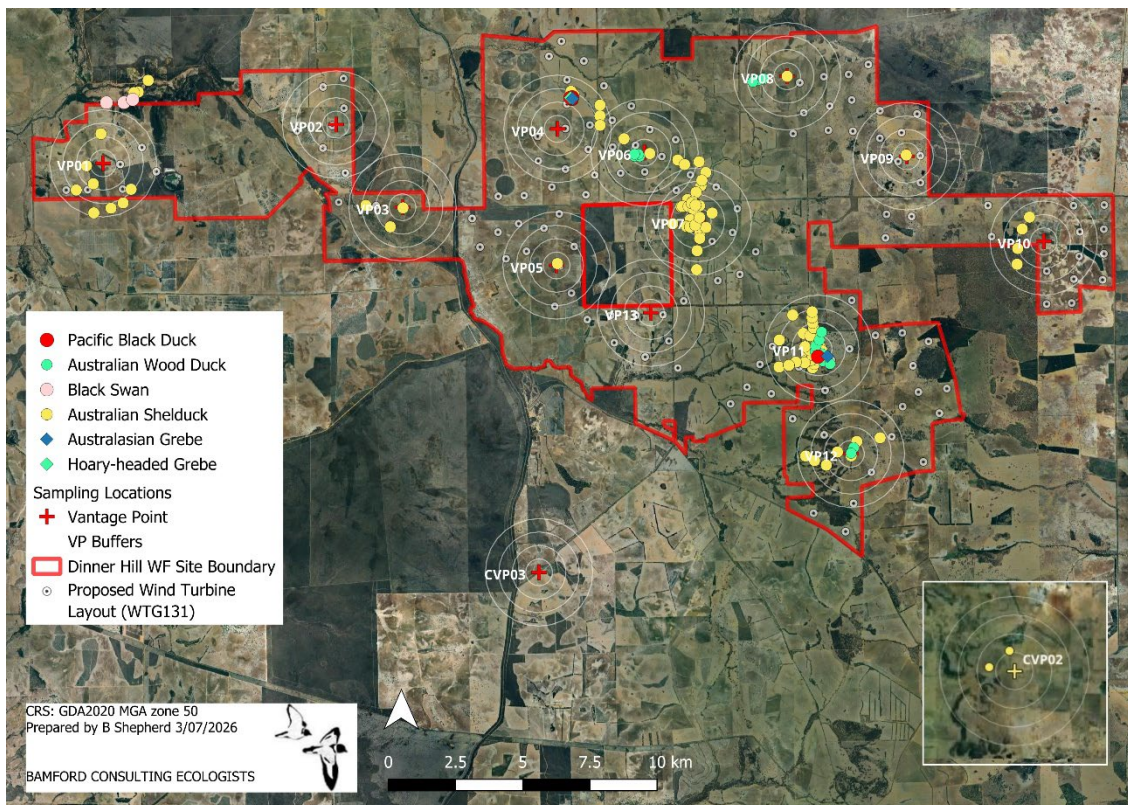
The species recorded within the Project Area and control VP sites are listed in Table 14. The location of water bird records made during the BBUS is provided in Figure 21 to Figure 23.

REPORT

Table 14: Non conservation significant water birds and waders recorded within the Project Area and at control sites during BBUS

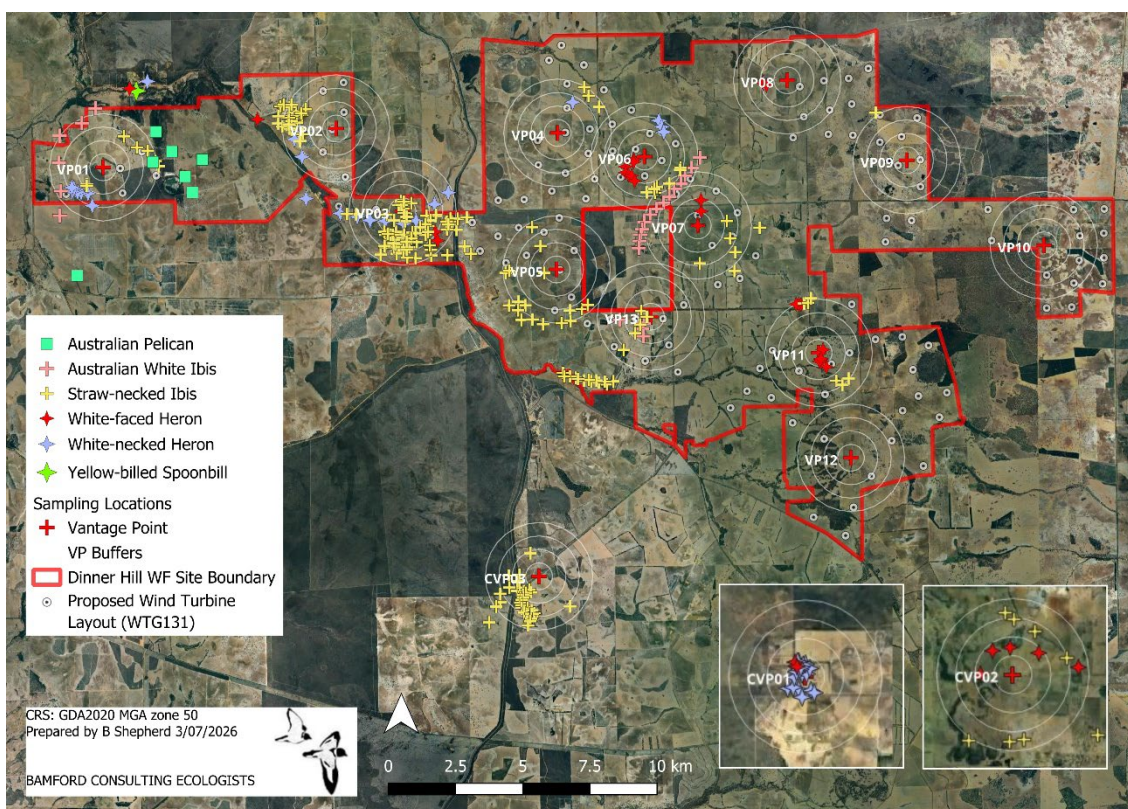
Scientific name	Common name	Group size range	Flight height range (m)	Number of encounters	Recorded locations
<i>Anas gracilis</i>	Grey Teal	6-25	0-60	3	-
<i>Anas superciliosa</i>	Pacific Black Duck	2-3	12-20	3	Figure 21
<i>Chenonetta jubata</i>	Australian Wood Duck	1-9	0-5	4	
<i>Cygnus atratus</i>	Black Swan	5	0-40	1	
<i>Tadorna tadornoides</i>	Australian Shelduck	1-30	0-150	16	
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe	2	0	1	
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	2	0	1	Figure 22
<i>Platalea flavipes</i>	Yellow-billed Spoonbill	2	15	1	
<i>Threskiornis molucca</i>	Australian White Ibis	1-12	15-70	5	
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	1-250	0-400	49	
<i>Ardea pacifica</i>	White-necked Heron	1-5	0-60	7	
<i>Egretta novaehollandiae</i>	White-faced Heron	1-3	0-30	7	Figure 23
<i>Pelecanus conspicillatus</i>	Australian Pelican	5	50-500	1	
<i>Himantopus himantopus</i>	Pied Stilt	7-9	1-2	2	
<i>Erythronyx cinctus</i>	Red-kneed Dotterel	1	0	1	
<i>Vanellus tricolor</i>	Banded Lapwing	1-60	0-150	13	

(Source: Shepherd and Bamford 2026a)



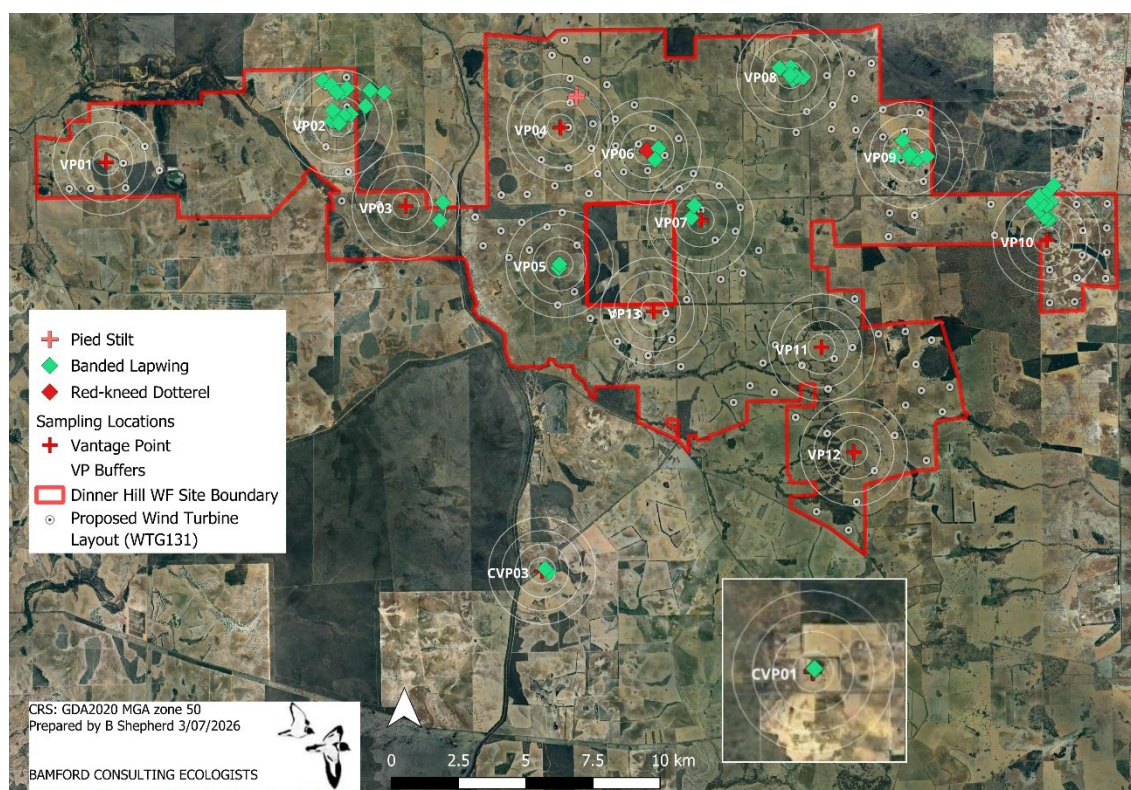
(Source: Shepherd and Bamford 2026a)

Figure 21: Records of ducks and grebes taken throughout the BBUS



(Source: Shepherd and Bamford 2026a)

Figure 22: Records of pelicans, ibis and herons taken throughout the BBUS



(Source: Shepherd and Bamford 2026a)

Figure 23: Records of stilts, plovers and lapwings taken throughout the BBUS

3.3.3.2.3 Bat species

No conservation significant bat species were recorded during the BBUS.

Six bat species were positively identified as present within the Project Area. A bat species that was not recorded, but otherwise may be expected, was the Inland Broad-nosed Bat (*Scotorepens balstoni*). The project area is near the southern limit of its range and therefore it may not be so abundant or regular in visits. It has however, been recorded to the southwest of the project area in the last year (B. Metcalf pers. comm.). Results of the bat utilisation surveys and call analysis is provided in Table 15.

Bat activity was lowest in open agricultural landscapes, and highest in wooded environments such as the creekline crossing at Windjardie Rd and along the treeline adjacent Dewar Rd (Shepherd and Bamford 2026a).

Of the species recorded, most have been recorded only occasionally through carcass retrieval on wind farms in eastern states and in relatively low numbers (Shepherd and Bamford 2026a). As this is not the case for the White-striped Freetail Bat or Gould's Wattled Bat, these species are discussed further below.

Table 15: Bat species recorded during BBUS

Scientific name	Common name	Total number of calls recorded
<i>Austronomus australis</i>	White-striped Freetail Bat	6
<i>Ozimops kitcheneri</i>	South-western Freetail Bat	8
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	178
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	6
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	3
<i>Vespadelus regulus</i>	Southern Forest Bat (possibly some records of Inland Forest Bat (<i>V. baverstocki</i>)).	Not listed, calls detected in July and August.
<i>Ozimops kitcheneri</i> or <i>Chalinolobus gouldii</i>	Forest Bat (probably Southern species) or Lesser Long-eared Bat	Not listed, calls detected in July and August.

(Source: Shepherd and Bamford 2026a).

3.3.3.2.3.1 White-striped Freetail Bat (*Austronomus australis*)

The White-striped Freetail Bat (*Austronomus australis*) was deemed locally significant for the Project by Shepherd and Bamford (2026a) because:

- It has a low tolerance to warmer temperatures and is an internal migrant in within Australia, being found in northern latitudes in the cooler months and southern latitudes in warmer periods.
- It is the most common bat species found during carcass searches on wind farms in eastern states.

The White-striped Freetail Bat is considered a regular visitor to the Project Area and was positively identified as present throughout the year. The Project Area is potentially within or between both its northern and southern extents and may therefore be found at any time through the year.

It hunts in open landscapes and above vegetation, often at height. It requires large tree hollows for breeding and while they are known to utilise a wide-range of shelter for day-roosts, they are known to return regularly to communal roosts. Within the Project Area, this species was recorded over native scrub, woodland and paddocks but call sequences were more numerous in wooded environments where it probably roosts and where foraging may be concentrated, and has lower detection rates over agricultural paddocks.

3.3.3.2.3.2 Gould's Wattled Bat (*Chalinolobus gouldii*)

Gould's Wattled Bat (*Chalinolobus gouldii*) was deemed locally significant for the Project by Shepherd and Bamford (2026a) as it is the second most commonly reported bat found during carcass searches below wind farms in the eastern states of Australia.

The Gould's Wattled Bat is considered to be resident and breeding in the Project Area. It was recorded across the entire Project Area, but with increased levels of activity around woodland, large trees and over water. Maternity roosts are located mostly within large tree hollows, but they will roost almost anywhere outside of breeding periods including under loose bark, overhanging grass tree fronds and, frequently in artificial roosts and human structures.

This species is attracted to lighting and persists in areas of high human activity.

3.4 Flight heights for birds

BCE has confirmed the flight heights through the local landscape of the following conservation significant species or those species considered locally significant. These species are listed in Table 16, with section and figure references that summarise the flight height information.

Table 16: Flight height information from bird species recorded during the BBUS

Target species	Species	Section reference	Figure reference	Graph reference
Primary target species (Conservation significant species)	Carnaby's cockatoo (<i>Zanda latirostris</i>)	Section 3.4.1	Figure 24 to Figure 31, Figure 32	Graph 3, Graph 4
	Peregrine Falcon (<i>Falco peregrinus</i>)	Section 3.4.2	Figure 33	-
Secondary target species (Bird species considered to be locally significant or most at risk of colliding with turbine blades at an ecological-level of importance)	Wedge-tailed eagle (<i>Aquila audax</i>)	Section 3.4.3	Figure 16, Figure 34	Graph 5, Graph 6
	Nankeen Kestrel (<i>Falco cenchroides</i>)	Section 3.4.4	Figure 20, Figure 35	Graph 7, Graph 8
	Brown Falcon (<i>Falco berigora</i>)	Section 3.4.5	Figure 19, Figure 36	Graph 9, Graph 10
	Little Eagle (<i>Hieraaetus morphnoides</i>)	Section 3.4.6	Figure 17	-
	Australian Hobby (<i>Falco longipennis</i>)	Section 3.4.7	Figure 18	-

(Source: Shepherd and Bamford 2026a)

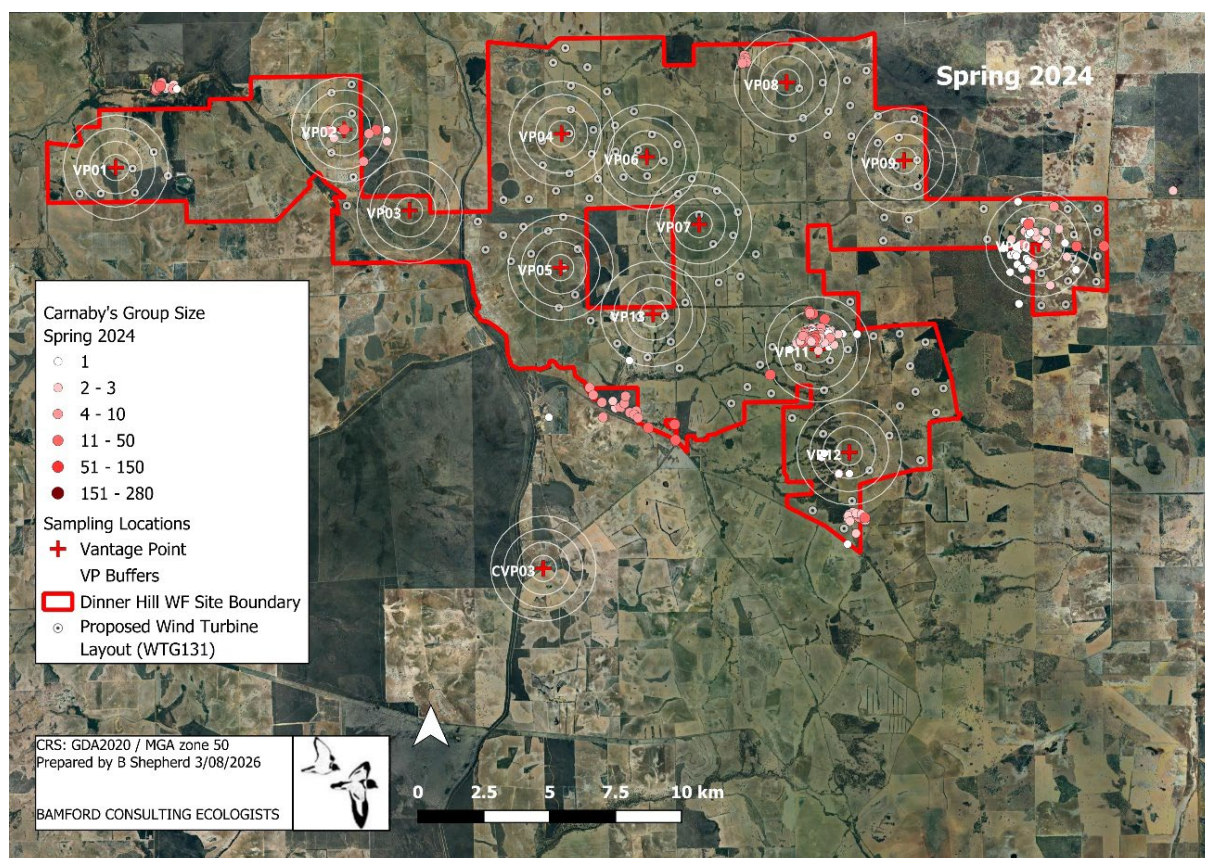
3.4.1 Carnaby's cockatoo (*Zanda latirostris*)

Carnaby's cockatoos were recorded in the Project Area during all survey campaigns and are likely to be present year-round. However, it is not known whether the same birds remain throughout the year or whether different groups use the project area at different times. Bird numbers fluctuate throughout the year as plotted in Graph 2 and summarised below (Shepherd and Bamford 2026a):

- The smallest group sizes were encountered in late winter and spring when the species was generally difficult to find; this corresponds with the breeding season when birds would be expected to be scattered across their breeding range and therefore at lower densities.
- Group size peaked to a maximum of between 250 and 280 through the summer, autumn and early winter when large roosting groups were encountered.
- A large flock of Carnaby's cockatoo was encountered consistently throughout the year around control site CVP01. This is considered inconsistent with their normal distribution during the non-breeding season (e.g. coastal plain).

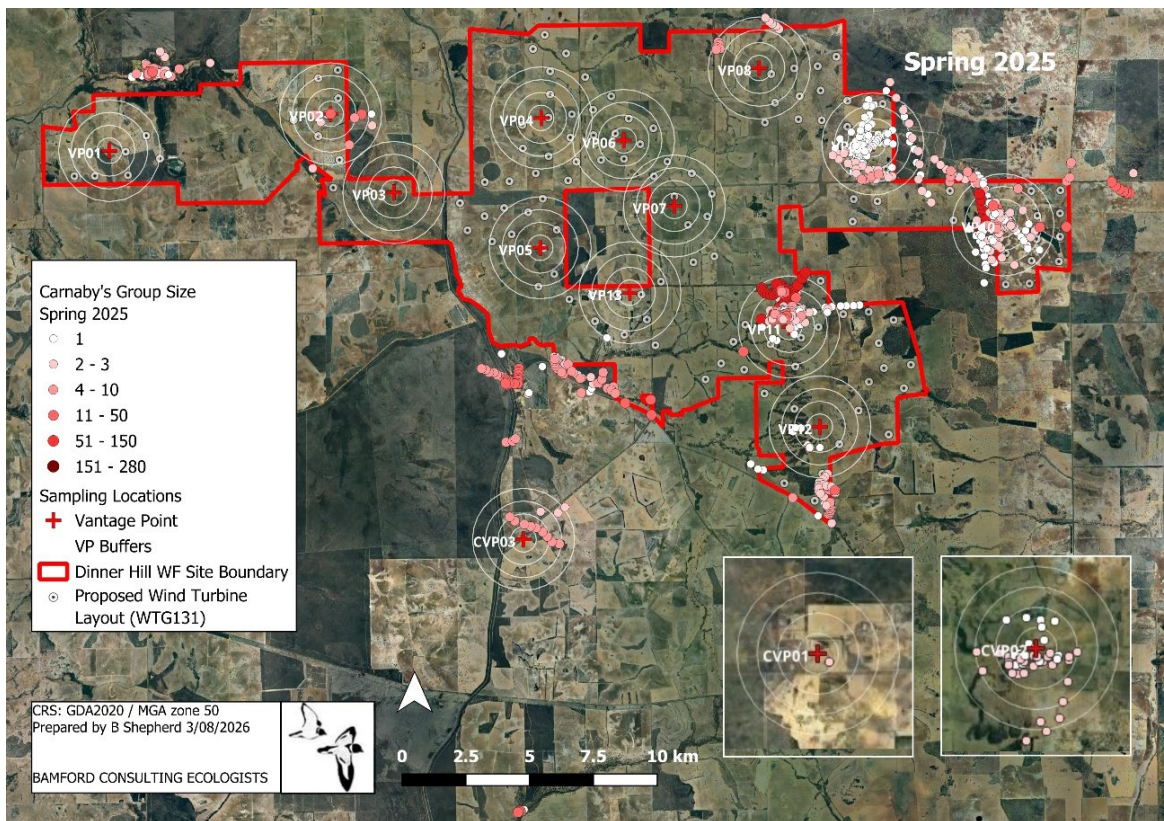
All sightings of Carnaby's cockatoos are shown in Figure 24 to Figure 31, indicating the group size per record from spring, summer, autumn and winter. The flight height and lines of Carnaby's cockatoos recorded during the BBUS are shown in Figure 32. The maximum height recorded of 60 m for a pair of birds is plotted as a red point in this figure as the flight duration was very brief and flight at this height short.

Flight heights for the majority of Carnaby's cockatoo were low, with 99.88% of observations estimated to be at or below 30 m (Graph 3). When adjusting for group size or "bird time", 99.96% of observations were recorded flying at or below 30 m (Graph 4). With the exception of two birds observed flying at an estimated 60 m for a very brief period, all other observations were estimated at 50 m or below. This brief flight was not timed. However, to plot data in Graph 3 and Graph 4, it has been given an estimate of 10 seconds, in which case the proportion of flights below 60 m would be 99.997% of all record time and 99.9999% of all bird time.



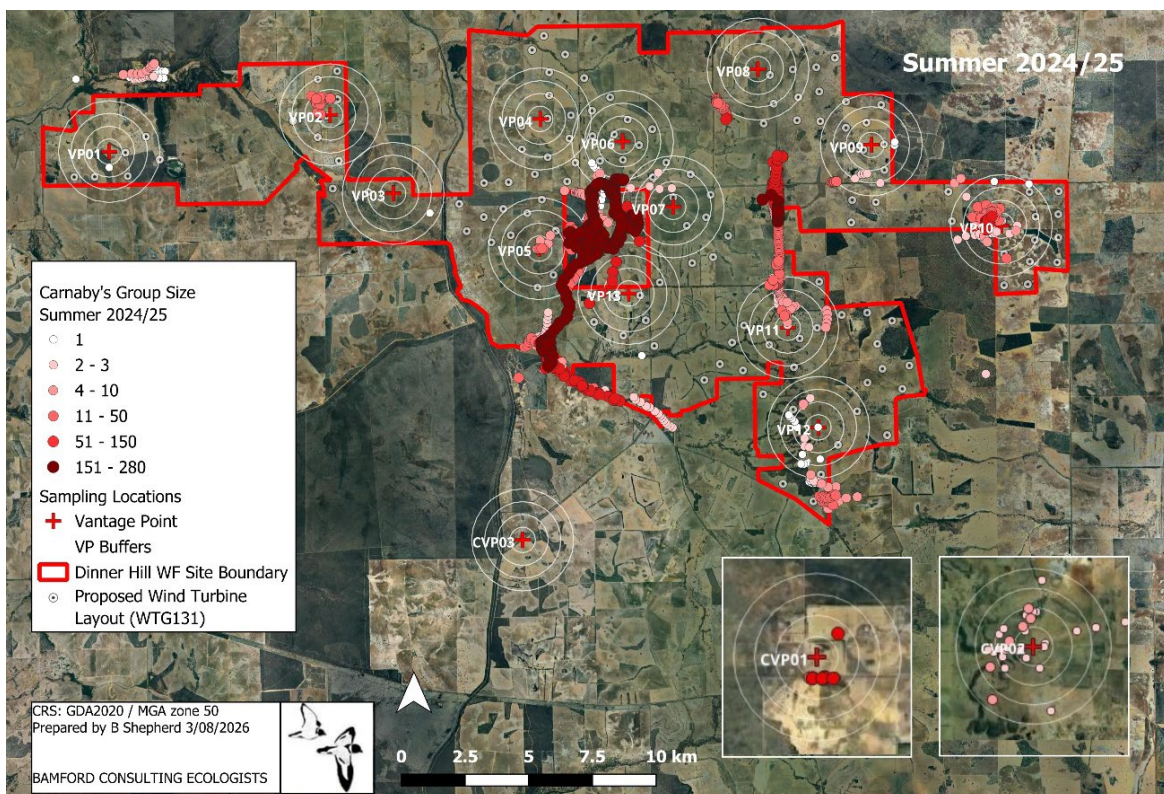
(Source: Shepherd and Bamford 2026a)

Figure 24: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from spring 2024



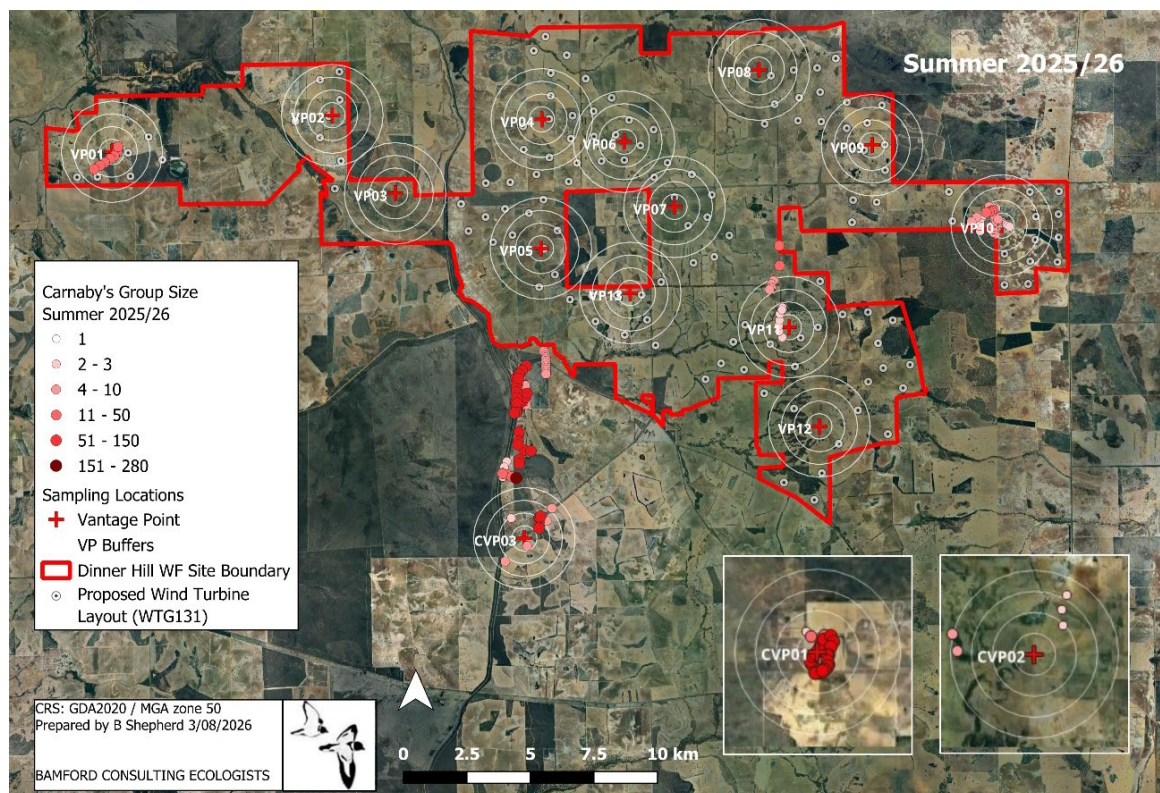
(Source: Shepherd and Bamford 2026a)

Figure 25: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from spring 2025



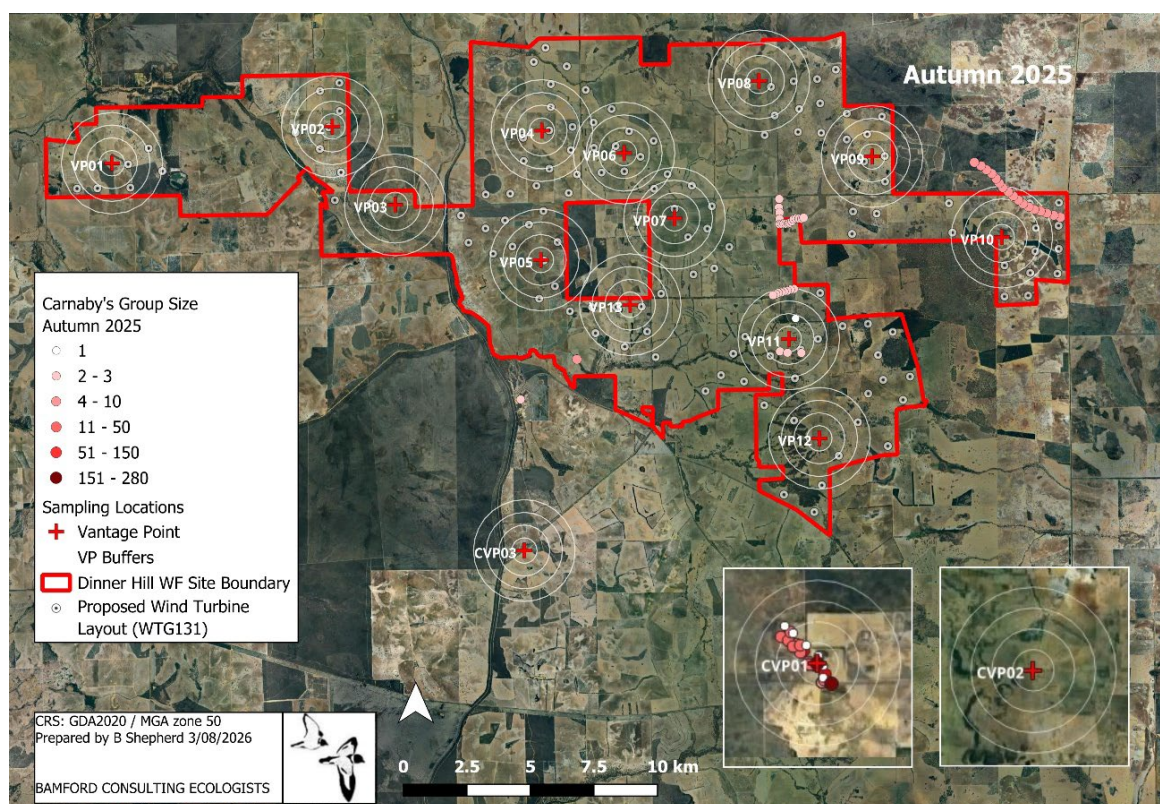
(Source: Shepherd and Bamford 2026a)

Figure 26: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from summer 2024/25



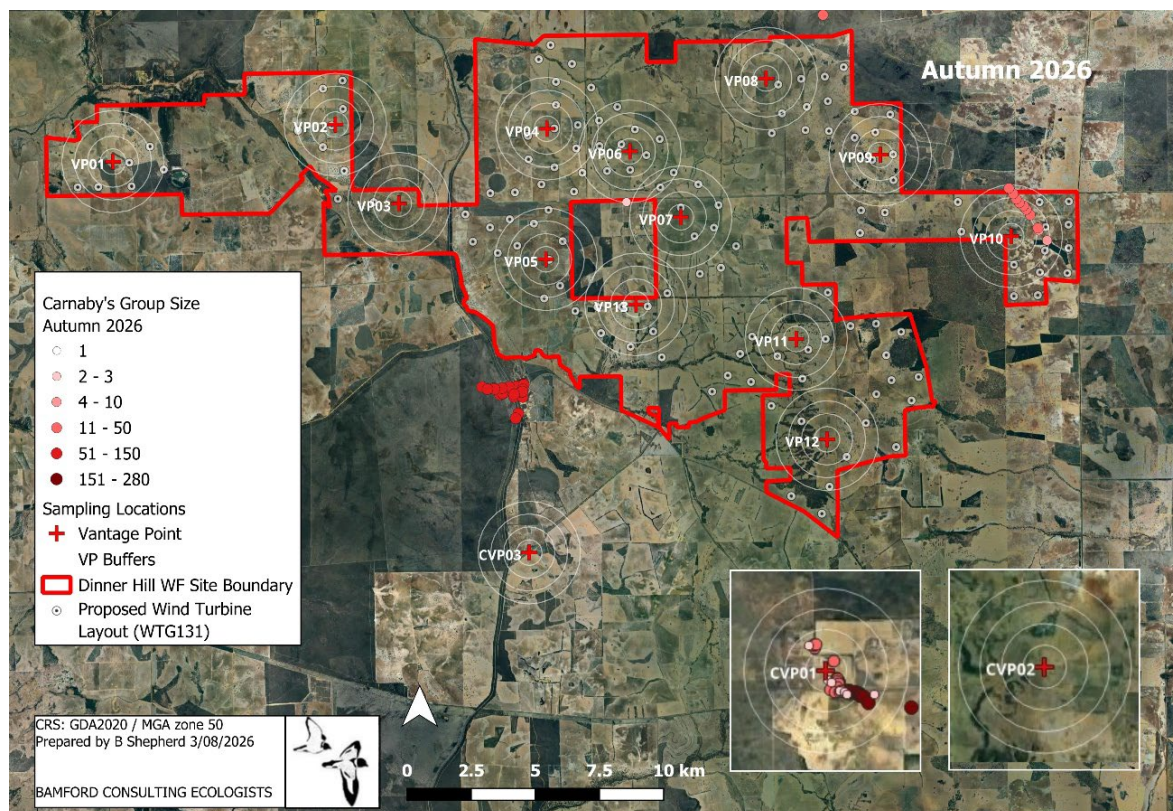
(Source: Shepherd and Bamford 2026a)

Figure 27: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from summer 2025/26



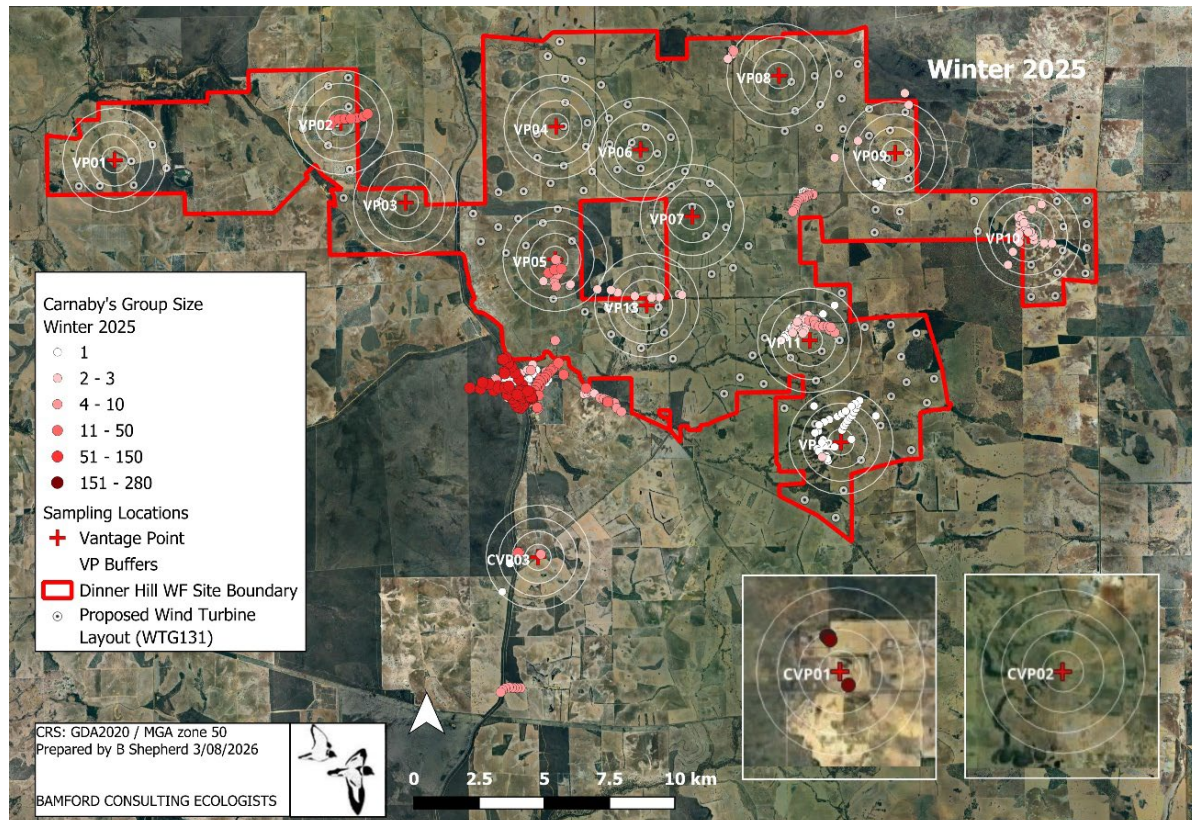
(Source: Shepherd and Bamford 2026a)

Figure 28: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from autumn 2025



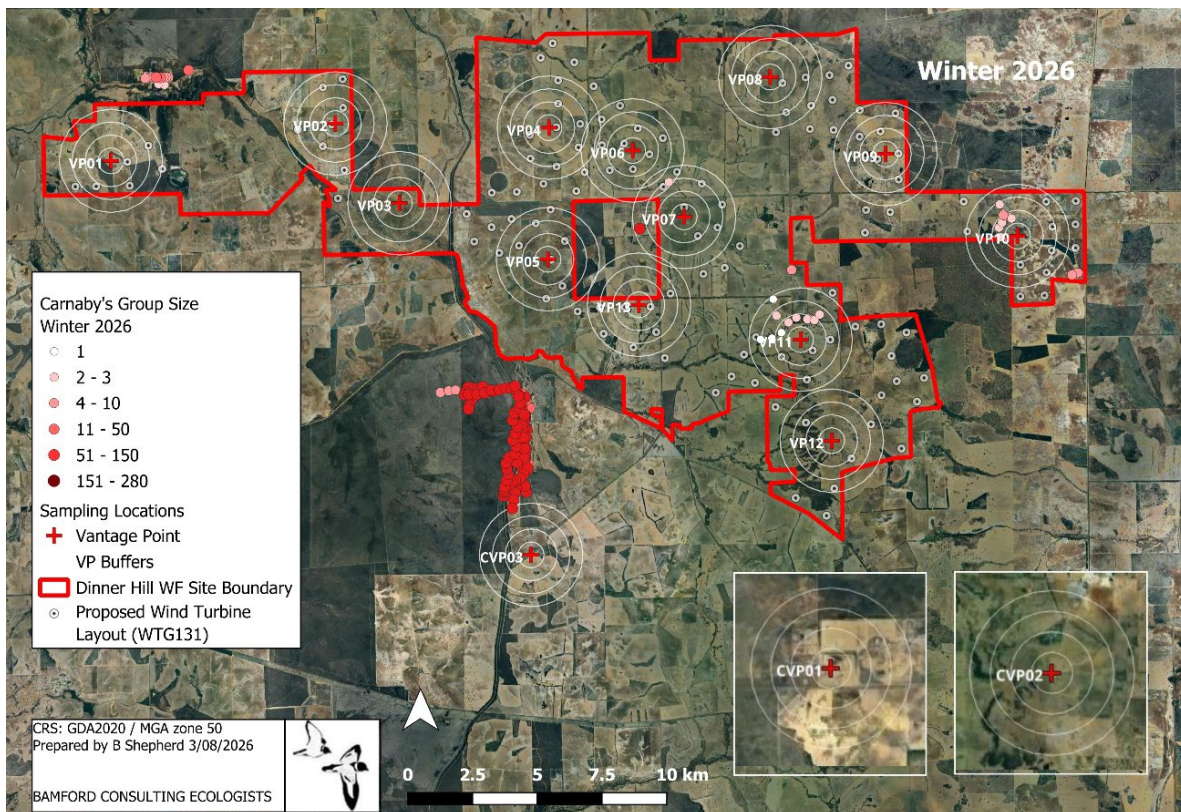
(Source: Shepherd and Bamford 2026a)

Figure 29: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from autumn 2026



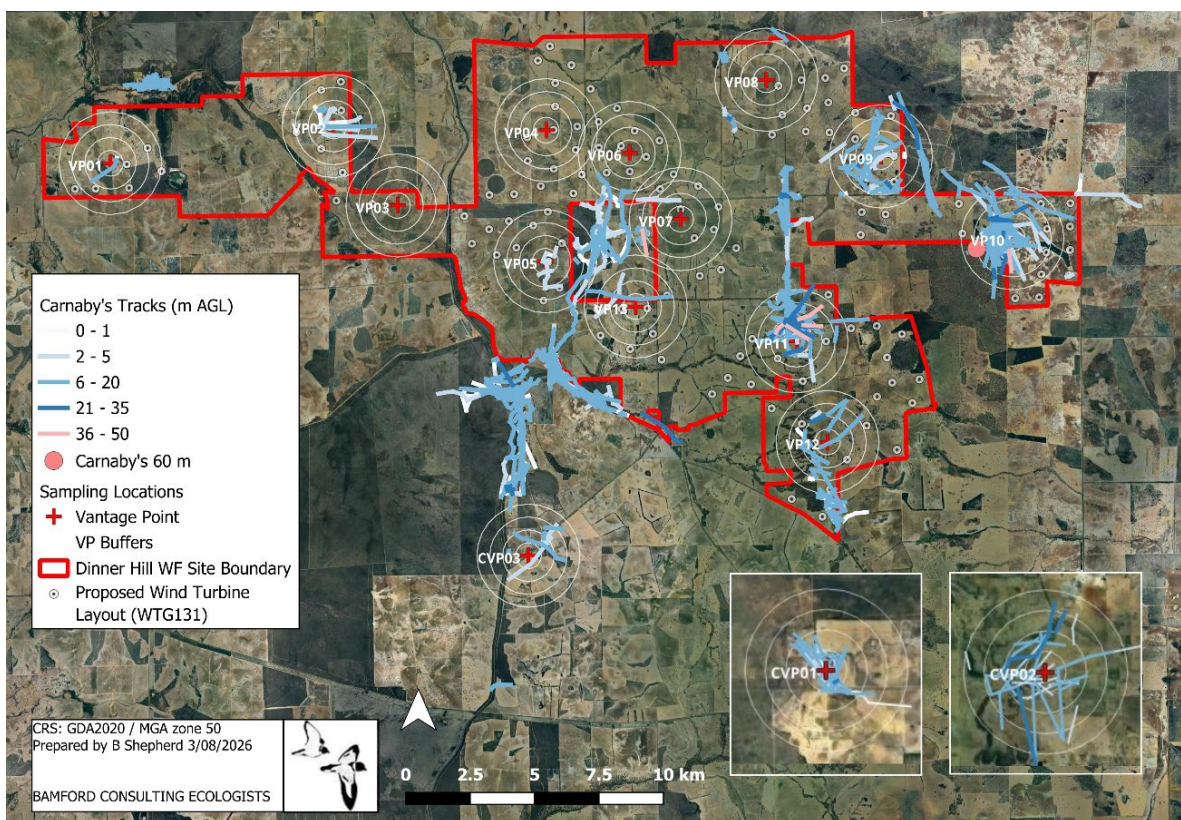
(Source: Shepherd and Bamford 2026a)

Figure 30: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from winter 2025



(Source: Shepherd and Bamford 2026a)

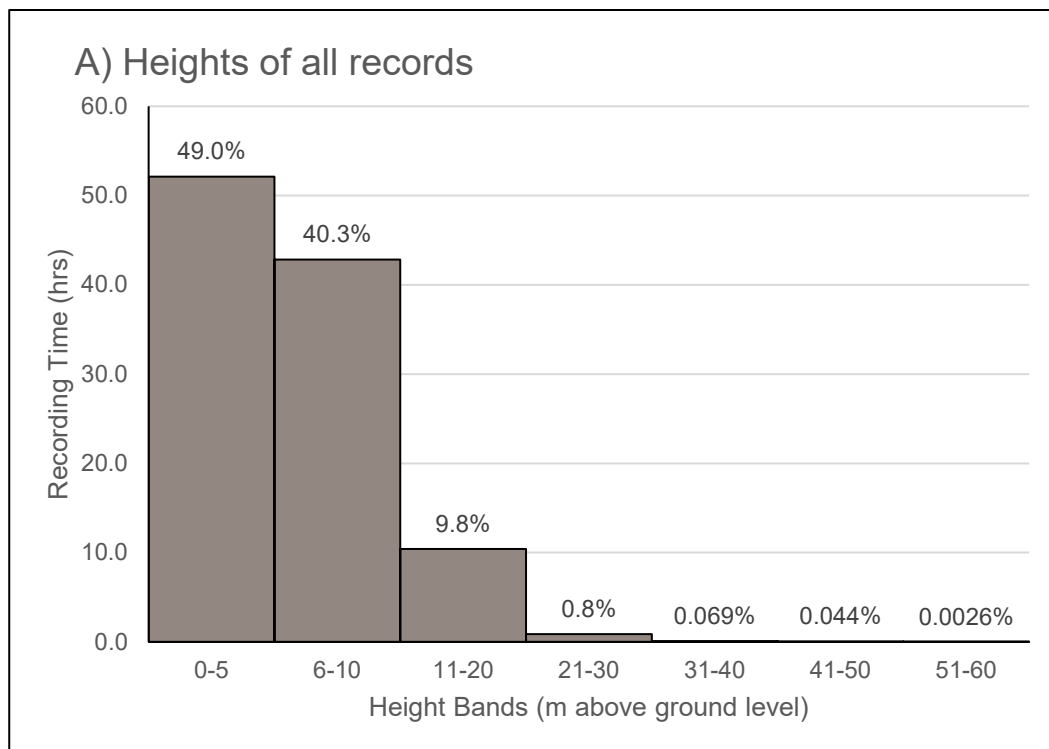
Figure 31: Records of Carnaby's cockatoo taken throughout the BBUS plotted as group size, from winter 2026



One flight of two birds near VP10 was estimated to be at 60 m did not result in a trackline and is instead, plotted as a red point.

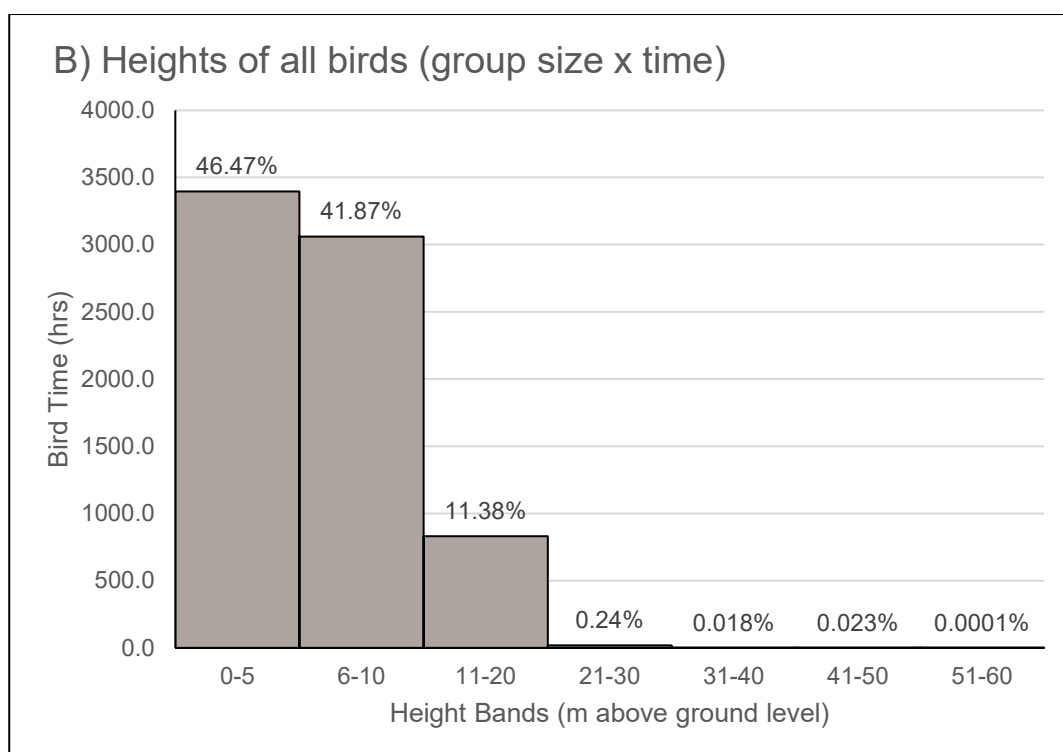
(Source: Shepherd and Bamford 2026a)

Figure 32: Flight lines of Carnaby's cockatoo colour-coded for estimated flight heights (m AGL)



(Source: Shepherd and Bamford 2026a)

Graph 3: Carnaby's cockatoo flight height distribution for all records



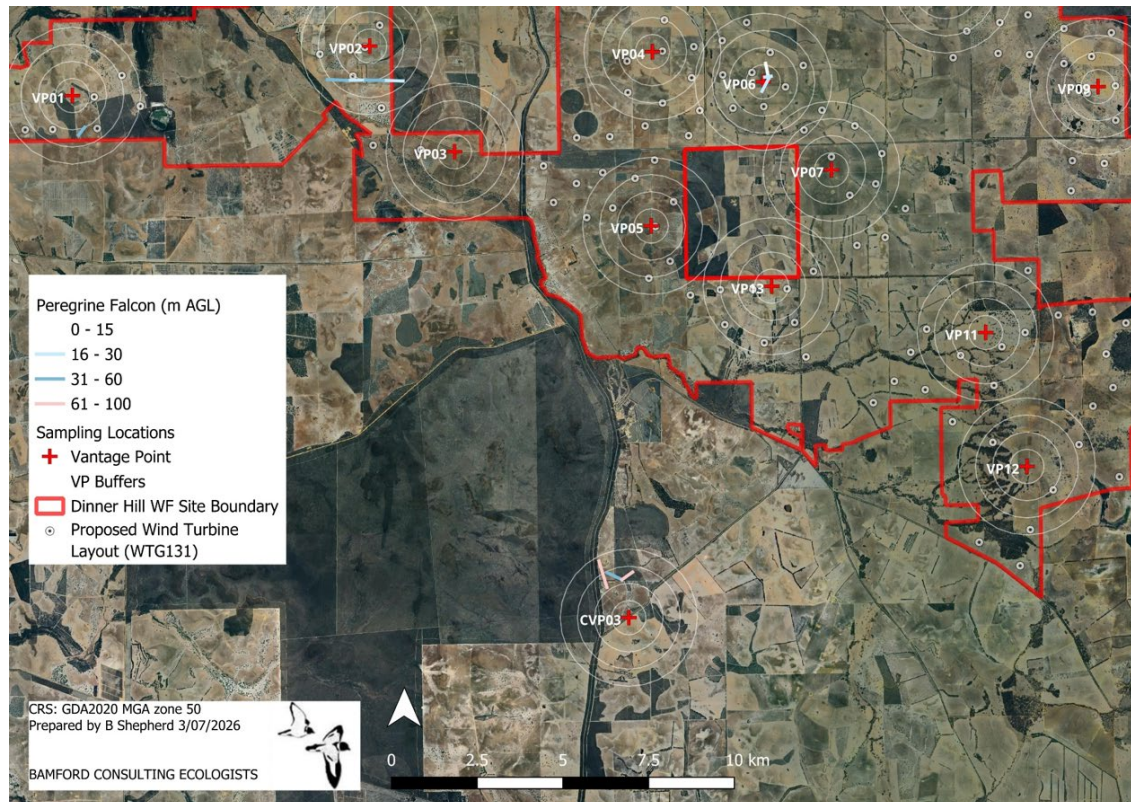
Accounting for bird time increases the proportion of time spent at 30 m or below due to the large groups being followed throughout their foraging activities in short Banksia heath and scrub or in paddocks.

(Source: Shepherd and Bamford 2026a)

Graph 4: Carnaby's cockatoo flight height distribution of individual birds (bird time)

3.4.2 Peregrine Falcon (*Falco peregrinus*)

Peregrine Falcon flights are shown in Figure 33 and were recorded for a total of 9.8 minutes (Shepherd and Bamford 2026a). Of those, 7 minutes were estimated to be at or below 50 m while 2.8 minutes (29%) were above 50 m. It is likely that the one bird was in transit between hunting areas or is a dispersing young adult. Flight height was generally lower than normally expected of this species.



(Source: Shepherd and Bamford 2026a)

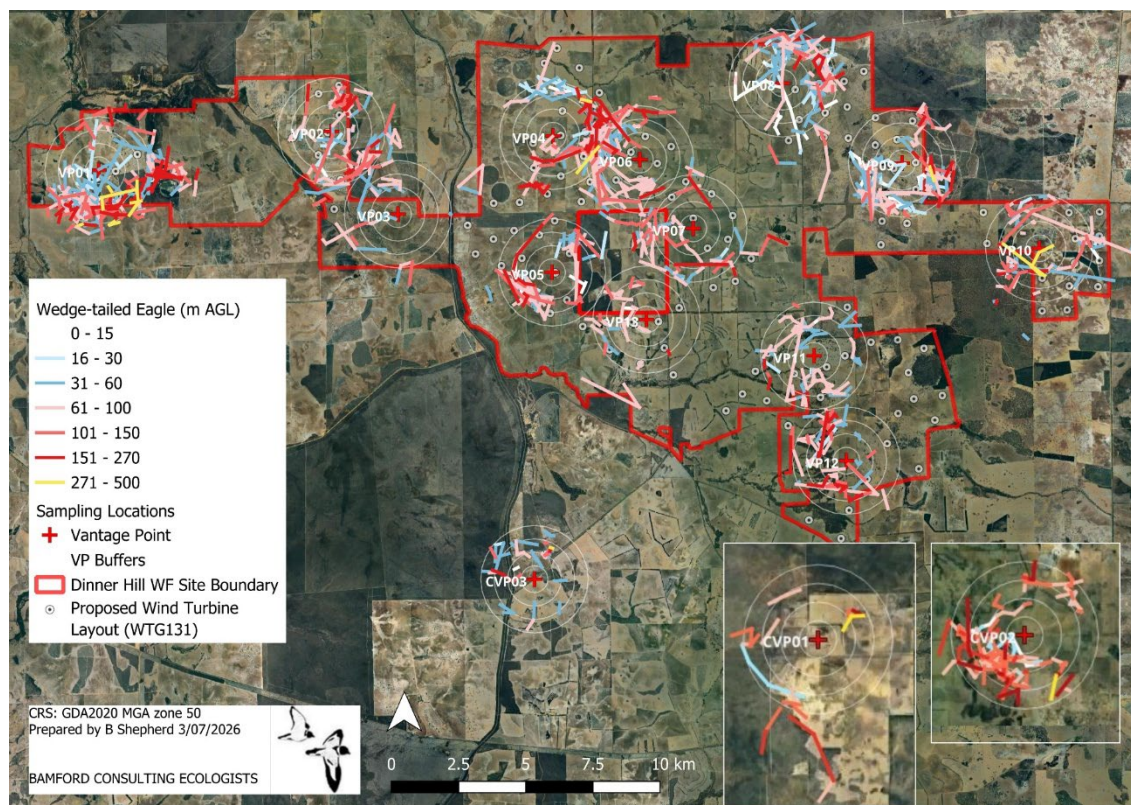
Figure 33: Flight lines of Peregrine Falcon sightings colour-coded for flight heights (m AGL)

3.4.3 Wedge-tailed Eagle (*Aquila audax*)

The Wedge-tailed Eagle (*Aquila audax*) has been deemed locally significant by BCE on the basis of its relatively low density throughout its range, high flight profile, cultural importance to Aboriginal Peoples and high-representation in mortality studies in Australia (Shepherd and Bamford 2026a). Wedge-tailed Eagles were the most frequently encountered bird of prey, due in part to their conspicuous silhouette and size, and frequent presence at height. They were present throughout all but one (November 2025) of the BBUS campaigns and were recorded from all VPs. Their numbers vary between campaigns from occasional singles or pairs to multiple family groups.

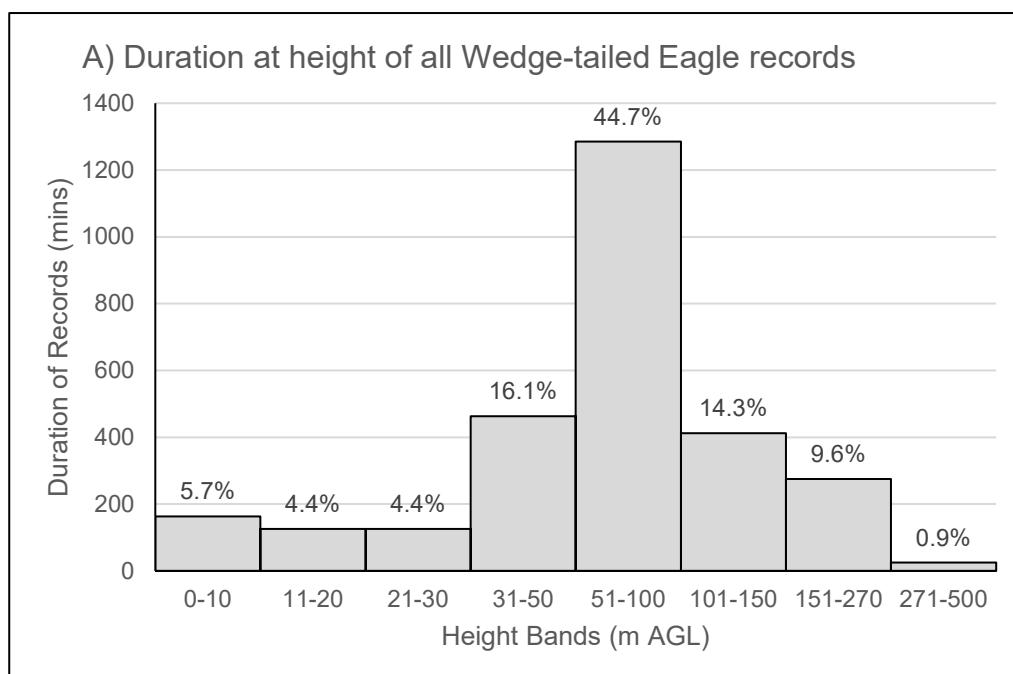
All sightings of Wedge-tailed Eagles are shown in Figure 34, indicating the group size per sighting. The species are likely to occur throughout the Project Area's airspace. Family groups were observed on 21 different occasions, where three or more birds are considered family units of two adults and juveniles or sub-adults. This suggests the area is very productive for the species. It is likely that several breeding pairs occupy the Project Area and surrounds and the species is considered to be resident.

The flight height and lines of Wedge-tailed Eagles recorded during the BBUS are shown in Figure 16. Flight heights for Wedge-tailed Eagles were shown to be between 50 – 270 m AGL for 68.6% of observations (Graph 5). When adjusting for group size or “bird time”, this increased to 71.2% of observations between 50 – 270 m AGL (Graph 6).



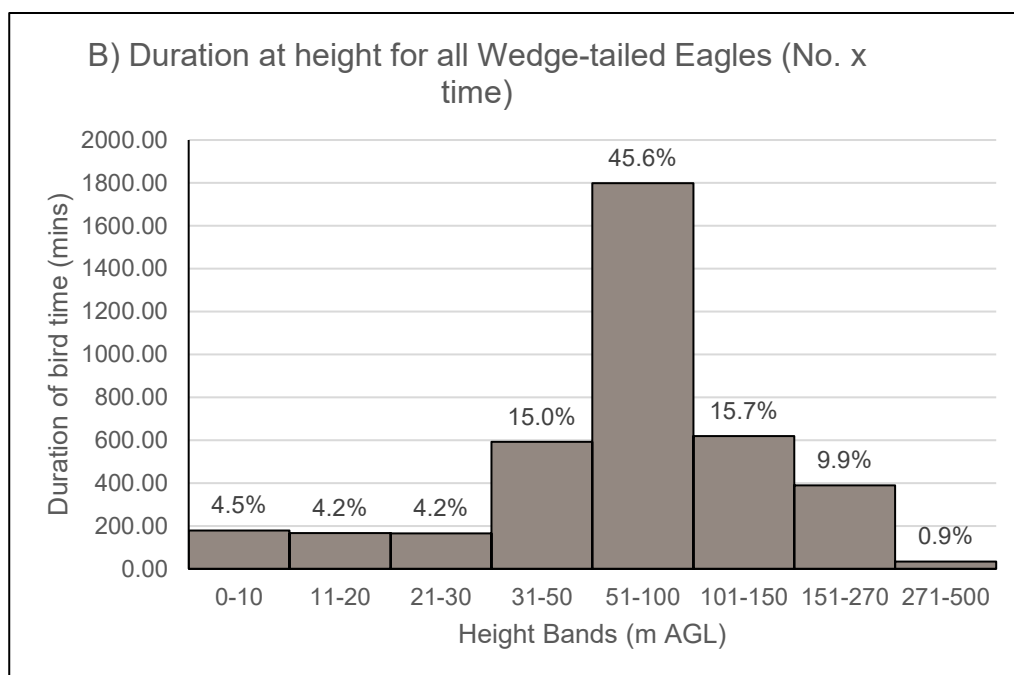
(Source: Shepherd and Bamford 2026a)

Figure 34: Flight lines of Wedge-tailed Eagle sightings colour-coded for flight heights (m AGL)



(Source: Shepherd and Bamford 2026a)

Graph 5: Wedge-tailed Eagle flight height distribution for all records



(Source: Shepherd and Bamford 2026a)

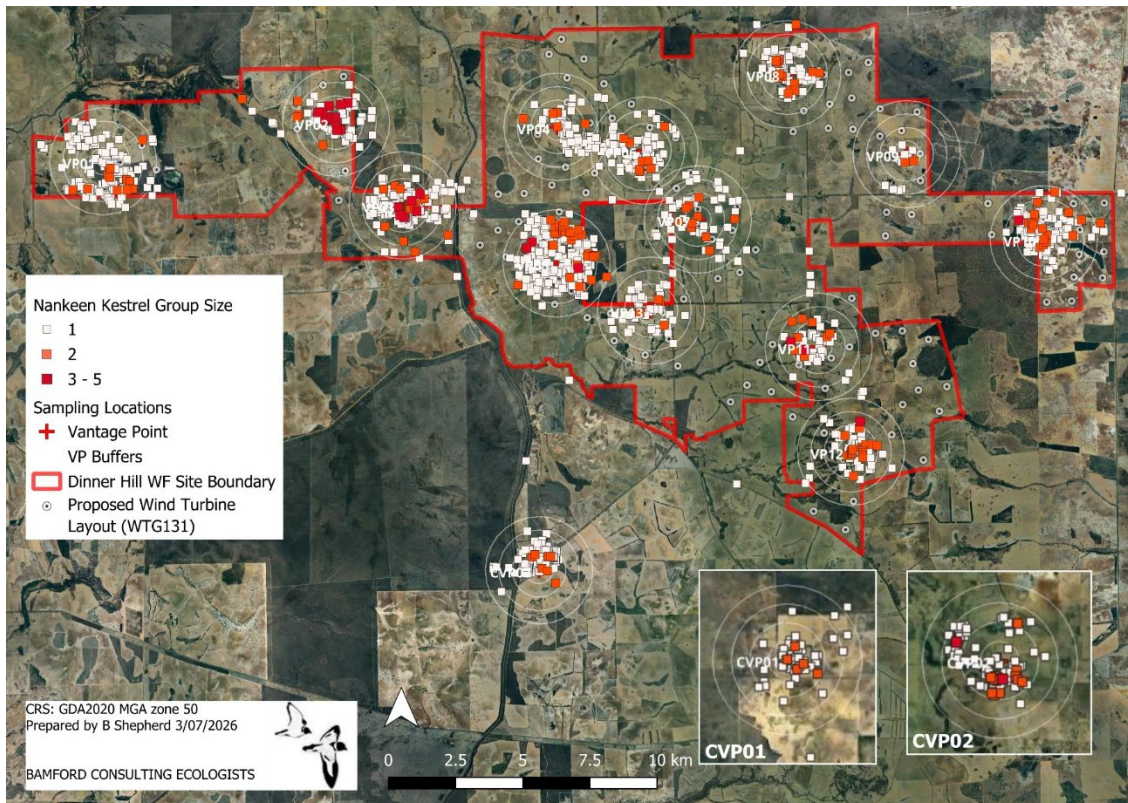
Graph 6: Wedge-tailed Eagle flight height distribution of individual birds (bird time)

3.4.4 Nankeen Kestrel (*Falco cenchroides*)

The Nankeen Kestrel (*Falco cenchroides*) was deemed locally significant by BCE as it is a resident and in relatively high densities around the Project Area, has a moderately high flight-profile and is regularly found during mortality studies on operational wind farms (Shepherd and Bamford 2026a). The Nankeen Kestrel was observed during every campaign except the FF campaign in February 2026 and were seen on every VP. Numbers detected vary widely between campaigns and is considered due to two factors: density and detectability. Bird density is thought to be in response to prey items, and especially the invertebrates associated with agriculture such as crickets and grasshoppers. When these invertebrates were present in large numbers, Nankeen Kestrels were often observed hunting at ground level with fewer flights to higher elevations where they would be more readily detected. It has the highest density of the raptors and is likely to have several breeding pairs within the Project Area. All sightings of Nankeen Kestrels are shown in Figure 20, indicating the group size per sighting.

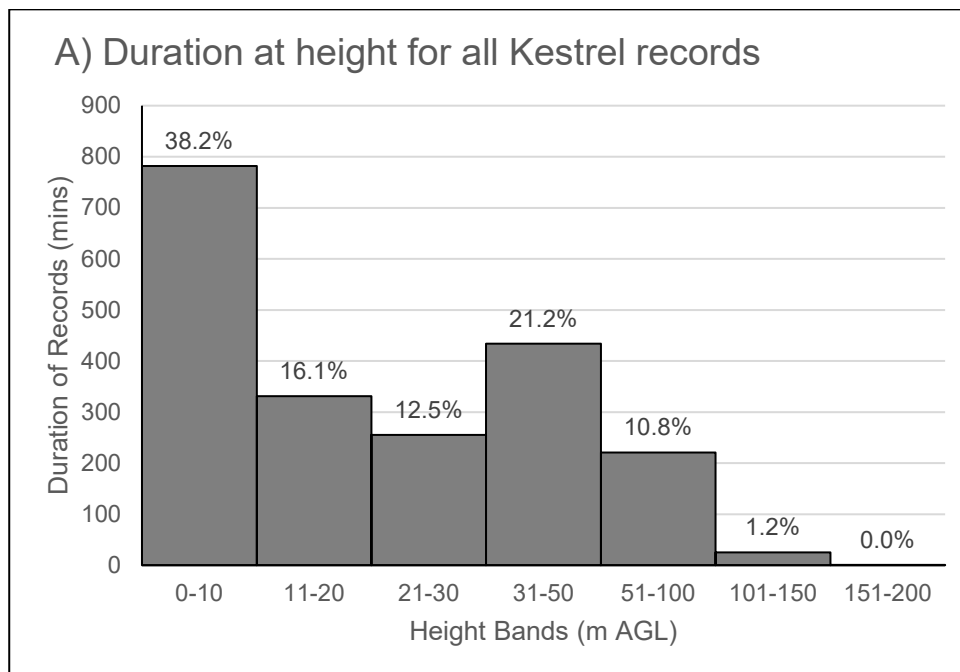
The flight height and lines of Nankeen Kestrels recorded during the BBUS are shown in Figure 35. Nankeen Kestrels were recorded for the second longest duration of the raptors, amounting to 34.6 hours of flight and activity data. Nankeen Kestrels were seen from ground level up to an estimated 200 m. Of the 35 hours of observation time, only 12.1% were of birds estimated to be between 50 – 200 m AGL and Nankeen Kestrels spent more than 87% of flight time at or below 50 m AGL (Graph 7). When adjusting for group size or “bird time”, this increased to 12.4% of observations between 50 – 200 m AGL (Graph 8).

While Nankeen Kestrels were observed at or below 50 m AGL for 13% of observations, the species has occasionally been observed repeating a cyclical flight pattern whereupon it would soar above 100 m and transit with the wind, only to reappear flying against the wind at very low-level (<1 m) presumably to flush prey items.



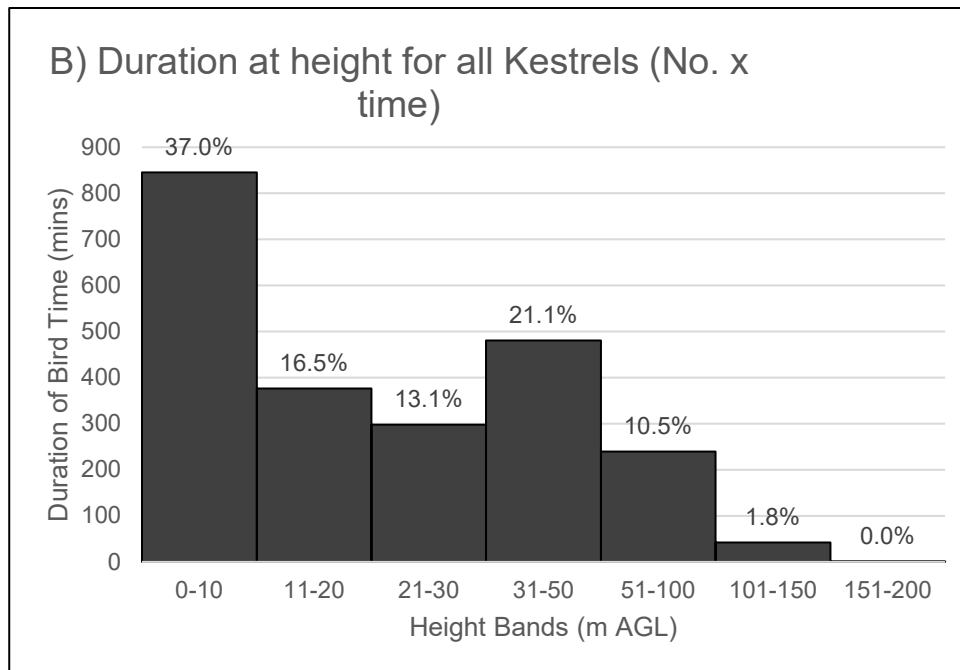
(Source: Shepherd and Bamford 2026a)

Figure 35: Flight lines of Nankeen Kestrel sightings colour-coded for flight heights (m AGL)



(Source: Shepherd and Bamford 2026a)

Graph 7: Nankeen Kestrel flight height distribution for all records



(Source: Shepherd and Bamford 2026a)

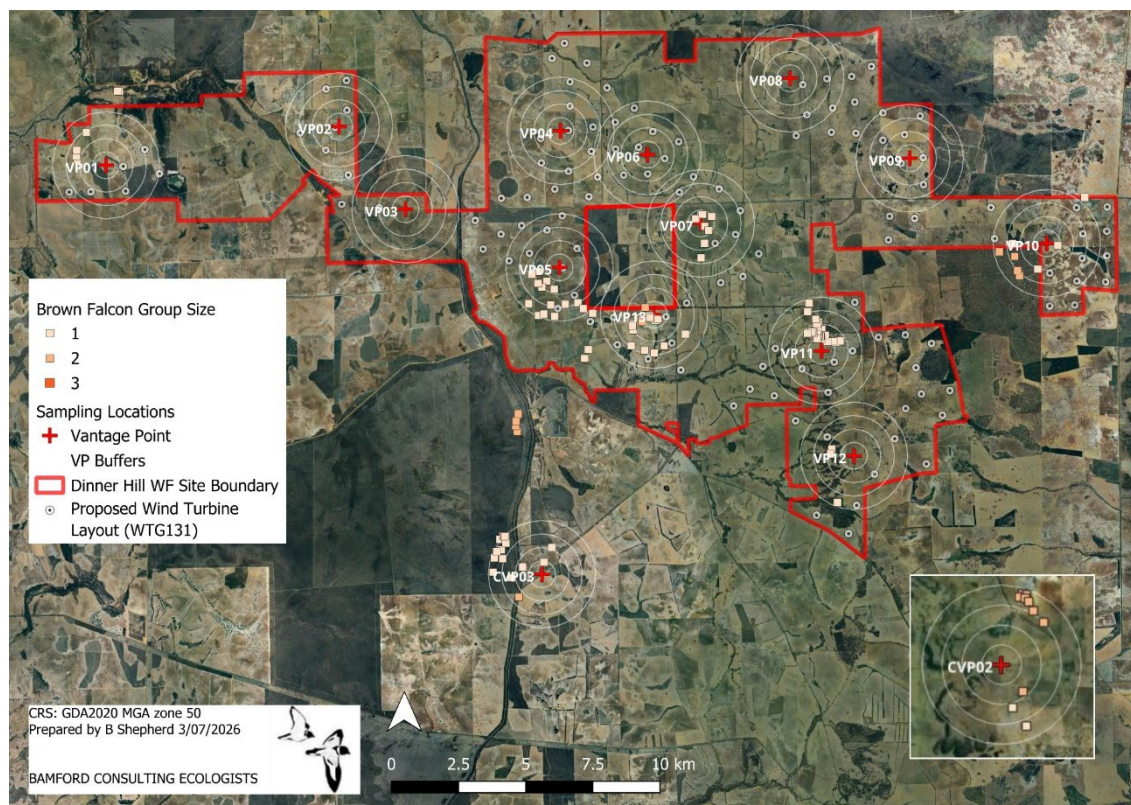
Graph 8: Nankeen Kestrel flight height distribution of individual birds (bird time)

3.4.5 Brown Falcon (*Falco berigora*)

The Brown Falcon (*Falco berigora*) has been deemed locally significant on the basis of their relatively high density around the Project Area, moderately high flight-profile and being regularly found during mortality studies on operational wind farms (Shepherd and Bamford 2026a).

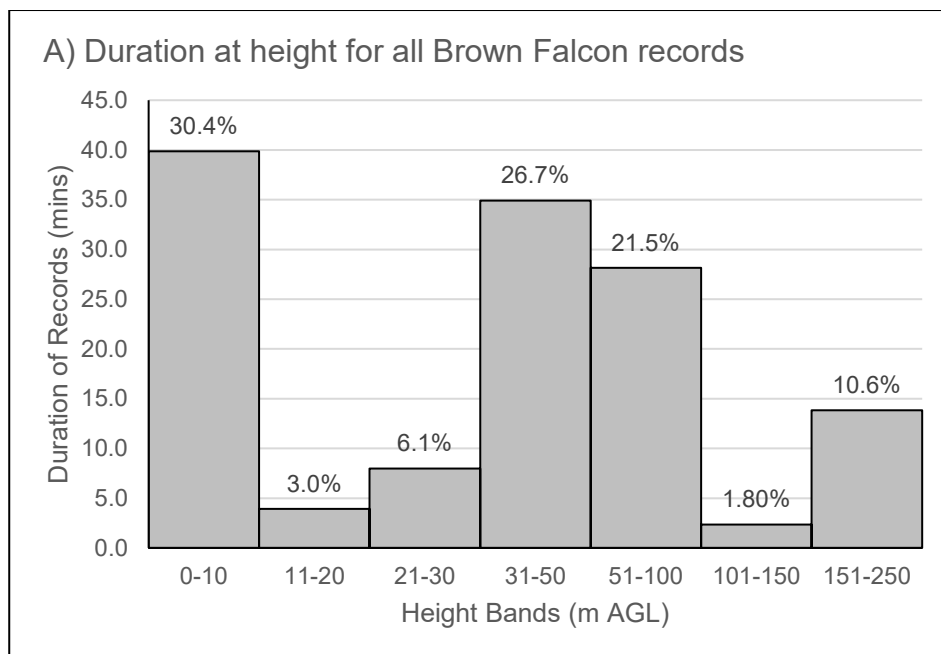
The Brown Falcon is expected to use the airspace throughout the Project Area but is more likely to hunt over native vegetation. Brown Falcons were encountered on 11 of the 14 campaigns and from VPs only in the south and extreme west as shown in Figure 19. There was no obvious reason for this distribution. Despite being present almost throughout, they were only encountered several times per campaign and are considered present in low densities. The Brown Falcon is likely to be breeding in the Project Area and is therefore considered a resident. All sightings of Brown Falcons are shown in Figure 19, indicating the group size per sighting.

The flight height and lines of Brown Falcons recorded during the BBUS are shown in Figure 36. Brown Falcons were seen from 1 m and up to an estimated 250 m during the BBUS. They were observed for 2.2 hours of activity records which increases to 2.48 hours when multiplying by the number of birds in each record. From these observations, approximately 46 minutes (33.8%) of flight time was above 50 m with the remaining 66.2% of records being at or below 50 m AGL (Graph 9). When adjusting for group size or “bird time”, this changed slightly to 32.1% of observations above 50 m AGL and 68.9% of observations below 50 m AGL (Graph 10).



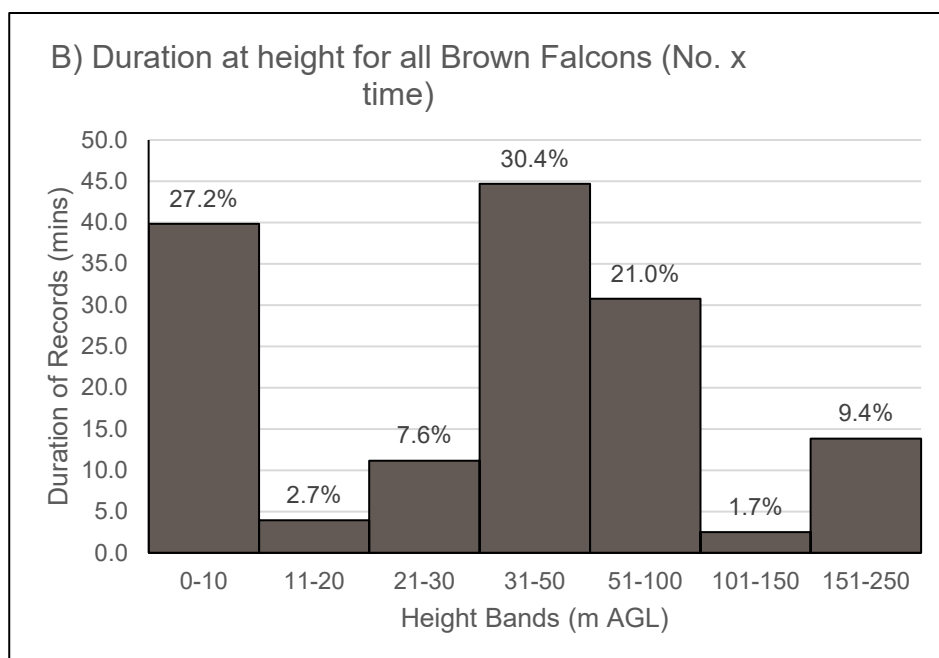
(Source: Shepherd and Bamford 2026a)

Figure 36: Flight lines of Brown Falcon sightings colour-coded for flight heights (m AGL)



(Source: Shepherd and Bamford 2026a)

Graph 9: Brown Falcon flight height distribution for all records



(Source: Shepherd and Bamford 2026a)

Graph 10: Brown Falcon flight height distribution of individual birds (bird time)

3.4.6 Little Eagle (*Hieraaetus morphnoides*)

The Little Eagle (*Hieraaetus morphnoides*) was encountered on 26 separate occasions throughout the BBUS and can be expected to hunt or scavenge throughout the Project Area on occasion (Shepherd and Bamford 2026a). Little Eagles can be expected to be found throughout the airspace of the Project Area either while hunting or transiting and are observed frequently at heights consistent with the Rotor Swept Area (RSA). No signs of breeding were observed in the Project Area, but the species is likely to be breeding within the region and is considered a regular visitor.

Little Eagle flight records totalling approximately 111 minutes of observations were obtained, of which 27 minutes were at or below 50 m AGL (24%) and 84 minutes (76%) were greater than 50 m AGL and up to 300 m AGL. This species was addressed in the risk assessment, which determined that potential impacts to the species from collision with wind farm infrastructure, and / or barotrauma, had a likelihood rating of Unlikely, a consequence rating of Low, and a risk rating of Negligible (Section 6.2). The risk assessment was informed by the species' collision risk modelling by Shepherd and Bamford (2026b; Appendix A). The predictions of flights at risk of colliding with turbines was relatively low at a median of 0.15 strikes per annum (95% CI: 0.00 – 0.69) or one bird every six years.

3.4.7 Australian Hobby (*Falco longipennis*)

The Australian Hobby (*Falco longipennis*) was observed on six occasions through the BBUS (Shepherd and Bamford 2026a). However, it may not be present throughout the year and is considered a regular visitor but may also breed occasionally.

Australian Hobby flight records totalling just over 31 minutes of activity were between 3 m AGL to 60 m AGL. Approximately 2.5 minutes were above 50 m (8%) and the majority of time at 50 m or below where it was often observed hunting acrobatically. It has been seen to fly higher more regularly than this (B. Shepherd pers. comm.). The species preys on small birds and invertebrates on the wing and often at lower levels. It may be seen throughout the airspace of the Project Area including over water.

3.5 Flight heights for bats

BCE positively identified six bat species during the BBUS through acoustic sampling (Table 15). Flight height information was not collected for bat species as part of the BBUS, being nocturnal, therefore flight height information from BBUS observations and literature sources are outlined in Table 17.

Table 17: Flight height information for the bat species calls recorded during the BBUS

Target species	Species	BBUS observations	Flight heights and movement details
Secondary target species (Bat species considered to be locally significant or most at risk of colliding with turbine blades at an ecological-level of importance)	Gould's Wattled Bat (<i>Chalinolobus gouldii</i>)	- The species is considered to be resident and breeding in the Project Area. - The species was commonly detected in the Project Area, but with increased levels of activity around woodland, large trees and over water.	- The Gould's Wattled Bat is known to forage above and below the forest canopy and in the open area just below the forest canopy. Flight is direct and rapid, and manoeuvrability is limited (Chruszcz and Barclay 2002). - This species tends to stay below 20 m and may descend to a height of 1 m above the ground (Chruszcz and Barclay 2002). - The species regularly forages 5-10 km from their roost site, and occasionally up to 15 km from their roost site (Churchill 2008).
	White-striped Free-tail Bat (<i>Austronomus australis</i>)	- The species is a regular visitor to the Project Area and was positively identified as present throughout the year, but with lower detection rates in winter. - The species was recorded over native scrub, woodland and paddocks but call sequences were more numerous in wooded environments where it probably roosts and has lower detection rates over agricultural paddocks.	- The White-striped Free-tail Bat is a specialized high-altitude, fast-flying interceptor insectivore (Atlas of Living Australia 2026). - The species hunts in open landscapes and above vegetation, often at height. - The species is not designed for manoeuvrability and intercept their prey at 50 m or more above the ground (Churchill 2008). - The species has been documented hunting above 50 m (B. Shepherd, personal communication, 27 May 2026).
Bat species	South-western Freetail Bat (<i>Ozimops kitcheneri</i>)	- The species is considered a regular visitor to the Project Area. - The species was more frequently recorded in the wooded areas probably due to roost activity.	- The South-western Freetail Bat usually forages at or above the canopy height in the spaces between trees, along roadways, along outer edges of remnant vegetation, and above the forest canopy (Churchill 2008). The species also forages on the ground. - The species is known to forage up to 12 km from their roost site (Churchill 2008).
	Chocolate Wattled Bat (<i>Chalinolobus morio</i>)	- The species is considered a regular visitor to the Project Area. - The species was only recorded over native Banksia scrub and woodland.	- Flight of the Chocolate Wattled Bat is usually fast and direct and are among the most agile bats (Churchill 2008). - The species regularly forages up to 5 km from their roost site for each night (Churchill 2008). They mostly forage in the open zone between the top of the understorey and the canopy. However, they sometimes fly low along forest trails.
	Lesser Long-eared Bat (<i>Nyctophilus geoffroyi</i>)	The species is considered to be resident to the Project Area.	- The Lesser Long-eared Bat fly slowly and are highly manoeuvrable (Churchill 2008). - The species flies close to the vegetation and into the understorey when foraging (Churchill 2008). The species forages at 6-10 m above ground level in forests, and at lower heights in open areas, spiralling around shrubs and bushes.

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Target species	Species	BBUS observations	Flight heights and movement details
	<i>Vespadelus regulus</i> Southern Forest Bat (possibly some records of Inland Forest Bat (<i>V. baverstocki</i>)).	The species is considered to be resident to the Project Area.	• The Southern Forest Bat are highly manoeuvrable and moderately fast insectivores, with flight speeds of 5-25 km/hr (Churchill 2008). • The species tends to fly close to vegetation and easily enters gaps in understory. They typically forage at half the canopy height.

(Source: Shepherd and Bamford 2026a)

4 POTENTIAL IMPACTS TO BIRDS AND BATS

The PBBAMP focuses on potential impacts to birds and bats from planned (and unplanned events) during the Project's construction and operation phases.

The main exposure pathways for birds and bats from wind farms can be classified into three categories:

1. Collision: direct mortality following collision with turbines or infrastructure.
2. Displacement and barrier: behavioural avoidance, where wind farms and/or operational activities lead to temporary displacement from a foraging habitat or act as a barrier to movement if the turbines are in narrow migration pathways.
3. Habitat modification: where birds and bats respond to the modification of the physical environment associated with wind farm infrastructure, i.e. attraction, disturbance, increased predation.

Vulnerability to these potential impacts is species dependent. For example, birds may be vulnerable to foraging habitat loss through displacement effects if they are able to detect the wind turbines and actively avoid the turbines or the whole wind farm. Conversely, bats may be attracted to wind turbines placing them at greater collision risk.

Collisions are low likelihood, unplanned events where birds and bats may collide with wind turbines, met masts and / or transmission lines which is likely to cause death or injury. The consequence of this event will vary depending on how many birds and bats are affected and the protection status of those species.

As collisions with turbines are the main source of risk for onshore wind farms, the focus of the assessment is on the operational phase of the Project. Project decommissioning (i.e. removal of the wind turbines) carries no risk of collision and will not be considered further in this PBBAMP.

Potential impacts to birds and bats from planned and unplanned events during the Project's construction and operation phases were identified by RPS (2026c), as summarised in Table 18. RPS (2026c) assessed the impacts to terrestrial fauna (including birds and bats) and applied the EPA's mitigation hierarchy (avoid, minimise and rehabilitate) to address the key potential impacts. The PBBAMP has undertaken a risk assessment and developed a monitoring and adaptive management program to address the following potential impacts from the operation phase:

- Collision with wind farm infrastructure (unplanned event)
- Barotrauma (unplanned event), which is bodily injury caused by changes in barometric (air) pressure.

The PBBAMP focuses on collision with wind turbines, on the basis that the wind turbines present the greatest risk to birds and bats, considering they are dynamic structures, there will be 131 turbines, the turbine blades will range from 60 – 270 m AGL, and the turbines will be located throughout the Project Area.

Collision with other wind farm infrastructure (e.g., permanent met masts, transmission lines, buildings) present reduced risk to bird and bat species, in comparison to collision with wind turbines. This is because the other wind farm infrastructure:

- Are static structures.
- Fewer in number and less spatially distributed within the project area than the 131 wind turbines.
- Are of a lower height than the wind turbines (e.g., met masts up to 168 m).
- And a portion of the infrastructure will remain in place for a short length of time (indicatively 12 months during construction; Section 2.3).

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Table 18: Potential impacts to birds and bats from the Project's construction and operation phases

Phase	Impact class	Works / operations	Potential impacts to terrestrial fauna
Construction	Direct	Construction of the proposal	Loss of terrestrial fauna habitat (planned event) - Depending on the final layout options, the following fauna habitat will be impacted from implementation of the Project: - Between 31.4 ha to 34.34 ha of native vegetation comprising potential fauna habitat. 9.64 ha to 10.75 ha of planted vegetation (pine plantations and planted Eucalypts). - Removal of between 41.41 ha to 45.10 ha the potential black cockatoo foraging habitat. - Impacts to potential breeding trees will be confirmed through targeted habitat searches. This information will be included in the environmental referrals. Injury and / or mortality of terrestrial fauna from construction vehicles (unplanned event) - Risk of collision with construction vehicles leading to injury/mortality of terrestrial fauna.
	Indirect		Alteration of fauna behaviour (planned event) - Altered fauna behaviour from noise, lighting and increased human presence during construction activities. Indirect loss or impact to terrestrial fauna habitat from habitat degradation (unplanned event) - Indirect loss or impact to terrestrial fauna habitat from habitat degradation as a result of: - Introduction of invasive species (pests and weeds) from construction machinery and vehicles. - The introduction or spread of disease and / or pathogens from construction machinery and vehicles. - Inappropriate disposal of waste. Accidental clearing of fauna habitat (unplanned event) - During construction activities, there is a risk that fauna habitat outside the areas directly impacted will be accidentally cleared. Fire (unplanned event) - Loss of fauna habitat from fire.
Operation	Direct	Operation of the proposed infrastructure, including the wind farm and BESS	Collision with wind farm infrastructure (unplanned event) - There is a risk for injury or mortality to birds and bats from collision with wind farm infrastructure. Barotrauma (unplanned event) - There is a risk for injury or mortality to bats from barotrauma during operation of the Project. Alteration of fauna behaviour (planned event) - Altered fauna behaviour from noise during operation of the project.
	Indirect	Installation of linear infrastructure Vehicle movements during operational activities (e.g. maintenance of the	Fragmentation of fauna habitat (planned event) - The proposed construction and installation of the proposal has potential to result in fragmentation of fauna habitat. Indirect loss or impact to terrestrial fauna habitat from habitat degradation (unplanned event) - Indirect loss or impact to terrestrial fauna habitat from habitat degradation as a result of: - The introduction or spread of invasive species (pests and weeds) due to vehicle and personnel movement during operation.

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Phase	Impact class	Works / operations	Potential impacts to terrestrial fauna
		proposed infrastructure)	– The introduction or spread of disease (for example, <i>Phytophthora</i> dieback) due to vehicle and personnel movement during operation. Fire (unplanned event) • Loss of flora and vegetation from fire.

5 INITIAL SPECIES SCREENING

An initial species screening process was undertaken to identify which bird and bat species were potentially at risk of collision with the Project's wind turbines, resulting in mortality, injury, or barotrauma.

The expected bird and bat assemblages within the Project Area was prepared by Shepherd and Bamford (2026a) which identified 185 bird species and 8 bat species. The species potentially at risk of collision with the Project's wind turbines were identified by Shepherd and Bamford (2026b), and included:

- Conservation significant bird species recorded frequently in the BBUS within the Project Area and / or were considered to have a high sensitivity according to Avistep (BirdLife International 2025) and / or a high risk according to Reid and Baker (2025). These species are classified as CS1 by Shepherd and Bamford 2026a. Four species were identified.
- Locally significant and common bird and bat species recorded frequently in the BBUS within the Project Area and with flight heights estimated to be at 60 m AGL or higher. These species are classified as CS3 by Shepherd and Bamford 2026a. Twenty-nine species were identified.

A total of 33 species were included and addressed further in the PBBAMP (Table 19).

It is noted that the sensitivity ratings according to Avistep (BirdLife International 2025) and risk ratings according to Reid and Baker (2025) are not influenced by the species' recorded status in Project Area (Shepherd and Bamford (2026a)). The risk assessment in Section 6 of this report takes into consideration the species site specific status in the Project Area.

Other species from the expected bird and bat assemblage were excluded from the screening process. This was because they either had been recorded too infrequently and / or were considered to have a low sensitivity according to Avistep (BirdLife International 2025) and / or a low risk rating according to Reid and Baker (2025) such that they were very unlikely to be impacted.

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Table 19: Birds and bats deemed to be potentially at risk of collision with the wind turbines and in need of detailed collision risk assessment

Species name	Conservation status BC Act	EPBC Act	BCE code	Status in Project Area	Risk (Avistep)	WA risk score ¹ (Reid and Baker)
Conservation significant species						
Peregrine Falcon <i>Falco peregrinus</i>	Other specially protected	-	CS1	Irregular visitor	High (15.4)	High
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	Vulnerable	Vulnerable	CS1	Regular visitor	High (10.8)	High
Carnaby's cockatoo <i>Zanda latirostris</i>	Endangered	Endangered	CS1	Resident	High (21.4)	High
Fork-tailed Swift <i>Apus pacificus</i>	Migratory	Migratory	CS1	Irregular visitor	High (30.7)	High
Locally significant and common species						
Grey Teal <i>Anas gracillis</i>	-	-	CS3	Resident	High (10.4)	High
Australian Shelduck <i>Tadorna tadornoides</i>	-	-	CS3	Resident	High (19.2)	High
Australian White Ibis <i>Threskiornis molucca</i>	-	-	CS3	Regular visitor	High (9.4)	High
Straw-necked Ibis <i>Threskiornis spinicollis</i>	-	-	CS3	Regular visitor	High (9.4)	High
White-necked Heron <i>Ardea pacifica</i>	-	-	CS3	Irregular visitor	Not listed	High
Australian Pelican <i>Pelecanus conspicillatus</i>	-	-	CS3	Irregular visitor	High (15.5)	High
Banded Lapwing <i>Vanellus tricolor</i>	-	-	CS3	Regular visitor	High (11.1)	Medium
Wedge-tailed Eagle	-	-	CS3	Resident	High (66.2)	High

¹ Reid and Baker's (2025) ecological risk assessment of bird and bat species for Western Australia considers onshore wind farm risks such as direct collisions with turbines, displacement from preferred habitats, habitat destruction and barrier effects (the physical and visual obstruction of bird and bat flight paths) leading to altered movement patterns.

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Species name	Conservation status BC Act	EPBC Act	BCE code	Status in Project Area	Risk (Avistep)	WA risk score ¹ (Reid and Baker)
<i>Aquila audax</i>						
Little Eagle <i>Hieraaetus morphnoides</i>	-	-	CS3	Regular visitor	High (15.0)	High
Whistling Kite <i>Haliastur sphenurus</i>	-	-	CS3	Resident	High (14.8)	High
Collared Sparrowhawk <i>Tachyspiza cirrocephalus</i>	-	-	CS3	Resident	High (8.0)	Medium
Brown Goshawk <i>Tachyspiza fasciatus</i>	-	-	CS3	Resident	High (10.4)	Medium
Swamp Harrier <i>Circus approximans</i>	-	-	CS3	Irregular visitor	High (48.6)	High
Spotted Harrier <i>Circus assimilis</i>	-	-	CS3	Regular visitor	High (11.8)	High
Black-shouldered Kite <i>Elanus axillaris</i>	-	-	CS3	Regular visitor	Not listed	High
Brown Falcon <i>Falco berigora</i>	-	-	CS3	Resident	High (45.4)	Not listed
Nankeen Kestrel <i>Falco cenchroides</i>	-	-	CS3	Resident	High (7.2)	High
Australian Hobby <i>Falco longipennis</i>	-	-	CS3	Regular visitor	High (7.1)	High
Little Corella/Western Corella <i>Cacatua spp</i>	-	-	CS3	Resident	High (10.7) High	High
Galah <i>Eolophus roseicapilla</i>	-	-	CS3	Resident	High (8.9)	Medium
Rainbow Bee-eater <i>Merops ornatus</i>	-	-	CS3	Regular visitor	Not listed	Medium
White-backed Swallow <i>Cheramoeca leucosterna</i>	-	-	-	Regular visitor	Not listed	Medium
Tree Martin <i>Petrochelidon nigricans</i>	-	-	-	Regular visitor	Not listed	Not listed

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Species name	Conservation status		BCE code	Status in Project Area	Risk (Avistep)	WA risk score ¹ (Reid and Baker)
	BC Act	EPBC Act				
Ground Cuckoo-shrike <i>Coracina maxima</i>	-	-	CS3	Vagrant	High	Medium
Australian Magpie <i>Gymnorhina tibicen</i>	-	-	-	Resident	Not listed	Medium
Magpie-lark <i>Grallina cyanoleuca</i>	-	-	-	Resident	Not listed	Low
Australian Raven <i>Corvus coronoides</i>	-	-	CS3	Resident	Not listed	Medium
White-striped Freetail Bat <i>Austronomus australis</i>	-	-	CS3	Regular visitor	NA	High
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	-	-	CS3	Resident	NA	High

6 RISK ASSESSMENT OF POTENTIAL IMPACTS

6.1 Risk assessment methodology

Shepherd and Bamford's (2026b) undertook a risk assessment on birds and bats from potential collision with wind turbines, as presented in Appendix A.

This section summarises the risk assessment methodology used in the PBBAMP, which relies on the risk assessment analytical methods from Shepherd and Bamford (2026b). The assessment has taken a risk-based approach, focusing effort on those species most at risk and with higher protection levels. The species of concern addressed in the risk assessment were determined by the initial species screening (Section 5).

The risk assessment methodology was based on the Risk Evaluation Matrix Model, which is consistent with the AS/NZS ISO31000 Risk Assessment Standard 2009. The risk assessment involved the following:

- An assessment of the potential impacts to birds and bats (Section 4).
- Approach to determining the risk events that are specific to each species and potential impacts (Table 20).
- Collision Risk Modelling (CRM) applied to bird data for species that had a timed presence within the RSA (>60 m, <270 m) from one or more of the VPs.
 - This is a quantitative approach that provides an estimate of mortality for each species that qualifies for CRM.
 - Flight height data gathered during FF are also used to generate flight profiles and the proportion of time each species spent within the RSA.
- Collision Likelihood Score (CLS) applied to bird and bat species that have been recorded in the project area and are known or suspected to fly within RSA heights but have insufficient data to support CRM.
 - The CLS is scaled out of 100, and the likelihood ratings are outlined in Table 21.
- Likelihood criteria was developed and applied to each potential impact for the species of concern assessed by CRM (Table 22). This is informed by the CRM's median estimated number of collisions per turbine (annual collision estimates).
- Consequence criteria were developed and applied to each potential impact for each species of concern (Table 23). For ease of reference, the Carnaby's cockatoo consequence criteria are provided in Table 24.
- Through calculating the likelihood and the consequence, an overall risk rating was determined consistent with a risk matrix (Table 25). This Risk Evaluation Matrix Model is currently used across a wide range of industry sectors, in particular for assessing environmental risk.

Table 20: Determining the risk events

Potential impact	Approach to determining the risk event
• Collision with wind farm infrastructure (unplanned event) • Barotrauma (unplanned event)	Defined as the number of birds or bats for each species that could reasonably be expected to fly together and / or be expected to utilise fauna habitats together. For species assessed by CLS: This would be informed by the group size range recorded during the BBUS (Shepherd and Bamford (2026b), particularly for group sizes recorded within the RSA if noted. The largest group size was used as a conservative approach for the risk assessment. If the species has no group sizes recorded, then species characteristics on common soaring or flocking numbers of birds and bats and common numbers of birds and bats when utilising fauna habitat (e.g. foraging, roosting, breeding, transiting) would be used. For species assessed by CRM: Informed by the median estimated number of collisions per turbine annually from the CRM.

Table 21: CLS likelihood ratings

CLS	Likelihood rating
>90	Very Likely
60-90	Likely
40-60	Possible
10-40	Unlikely
≤10	Very unlikely

Table 22: Likelihood of event criteria for species assessed by CRM

Likelihood	Description
Very Likely	It is very probable that the risk event could occur in any year (>95%)
Likely	It is more probable than not that the risk event could occur in any year (>50%)
Possible	It is equally probable that the risk event could or could not occur in any year (50%)
Unlikely	It is less probable than not that the risk event could occur in any year (<50%)
Very unlikely	It is improbable that the risk event could occur in any year (<5%)

Table 23: Consequences of event criteria

Consequence	Predicted to seriously disrupt an ecologically significant proportion of the: Total population annually	Local population within and proximate to the Project Area over a certain period
Negligible	≤ 0.00033% Represents 0.01% over a 30 year operational life	Occasional individuals lost but no reduction in local or regional population viability
Low	0.00033% to 0.0033% Represents 0.01% and 0.1% over a 30 year operational life	Repeated loss of small numbers of individuals but no reduction in local or regional population viability
Moderate		Moderate loss in numbers of individuals, leading to minor reduction in localised or regional population viability for between one and five years
High	≥ 0.0033% Represents 0.1% over a 30 year operational life	Major loss in numbers of individuals, leading to reduction in regional or state population viability for between five and ten years
Severe		Extreme loss in numbers of individuals, leading to reduction in regional or state population viability for a period of at least ten years

Modified from Emerge Associates 2024b and Nature Advisory 2023

Table 24: Consequences of event criteria for Carnaby's cockatoo

Consequence	Predicted to seriously disrupt an ecologically significant proportion of the: Total population annually	Local population within and proximate to the Project Area over a certain period
Negligible	≤ 1 bird annually Represents 0.01% of total population over a 30 year operational life	Occasional individuals lost but no reduction in local or regional population viability
Low	1 bird to 2 birds annually Represents 0.01% and 0.1% of total population over a 30 year operational life	Repeated loss of small numbers of individuals but no reduction in local or regional population viability
Moderate		Moderate loss in numbers of individuals, leading to minor reduction in localised or regional population viability for between one and five years

Consequence	Predicted to seriously disrupt an ecologically significant proportion of the:	
	Total population annually	Local population within and proximate to the Project Area over a certain period
High	≥ 2 birds annually ² Represents 0.1% of total population over a 30 year operational life	Major loss in numbers of individuals, leading to reduction in regional or state population viability for between five and ten years
Severe		Extreme loss in numbers of individuals, leading to reduction in regional or state population viability for a period of at least ten years

Modified from Emerge Associates 2024b and Nature Advisory 2023

Table 25: Risk matrix defining risk level based on likelihood and consequence

		Consequence				
		Negligible	Low	Moderate	High	Severe
Likelihood	Very Likely	Negligible	Low	High	Severe	Severe
	Likely	Negligible	Low	Moderate	High	Severe
	Possible	Negligible	Low	Moderate	High	High
	Unlikely	Negligible	Negligible	Low	Moderate	High
	Very unlikely	Negligible	Negligible	Negligible	Low	Low

6.2 Risk assessment results

The results of the risk assessment are presented in Table 26 for the conservation significant bird species, and in Table 27 for the locally significant and common bird and bat species. Out of the 33 species addressed in the risk assessment, there were:

- For the four conservation significant bird species:
 - Three species had a negligible risk rating
 - One species had a moderate risk rating.
- For the twenty-nine locally significant and common bird and bat species:
 - Fourteen species had a negligible risk rating
 - Thirteen species had a low risk rating
 - One species had a moderate risk rating
 - One species had a high risk rating.

The species with low, moderate and high risk ratings are addressed in the monitoring and adaptive management program.

² The threshold for high to severe consequences annually to the total population of Carnaby's cockatoo is intentionally conservative, as it applied the 0.1% of total population (34,000 birds; Garnett and Baker 2021) across each year of the operational life of 30 years. As such, the high consequence should not exceed the fecundity of the local population of Carnaby's cockatoo or recruitment ability on a given year.

Table 26: Risk assessment results for conservation significant bird species (CLS)

Species name	Conservation status		Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
	BC Act	EPBC Act						
Peregrine Falcon <i>Falco peregrinus</i>	Other specially protected	-	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird	Unlikely (40)	Low	Negligible	- Several flights of a single Peregrine Falcon were acquired through the BBUS programme. Results of the CLS suggests the risk from rotor-strike is unlikely (while a different species with some different flight characteristics, it is worth noting that CRM results for the Brown Falcon, which had 19 flights compared with the three for Peregrines, predicted the risk of collision once about every 12.5 years). The Unlikely risk for the Peregrine Falcon is due in part to the relatively low activity levels of this species within the wind farm area, relatively low flight profile recorded in the area, and documented ability to avoid wind turbines in Europe. It is also a rare mortality at wind farms in Australia (T. Kelly, pers. comm.). - The risk to this species can be considered negligible to low due to very irregular occurrence and reported to have high situational awareness and behavioural avoidance of turbines (Scottish Natural Heritage, 2010). Population density is uncertain but broadly across Australia, densities are typically within a pair per 500 – 1,500 km² (Marchant and Higgins 1986). The density is likely to be very low in the region. If a breeding pair is found to be resident in the future, it would require further monitoring to detect any possible impact. - The global population is estimated to range from 100,000–499,999 mature individuals (BirdLife International 2026). It is estimated that there are 3,000 – 5,000 pairs in Australia and its abundance is sparse (Lindsey 1992). For the purposes of the risk assessment, the total population is estimated to be 100,000. If 1 bird was impacted this would represent 0.001% of the total population of peregrine falcon. If this occurred each year during the 30 year operational life, this would represent 0.03% of the total population of peregrine falcon. The 1 bird represents a repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Forest Red-tailed Black Cockatoo <i>Calyptrorhynchus banksii naso</i>	Vulnerable	Vulnerable	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	2 and 5 birds	Very unlikely (6)	Negligible	Negligible	- This sub-species was recorded potentially only once within the project area and at very low height. It is considered an irregular visitor but may be expected to occur more frequently in the project area as the sub-species appears to be expanding its range to the north. This reflects its former range which is noted to have extended to Dandaragan (Johnstone and Storr 1998). The risk of collision is concluded as very unlikely through the CLS. - The risk of significant consequences can be considered negligible due to irregular occurrence, very low flight profiles and no key activities such as breeding.
Carnaby's cockatoo <i>Zanda latirostris</i>	Endangered	Endangered	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	2 birds (1-280 birds)	Unlikely (14)	High	Moderate	- Carnaby's Black-Cockatoo is a high-profile species and one for which the Dinner Hill area is considered of importance. They have been shown to be present throughout the year and were observed roosting and nesting. Data gained on their flight profiles demonstrate that they remain at relatively low heights for the majority of time. A very low percentage of their flight time is above 40 m and generally only involves one or two birds. - The CLS tool has estimated the risk of rotor strike on Carnaby's to be unlikely and therefore few if any deaths per year are expected. In comparison to existing threats such as vehicle collisions and ongoing loss of foraging habitat, the risk of mortality from the Dinner Hill Wind Farm is concluded to be negligible. - The estimated number of mature individuals of Carnaby's cockatoo is 34,000 in Australia (Garnett and Baker 2021). If 2 birds were impacted, this would represent 0.006% of the total population of Carnaby's cockatoos. If this occurred each year during the 30 year operational life, this would represent 0.176% of the total population of Carnaby's cockatoos. If 2 birds were impacted annually, this would represent a major loss in the number of individuals from the local population, particularly as the species is resident within the Project Area and breeding is known to occur. - Adult mortality can have a profound effect on population viability (Williams et al. 2017). For instance, female Carnaby's Cockatoos would have to live for at least 20–25 years to replace themselves and maintain a viable breeding population (Saunders et al. 2024). Carnaby's cockatoo has low survival in the juvenile years, high survival as adults, and is long-lived, which is necessary for the species' sustainability due to several years of sexual immaturity and low reproductive output. The loss of the 2 birds could lead to a reduction in the state population viability for between 5 to 10 years. - Shepherd and Bamford (2026b) determined that the risk of collision to this species can be considered negligible due to their flight profile relative to a ground clearance of 60 m. A higher risk rating of moderate was applied in this case, according to the consequence rationale above.
Fork-tailed Swift <i>Apus pacificus</i>	Migratory	Migratory	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird	Unlikely (31)	Negligible	Negligible	- Fork-tailed Swifts were not recorded during the BBUS but can be expected to occur in the project area occasionally; they are classed as an irregular visitor. Due to their flight profile, they are considered at risk, but due to their sparse and sporadic occurrence in the region, they are deemed to be unlikely to collide with turbines. - The risk of significant consequences to this species can therefore be considered negligible due to extremely irregular occurrence.

Table 27: Risk assessment results for locally significant and common bird and bat species (CLS and CRM)

Species name	Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
Grey Teal <i>Anas gracillis</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	25 birds (6-25 birds)	Unlikely (40)	Low	Negligible	- Grey teal were present throughout and associated with field dams, where they would take refuge to roost when not foraging across paddocks (Shepherd and Bamford 2026a). Numbers of waterbirds within the project area or on the control sites were generally low. There was five observations of 6-25 individuals near a field dam during the BBUS (Shepherd and Bamford 2026b), and the maximum height recorded was 60 m, which is the minimum turbine blade ground clearance. In contrast, Guraga Lake, which is a large wetland complex, occasionally had very large numbers of waterbirds, including 1,200 grey teal with a maximum height recorded at 30 m. Guraga Lake is located approximately 45 km south of the Project Area. - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The species is distributed throughout Australia and found throughout Western Australia (BirdLife Australia 2023h). Counts of grey teal at wetlands in south-west Australia ranged from 41,000 to 70,000 birds. If 25 birds were impacted annually, this would represent a moderate loss in numbers of individuals in the region, considering 1,200 birds were recorded at Guraga Lake during the BBUS. However, 25 birds impacted annually over the Project's lifetime (~750 birds) may be an overestimation, considering the species was not recorded within the RSA (>60 m, <270 m) at the project area and was infrequently observed within the project area (four encounters over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling). As such, a low consequence was selected.
Australian Shelduck <i>Tadorna tadornoides</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	16 birds (1-30 birds)	Unlikely (38)	Low	Negligible	- Australian Shelduck were present throughout and associated with field dams, where they would take refuge to roost when not foraging across paddocks (Shepherd and Bamford 2026a). Numbers of waterbirds within the project area or on the control sites were generally low. The species was occasionally observed flying to 150 m height in groups of 30 birds. They were observed flying generally straight between the field dams, roosting trees and paddocks on which they grazed. They were recorded during all but five campaigns and can be expected throughout the year. The species was also observed at Guraga Lake, with over 2,000 Australian shelduck with a maximum height recorded at 50 m. - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). Australian Shelduck were observed flying at height in substantially lower numbers and for much less time than the Straw-necked Ibis and therefore can expect to have substantially fewer predictions of rotor-strike than the ibis. - The species has a common abundance in Australia, and its status is secure (no existing or foreseeable threat to continuance of the species) (Lindsey 1992). The species occurs in south-east and south-west Australia and is widespread in the south-west corner of Western Australia (BirdLife Australia 2023a). Counts of Australian shelduck at wetlands in south-west Australia ranged from 19,000 to 65,000 birds. If 16 birds were impacted annually, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Australian White Ibis <i>Threskiornis molucca</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	12 birds (1-12 birds)	Possible (46)	Low	Low	- The species was observed as several small flocks of 3-12 birds feeding in paddocks and soaring on thermals, at heights up to 70 m (Shepherd and Bamford 2026a). The species was not observed on Emu or Guraga Lakes during the BBUS. - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The species is distributed throughout east, north and southwest Australia, and is found in the southwest and Kimberly regions of Western Australia (BirdLife Australia 2023i). The species can breed in small to very large colonies (20,000 pairs). Species such as the White-necked Heron, Australian White Ibis and Australian Pelican are present intermittently and in small numbers, and are much more abundant elsewhere, and the consequences of deaths would be different compared with for the Brown Goshawk, which may be represented by a few resident pairs in the region. The species was infrequently observed within the project area (five encounters over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling) (Shepherd and Bamford 2026a). If 12 birds were impacted annually, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Straw-necked Ibis <i>Threskiornis spinicollis</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	7 birds, rounded up from the median estimated number of collisions per turbine annually (1-250 birds)	Very likely As it is very probable that the risk event could occur in any year (>95%), according to its CRM (6.55; median estimated number of collisions per turbine annually)	Low	Low	- While Straw-necked Ibis were only occasionally observed in the project area, they were in flocks of up to 250 individuals and were regularly observed soaring within RSA to get elevation before transiting elsewhere at height. They were therefore the most abundant bird in RSA heights but were present only occasionally. Predicted losses of around a median of six to seven birds per annum (95% CI: 0.00 – 58.04), appear low considering their flight height profile and numbers within RSA. However, they are not commonly found during carcass searches on wind farms in south-eastern Australia (Moloney et al. 2019) and must therefore be adept at avoiding turbines. - This species is very common in the region and often associated with waste dumps or agricultural systems in elevated numbers when food and invertebrate prey is abundant. The loss of around seven birds per annum is unlikely to be ecologically significant. - If seven birds annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
White-necked Heron <i>Ardea pacifica</i>	Collision with wind farm infrastructure (unplanned event)	5 birds (1 & 5 birds)	Possible (43)	Low	Low	There were seven observations of single birds mostly but one group of five birds flying to 60 m over native vegetation during the BBUS (Shepherd and Bamford 2026a). The maximum height recorded was 60 m, which is the minimum turbine blade ground clearance. A group of three birds were observed on a regional waterbody.

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Species name	Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
	Barotrauma (unplanned event)					- Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The species is widespread throughout Australia, and its population is apparently stable (BirdLife Australia 2023j). Species such as the White-necked Heron, Australian White Ibis and Australian Pelican are present intermittently and in small numbers, and are much more abundant elsewhere, and the consequences of deaths would be different compared with for the Brown Goshawk, which may be represented by a few resident pairs in the region. The species was infrequently observed within the project area (seven encounters over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling) and was not recorded within the RSA (>60 m, <270 m) at the project area (Shepherd and Bamford 2026a). If 5 birds were impacted annually, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Australian Pelican <i>Pelecanus conspicillatus</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	5 birds	Possible (50)	Low	Low	- There was one flight of five birds recorded taking off from fish pond in west of project area, flying up to 200 m during the BBUS (Shepherd and Bamford 2026a). This record shows the potential for unexpected waterbird species for which the project area provides little habitat to pass through or above the project airspace. In this case, the Australian Pelicans were present because of fish ponds outside the project area. - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The species is widespread in Australian coastal and inland waters (BirdLife Australia 2023k). Species such as the White-necked Heron, Australian White Ibis and Australian Pelican are present intermittently and in small numbers, and are much more abundant elsewhere, and the consequences of deaths would be different compared with for the Brown Goshawk, which may be represented by a few resident pairs in the region. The species was infrequently observed within the project area (one encounter over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling) (Shepherd and Bamford 2026a). If 5 birds were impacted annually, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Banded Lapwing <i>Vanellus tricolor</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	60 birds (1-60 birds)	Unlikely (40)	Moderate	Low	- The Banded Lapwing has been observed during nine campaigns in flocks of up to 60 birds and up to 150 m height (Shepherd and Bamford 2026a). Banded Lapwing was observed to forage and roost in paddocks and take flight when moving between paddocks. Their flight patterns in taking off and landing were to circle in broad arcs in gaining altitude or descending. Once at height, they would fly straight and fast. This species was observed across the breadth of the project area. - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The species is endemic to Australia, found in east, south and west mainland and on Tasmania (BirdLife Australia 2023l). The Australian population is estimated to be c. 27,000. If 60 birds were impacted annually, this would represent a major loss in numbers of individuals leading to reduction in regional or state population viability for between five to ten years, considering the estimated national population. However, 60 birds impacted annually over the Project's lifetime (~1,800 birds) may be an overestimation, considering this assumes any birds lost to collision will be immediately replaced which is highly unlikely, noting the species' generation length is approximately 4.3 years; BirdLife International 2026). Also, as the risk event was based on the maximum flock count from the BBUS, whereas the group size ranged from 1-60 birds, and flocks for this species are generally small at 3-20 birds, sometimes larger 30-50+ birds and occasionally over 100 birds (BirdLife Australia 2023l). As such, a moderate consequence was selected.
Wedge-tailed Eagle <i>Aquila audax</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	5 birds, rounded up from the median estimated number of collisions per turbine annually (1-5 birds)	Very likely As it is very probable that the risk event could occur in any year (>95%), according to its CRM (4.41; median estimated number of collisions per turbine annually)	Moderate	High	- Wedge-tailed Eagles observed during the BBUS spent the majority of flight time within the RSA (Shepherd and Bamford 2026b). CRM analysis predicts that the number of collisions involving Wedge-tailed Eagles is around a median of four to five birds per annum (95% CI: 2.16 – 10.27 birds). This assumes that any birds lost to collision will be immediately replaced, whereas replacement is more likely to be slow and vary seasonally, so the real mortality rate will be lower even without any other mitigation measures. Losses of four to five birds per annum is consistent with carcass monitoring studies conducted in south-eastern Australia (Moloney et al. 2019). - The Wedge-tailed Eagle is considered the raptor species to be most at risk from the operating wind farm due to the large proportion of time it spends within RSA heights and vulnerability to rotor-strike (Moloney et al. 2019). This species has persisted in the past despite organised persecution and appears able to withstand substantial losses (Serventy and Whittell, 1976). Juvenile eagles appear most at risk from collision (T. Kelly pers. comm.), but juvenile mortality is naturally high and as such small losses of 4-5 juvenile birds per annum from rotor-strike may be sustainable. - Loss of breeding adults is more of a concern and may require further monitoring. One nest was found within the Project Area, near McKays Road, in July 2026 and was attended by an adult bird (Shepherd and Bamford 2026a; Figure 16). Another nest was recorded in woodland approximately 7 km north of the Project Area and attended by an adult bird in 2025. Carrion, its primary food source, is common in the project area and seems to maintain several families throughout. Carcasses can be removed from within the turbine array and potentially reduce their exposure to rotor-strike. Adult birds appear capable of identifying turbines as a risk and can avoid them, and perhaps why they persist in a region that contains a number of operational wind farms. If there were any consequences on Wedge-tailed Eagles because of the wind farms, it may be detected in a decline in breeding pairs which doesn't seem to have happened to date, but the cumulative impact of multiple wind farms across the region over the next decade should be

Species name	Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
						recognised as a risk. Juvenile birds can undertake large dispersal flights following fledging and recolonisation is therefore expected to be quite quick. - The risk to Wedge-tailed Eagles as a result of collision with turbine blades is expected to have low to moderate consequences depending on whether young birds or adults are impacted. However, cumulative impact of multiple wind farms in the region does need to be considered. - The species has a common abundance in Australia (Lindsey 1992). The total species population for wedge-tailed eagle was estimated to be approximately 98,000 individuals (Ferguson-Lees and Christie 2001). This was a conservative estimate based on a breeding range of nearly 7,000,000 km² and reported densities of 3-6 pairs / 100 km² and 7-21 pairs / 1000km². For the purposes of the risk assessment, the total population was estimated to be 98,000. If 5 birds annually were impacted, this would represent a moderate loss in numbers of individuals, leading to minor reduction in localised or regional population viability for between one and five years. - The moderate consequence was based on the conservative scenario of the loss of breeding adult wedge-tailed eagles. However, 5 adult birds impacted annually over the Project's lifetime (~150 birds) may be an overestimation, considering adult birds appear capable of identifying turbines as a risk and can avoid them and this assumes any birds lost to collision will be immediately replaced which is highly unlikely. The consequence is maintained at moderate, as it is likely that several breeding pairs occupy the project area and surrounds, therefore the loss of 5 breeding adults could result in a decline in breeding pairs.
Little Eagle <i>Hieraaetus morphnoides</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird, rounded up from the median estimated number of collisions per turbine annually (1-4 birds)	Unlikely As it is less probable than not that the risk event could occur in any year (<50%), according to its CRM (0.15; median estimated number of collisions per turbine annually)	Low	Negligible	- Little Eagles were the fourth most commonly detected raptor species and were observed in the RSA for approximately 60% of the recorded time. Predictions of flights at risk of colliding with turbines was relatively low at a median of 0.15 strikes per annum (95% CI: 0.00 – 0.69) or one bird every six years. A pair of Little Eagles was observed near a suitable nest and was therefore suspected of breeding. The Little Eagle has a sparse distribution but is regularly recorded throughout the region. In a similar way to Wedge-tailed Eagles, if juveniles were lost through collision, it would likely be within the natural attrition rate for the species. If, however, breeding adults were impacted, the losses would be more wide-reaching and replacement may take longer. - Monitoring of breeding and nesting activities will be important to understand whether the species is persisting following the commencement of operations. This issue is compounded considering the number of existing and proposed wind farm projects in the Northern Coastal Plain area. The risk to this species can be considered negligible due to irregular occurrence and predicted losses of one collision every six years or so.
Whistling Kite <i>Haliastur sphenurus</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird, rounded up from the median estimated number of collisions per turbine annually (1-2 birds)	Very unlikely As it is improbable that the risk event could occur in any year (<5%), according to its CRM (0.04; median estimated number of collisions per turbine annually)	Negligible	Negligible	- Whistling Kites were observed irregularly with only six encounters which are considered too few for robust CRM. Therefore, CRM results should be read in conjunction with the results from CLS. CRM predicted annual collisions of a median of 0.04 birds (95% CI: 0.00 – 0.66) or approximately one every 25 years, whereas CLS gave this species a collision risk score of 50 (possible). This species has higher densities than most other medium-sized raptors but seems to be relatively uncommon in the project area. This could be a result of annual variation. However, loss of breeding adults will carry higher consequences than losses of juveniles and breeding pairs should be targeted for monitoring if found. - The risk to this species can be considered negligible but there is some uncertainty regarding the output of the CRM due to the small sample size.
Collared Sparrowhawk <i>Tachyspiza cirrocephalus</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird	Unlikely (25)	Negligible	Negligible	- Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The species has a common abundance in Australia (Lindsey 1992). There are few indications of abundance but total breeding range probably covers approximately 6 million km² and appears to have a much lower density than the brown goshawk (Ferguson-Lees and Christie 2001). A total population in the upper tens of thousands is suggested. For the purposes of the risk assessment, the total population was estimated to be 75,000. If 1 bird annually was impacted, this would represent occasional individuals lost but no reduction in local or regional population viability.
Brown Goshawk <i>Tachyspiza fasciatus</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird	Possible (48)	Moderate	Moderate	- The Brown Goshawk and Collared Sparrowhawk were encountered on only two occasions each and use the landscape in a similar way. They are both seen regularly within heights typical of the RSA when transiting the landscape but hunt through or close to the top of vegetation. Brown Goshawks were recorded flying between 10 and 125 m (Shepherd and Bamford 2026a). This species was observed over same area near woodland from VP12. - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - Brown Goshawks are considered to be resident and to be breeding in the region. Since the species has low density across landscape, this may indicate higher vulnerability. Species such as the White-necked Heron, Australian White Ibis and Australian Pelican are present intermittently and in small numbers, and are much more abundant elsewhere, and the consequences of deaths would be different compared with for the Brown Goshawk, which may be represented by a few resident pairs in the region. If 1 bird annually was impacted, this may represent a moderate loss in numbers of individuals, leading to a reduction in localised or regional population viability between one and five years.
Swamp Harrier <i>Circus approximans</i>	Collision with wind farm infrastructure (unplanned event)	1 bird	Unlikely (24)	Low	Negligible	Swamp Harriers were observed across the south of the project area on four occasions through spring to autumn and the species is considered an irregular visitor. All encounters were of birds at 30 m or lower, but the species is regularly observed flying within RSA including at Guraga Lake. This species can be expected to transit throughout the

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Species name	Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
	Barotrauma (unplanned event)					project area on occasion and hunt by harrying at low level for invertebrates, reptiles, small birds and small mammals (Shepherd and Bamford 2026a). - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - Swamp Harrier is considered to be an irregular visitor to the project area (Shepherd and Bamford 2026a). The species was infrequently observed within the project area (four encounters over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling). If 1 bird annually was impacted, this may represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Spotted Harrier <i>Circus assimilis</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird	Unlikely (23)	Low	Negligible	- Spotted Harriers were observed only once in December 2024 and twice in November 2025 and the species is considered an irregular visitor. All encounters were at 50 m or below, but the species is known to soar at higher altitudes when transiting. They hunt in similar fashion to Swamp Harriers (Shepherd and Bamford 2026a). - Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - Swamp Harrier is considered to be a regular visitor to the project area (Shepherd and Bamford 2026a). The species was infrequently observed within the project area (three encounters over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling). If 1 bird annually was impacted, this may represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Black-shouldered Kite <i>Elanus axillaris</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird, rounded up from the median estimated number of collisions per turbine annually (1 bird)	Very unlikely It is improbable that the risk event could occur in any year (<5%), according to its CRM (0.02; median estimated number of collisions per turbine annually)	Low	Negligible	- Black-shouldered Kites are renowned for their highly varied densities following abundance of small mammal prey items (Marchant and Higgins 1989). Corresponding crashes in their abundance follow the collapse in the number of prey items. This appeared to be the case for this species in the project area in 2025/2026 with low numbers present. Encounters were few and the predicted loss of around a median of 0.02 birds per annum (95% CI: 0.00 – 0.09) is relatively low, equating to one collision about every 50 years. - During future irruptions of the species, this is likely to increase, but the consequences of higher collision rates when the population level is rising are low. The natural state of this species is of high population flux and high mortality/emigration.
Brown Falcon <i>Falco berigora</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird, rounded up from the median estimated number of collisions per turbine annually (1-3 birds)	Unlikely It is less probable than not that the risk event could occur in any year (<50%), according to its CRM (0.08; median estimated number of collisions per turbine annually)	Negligible	Negligible	- The Brown Falcon was the third most commonly-detected raptor in the project area, but its occurrence was sporadic and in low numbers compared with other areas in which BCE has been sampling (B. Shepherd pers. obs.). Predictions of annual mortalities are very low at a median of 0.08 birds (95% CI: 0.02-0.23) which equates to one collision every 12.5 years. - Some mortality over time is inevitable and while these may often be juvenile birds, there exists the possibility of members of breeding pairs being killed. This has implications for local persistence of the species. Note that the species is widespread at low to moderate densities, so recolonisation potential is likely to be high. The Brown Falcon is regularly found during carcass searches on wind farms in south-eastern Australia (Moloney et al, 2019), but the turbines are possibly lower, and bird densities may be higher than currently expected on Dinner Hill. The consequences on this species through collision with the wind turbines can be considered negligible.
Nankeen Kestrel <i>Falco cenchroides</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	2 birds, rounded up from the median estimated number of collisions per turbine annually (1-5 birds)	Very likely It is very probable that the risk event could occur in any year (>95%), according to its CRM (1.56; median estimated number of collisions per turbine annually)	Low	Negligible	- Nankeen Kestrels were observed within RSA for around 13% of the time (Shepherd and Bamford 2026) and were predicted to have a median loss of around a median of three birds every two years (95% CI: 0.57-4.13) due to rotor-strike. This is consistent with the expectation that Nankeen Kestrels are at higher risk than most other raptors from wind farms (Moloney et al. 2019), due in part to their relatively high density across the landscape, despite being at lower elevations for most of the time when compared with Wedge-tailed Eagles for example. - Some mortality is inevitable and while these may often be juvenile birds, there exists the possibility of members of breeding pairs being killed. This has implications for local persistence of the species. However, the species is widespread at moderate densities, so recolonisation potential is high. Therefore, the potential consequences on this species can be considered low.
Australian Hobby <i>Falco longipennis</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	2 birds (1-2 birds)	Unlikely (40)	Negligible	Negligible	- Other raptor species and some water birds were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed by Shepherd and Bamford (2026b). - The Australian Hobby can be expected to have a lower risk of rotor-strike than the Brown Falcon which is already very low. - The species has a common abundance in Australia, and its status is secure (no existing or foreseeable threat to continuance of the species) (Lindsey 1992). The species is widespread in Australia mainland, with sporadic breeding records in south-west Western Australia (BirdLife Australia 2023b). If 2 birds annually were impacted, this would represent occasional individuals lost but no reduction in local or regional population viability.
Little Corella/Western Corella <i>Cacatua</i> spp	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	100 birds (BirdLife Australia 2023m and 2023n). (1-500 birds 1-800 birds)	Possible (48)	Low	Low	These species were considered the most abundant taxa within the project area throughout all BBUS campaigns (Shepherd and Bamford 2026a). The BBUS had 52 encounters with Western Corella and 21 encounters with Little Corella. They were observed roosting in large flocks of up to 800 and foraging in paddocks. But were more often seen in smaller groups. Generally found around large trees on borders of paddocks. Frequently seen above 50 m and occasionally responds to disturbance by vortexing to height. A group of approximately 1,200 corellas were recorded near Control Site CVP02 to the south.

Species name	Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
						- Western Corella generally form flocks of up to 100 birds, and Little Corella are typically seen in small parties to flocks of several hundred (BirdLife Australia 2023m and 2023n). The corellas are overly abundant in the region and are regularly seen in flocks of several hundred to in excess of one thousand individuals. They are most abundant in urban and agricultural landscapes where they are considered a pest and competitive with other hollow nesting species including Carnaby’s cockatoo (Shepherd and Bamford 2026a). - Little Corellas are widespread in arid and semi-arid Australia, and the species occurs natural from northern Wheatbelt. (BirdLife Australia 2023m). The Western Corella population was estimated to be c. 3000 birds in 1985 (BirdLife Australia 2023n). The current total population for these species is not known. - If 100 birds of these species annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability. Considering flock sizes can range from several hundred to in excess of one thousand individuals for Little Corella. However, 100 birds impacted annually over the Project’s lifetime (~3,000 birds) may be an overestimation, considering this assumes any birds lost to collision will be immediately replaced which is highly unlikely, noting the species’ generation length is approximately 13 years and 16 years (BirdLife International 2026). As such, a low consequence was selected.
Galah <i>Eolophus roseicapilla</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	100 birds (Birdife Australia 2023c). (1-250 birds)	Possible (48)	Low	Low	- The Galah was recorded on all campaigns throughout in moderate numbers, in groups between 1 and 250 with larger groups near roosts or over native vegetation (Shepherd and Bamford 2026a). - The species has an abundant abundance in Australia, and its status is secure (no existing or foreseeable threat to continuance of the species) (Lindsey 1992). The species is widespread in the Wheatbelt (Birdife Australia 2023c). Flocks of 500-1,000 birds in the Wheatbelt are not uncommon, and the species is commonly seen in large flocks up to 1,000s, small groups and pairs. - If 100 birds annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability. Considering flock sizes can reach up to 1,000 birds. However, 100 birds impacted annually over the Project’s lifetime (~3,000 birds) may be an overestimation, considering this assumes any birds lost to collision will be immediately replaced which is highly unlikely, noting the species’ generation length is approximately 12 years (BirdLife International 2026). As such, a low consequence was selected.
Rainbow Bee-eater <i>Merops ornatus</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	3 birds (1-3 birds)	Unlikely (31)	Low	Negligible	- The Rainbow Bee-eater is a seasonal visitor to south-western WA where it breeds. It is present between October and February and will hawk for insects generally within 20 m of the ground. However, they have been observed flying in groups of up to 12 individuals during the BBUS at heights of up to 80 m when they were considered to be in transit between the north and south of Western Australia (Shepherd and Bamford 2026a). The species is possibly nesting in the project area and is considered a regular visitor. - The Rainbow Bee-eater is widespread in Australia and varying numbers are present in breeding areas from year to year (BirdLife Australia 2023o). If 3 birds annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
White-backed Swallow <i>Cheramoeca leucosterna</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	15 birds (1-15 birds)	Unlikely (34)	Moderate	Low	- White-backed Swallow is a regular visitor to the project area and was generally observed in low numbers but once in a flock of 15 birds (Shepherd and Bamford 2026a). White-backed Swallows, Tree Martins and woodswallows often aggregate over certain landscape features such as creek lines, breakaways, small stands of native vegetation and woodlands, likely in response to swarms of ant or termite alates or other insects. - The species has a sparse abundance in Australia, and its status is secure (no existing or foreseeable threat to continuance of the species) (Lindsey 1992). The species is widespread in southern Australia and is widespread in most regions of Western Australia (BirdLife Australia 2023f). The species is described as resident or seen throughout the year at various sites in Wheatbelt. - If 15 birds annually were impacted, this would represent a moderate loss in numbers of individuals in the region, considering the species has been recorded singly, in twos, or flocks of up to 20 birds (BirdLife Australia 2023f).
Tree Martin <i>Petrochelidon nigricans</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	30 birds (1-30 birds)	Unlikely (34)	Moderate	Low	- Tree Martin is a regular visitor to the project area and were seen regularly throughout and on most campaigns and over most terrains, in singles and loose flocks of up to 30 birds hawking up to 70m (Shepherd and Bamford 2026a). White-backed Swallows, Tree Martins and woodswallows often aggregate over certain landscape features such as creek lines, breakaways, small stands of native vegetation and woodlands, likely in response to swarms of ant or termite alates or other insects. - Tree Martins are widespread in Australia and in Western Australia (BirdLife Australia 2023p). They are often seen - If 30 birds were impacted, annually were impacted, this would represent a moderate loss in numbers of individuals in the region, considering the species has been recorded singly and in pairs, and during the non-breeding season, can be found in flocks of up to 20-30 birds or larger ones of hundreds, and occasionally flocks with over 1,000 birds (BirdLife Australia 2023p).
Ground Cuckoo-shrike <i>Coracina maxima</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	40 birds (1-40 birds)	Unlikely (31)	Moderate	Low	- Ground Cuckoo-shrike is considered to be an irregular visitor to the project area (Shepherd and Bamford 2026a). This bird is seldom seen this far west, and it is not known if this is a regular event or not, although Serenty and Whittell (1976) claim that this was an annual winter migration prior to broadscale clearing in the Wheatbelt. Several encounters with small flocks of Ground Cuckoo-shrikes were also recorded in June 2025 including a flight to 60 m. - The species is endemic to mainland Australia, and is usually seen in twos or small flocks, usually 3-6 birds (BirdLife Australia 2023q).

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Species name	Potential impact	Risk event	Likelihood of event	Consequence of event	Risk rating	Rationale (Shepherd and Bamford 2026b)
						The species was infrequently observed within the project area (four encounters over 15 BBUS campaigns, totalling 1,537.2 hours of formal bird sampling). If 40 birds annually were impacted, this would represent a moderate loss in numbers of individuals in the region, considering the species has been recorded in twos or small flocks (BirdLife Australia 2023q). However, 40 birds impacted annually over the Project's lifetime (~1,200 birds) may be an overestimation, considering this assumes any birds lost to collision will be immediately replaced which is highly unlikely, noting the species' generation length is approximately 4.4 years (BirdLife International 2026).
Australian Magpie <i>Gymnorhina tibicen</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	15 birds (1-15 birds)	Unlikely (32)	Low	Negligible	- The Australian Magpie was deemed likely to collide with wind turbines mostly through high numbers of carcasses found during monitoring on other wind farms. Australian Magpies are generally very abundant in the region and potentially have an elevated abundance across agricultural landscapes. Losses are unlikely to be ecologically impactful, and numbers will likely be replenished from surrounding areas. - The estimated population for the south-west Western Australian subspecies (<i>Gymnorhina tibicen dorasalis</i>) is 450,000–900,000 birds (BirdLife Australia 2023g). For the purposes of the risk assessment, the total population has been estimated to be at least 900,000. If 15 birds annually were impacted, this would represent a repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Magpie-lark <i>Grallina cyanoleuca</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	1 bird (1-7 birds)	Unlikely (37)	Low	Negligible	- Magpie-larks were seen throughout on most campaigns, mostly as individuals but in small groups of up to 15 and one flew to 60 m (Shepherd and Bamford 2026a). - The species has a common to abundant abundance in Australia, and its status is secure (no existing or foreseeable threat to continuance of the species) (Lindsey 1992). The species is widespread in Australia, with populations said to be increasing in the Wheatbelt region (Birdlife Australia 2023d). If 7 birds annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Australian Raven <i>Corvus coronoides</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	50 birds (1-50 birds)	Possible (48)	Low	Low	- The Australian Raven was present throughout and on all campaigns mostly as singles to small groups, but occasionally in groups between 10 and 60 birds, and regularly flies >50 m (Shepherd and Bamford 2026a). The raven favours large trees for roosting and breeding, and therefore can be expected to occur predominantly in or around isolated large trees, drainage lines, woodlands or plantations. - The species has a common abundance in Australia and its status is secure (no existing or foreseeable threat to continuance of the species) (Lindsey 1992). Populations have also increased and range expanded in Wheatbelt and elsewhere in southern Western Australia (Birdlife Australia 2023e). The species is commonly seen in twos, or in small family groups, often in large and mobile flocks which are usually less than 40 birds. - If 50 birds annually were impacted, this would represent a moderate loss in numbers of individuals in the region, considering the species is often recorded in twos or small flocks (BirdLife Australia 2023e). However, 50 birds impacted annually over the Project's lifetime (~1,500 birds) may be an overestimation, considering this assumes any birds lost to collision will be immediately replaced which is highly unlikely, noting the species' generation length is approximately 8 years (BirdLife International 2026). As such, a low consequence was selected.
White-striped Freetail Bat <i>Austronomus australis</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	10 bats. They roost either solitarily or in groups of up to 25, most commonly less than 10 (Churchill 2008). Maternity colonies can reach several hundred individuals while males and non-breeding females tend to roost alone or in smaller colonies (Baker and Gynther 2023)	Likely (71)	Low	Low	- The White-striped Freetail-Bat was detected frequently but with low call abundance during the BBUS and appears to have a sporadic presence through the year. The species is known to be an internal migrant in Australia and retreats to the lower south-west over summer. The Dinner Hill area may lie between its northern and southern haunts and could therefore be present at any time, but possibly with autumn and spring peaks in abundance during migration. Substantial numbers of deaths for this species are reported in south-eastern Australia (Moloney et al. 2019) although on wind farms with generally lower RSAs. While no losses can be estimated, mortality of perhaps ten or so individuals per year may be expected (based on mortality studies of moderate size wind farms elsewhere). Data from carcass searches on wind farms in the Badgingarra area are important to share and may provide better information. - The species is common in suitable habitat and habitat is common to sparsely scattered in suitable habitat with habitat limited in Australia (Baker and Gynther 2023). If 10 bats annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	- Collision with wind farm infrastructure (unplanned event) - Barotrauma (unplanned event)	10 bats. Colonies usually comprise up to 40 individuals, while some bats roost alone (Baker and Gynther 2023) Females form colonies of 8 to 40 bats in tree hollows, while males are usually solitary but can share roosts with other bat species (Churchill 2008).	Possible (57)	Low	Low	- Gould's Wattled Bat was detected during the BBUS and is considered one of the most abundant microbat species in Australia. The species is widespread throughout rural and urban landscapes (Churchill, 2008). It is frequently found during carcass searches in eastern states of Australia (T. Kelly pers. comm.). However, this has been below turbines that generally have lower RSA than current specifications. Data from carcass searches on wind farms in the Badgingarra area are important to share and may provide better information. Due to this species abundance and widespread range, some losses per annum can be sustainable. - The species is abundant in suitable habitat and habitat is abundant in Australia (Baker and Gynther 2023). If 10 bats annually were impacted, this would represent repeated loss of small numbers of individuals but no reduction in local or regional population viability.

7 MONITORING AND ADAPTIVE MANAGEMENT PROGRAM

The monitoring and adaptive management framework to achieve the project environmental outcomes (Section 6.1) for this project is illustrated in Figure 37 below and described in detail throughout Sections 7.1 to 7.5.

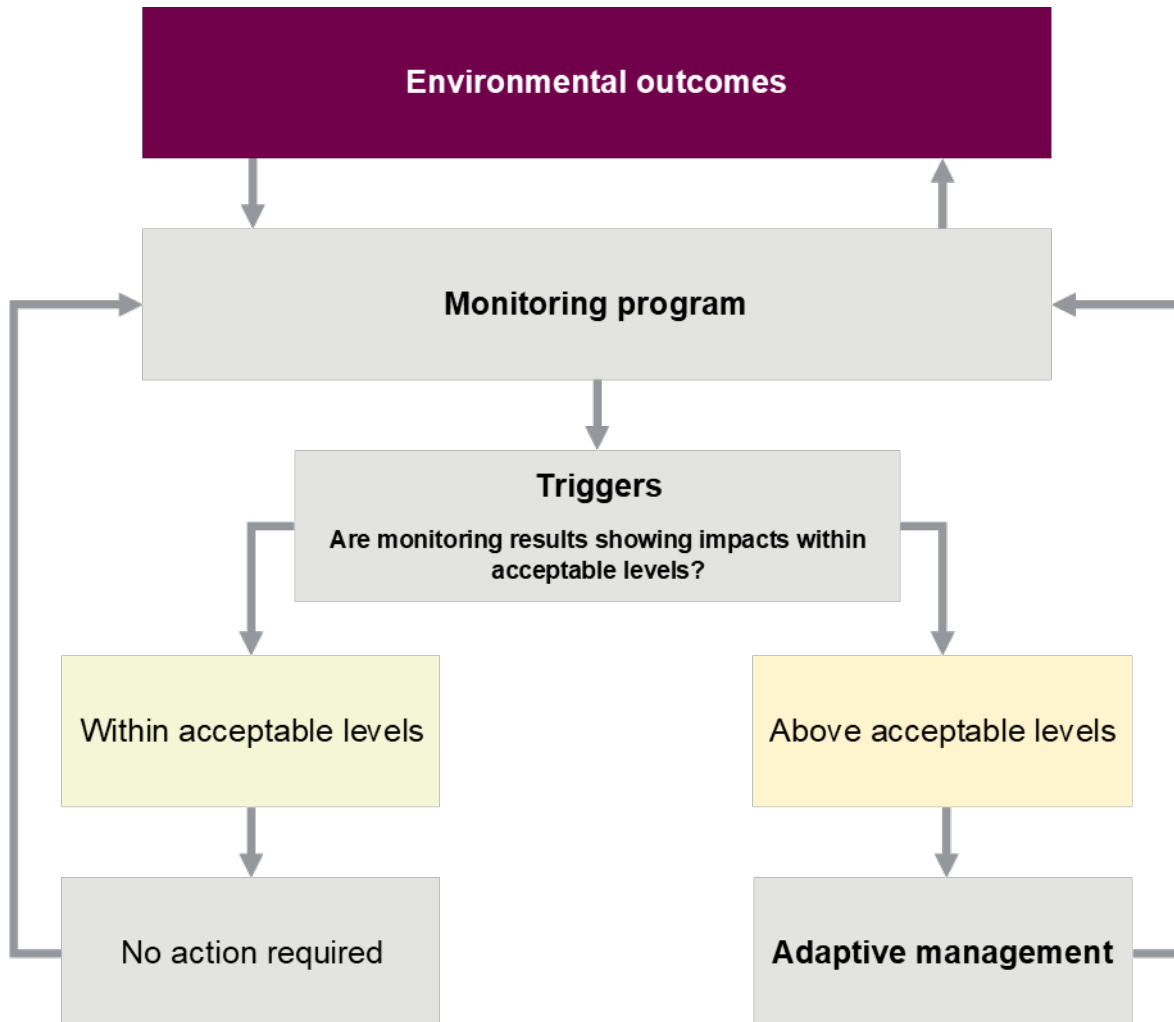


Figure 37: Monitoring and adaptive management framework

7.1 Environmental outcomes

The Environmental Management Plan Guidelines (DCCEEW 2024b) require the environmental outcomes for the Project to be defined and tailored to the key environmental issues. The PBBAMP's environmental outcomes have been informed by the risk assessment results (Section 6.2), take into consideration protection requirements, and are reflective of an acceptable level of impact for key species that are known to utilise the project area.

Taking a risk-based approach to focus on the species that have higher levels of protection and the species which returned a result of low or higher in the risk assessment (Section 6.2), the following species and groups of species have been identified:

- Carnaby's cockatoo
- Locally significant and / or common bird and bat species:
 - Raptors, including Wedge-tailed eagle and Brown Goshawk,
 - Waterbirds, including Australian White Ibis, Straw-necked Ibis, White-necked Heron, Australian Pelican, Banded Lapwing

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- Other birds, Little Corella/Western Corella, Galah, White-backed Swallow, Tree Martin, Ground Cuckoo-shrike, Australian Raven
- Bats, including White-striped Freetail Bat and Gould's Wattled Bat.

The following environmental outcomes will be achieved by the project:

1. **EO 1.** Fewer than 2 x Carnaby's cockatoos per year (or recognisable parts thereof) are found dead or injured within the Carcass Search Zone (260m from turbine) during any carcass search survey or incidentally by site personnel over a rolling three-year period.
2. **EO 2.** The Project will not result in unacceptable impacts to locally significant and / or common bird and bat species during the operational life of the Project of 30 years due to collisions with turbines. Where populations are known and reported by DBCA for the period concerned, the level of unacceptable impact on a locally significant and / or common bird and bat species is defined as when the number of annual collisions is likely to:
 - a. Lead to a greater than 50% reduction over a five year period in the local population (where known) that utilises the wind farm; AND
 - b. Act in an ongoing way to reduce the wider, regional population (where known) by more than 30% over a five year period; OR
 - c. Reduce the total species' population (where known) by more than 10% over a five year period.

An understanding of the local, regional and total population for a locally significant and / or common bird and bat species will be informed by the completed BBUS from 2024 to 2026 baseline dataset, advice from fauna specialists, advice from regulators, and / or scientific literature. This information will be included in the environmental referrals to state and commonwealth regulators. Identification of trends that indicate reductions in the local, regional and / or total species' population will be informed by the bird and bat monitoring program (Section 7.3), including long-term BBUS and carcass searches.

The Project will achieve these environmental outcomes by implementing a range of design features, mitigation and management measures to avoid or reduce environmental impacts to at or below acceptable levels.

7.2 Mitigation measures

The proposed mitigation measures for terrestrial fauna (including birds and bats) are as summarised in Table 28.

Table 28: Proposed mitigation measures for terrestrial fauna (including birds and bats)

Potential environmental impacts	Impact class	Mitigation hierarchy	Proposed mitigation measures	Residual impacts	Effectiveness of collision risk avoidance and mitigation (van Harten 2026)
Loss of terrestrial fauna habitat	Direct	Avoid	- The Project has been designed to avoid areas of high value fauna habitat, by maximising the use of existing disturbed or cleared areas (e.g. agricultural land and existing tracks or roads) where possible. The Project has undergone substantial redesign, resulting in avoidance of key ecological values. - Avoidance of direct impacts to fauna habitat within the Hill River Reserve through placement of transmission towers outside the reserve, with lines strung by helicopters to avoid direct impacts. If implemented, this will result in avoidance of an additional 0.34 ha of fauna habitat - The Development Footprint has been designed to avoid impacts to key ecological values, including: - All recorded black cockatoo breeding trees - All recorded black cockatoo roosting trees.	Residual impacts include: - Direct impacts to 19.09 ha to 21.92 ha of potential fauna habitat, including: - Up to 0.65 ha of potential black cockatoo foraging habitat of 'Moderate' to 'Moderate to high' value (0.2% of the overall extent of 'Moderate' to 'Moderate to high' value foraging habitat recorded within the survey area) - Up to 11.66 ha of potential habitat for the Western brush wallaby (1.3% of the habitat recorded within the survey area). - Loss of up to 140 potential black cockatoo breeding trees. Mitigation measures outlined in this report will ensure that no more than 21.92 ha of potential fauna habitat will be cleared. This comprises 0.71% of the native fauna habitat present within the survey area. Due to the large extents of potential fauna habitat retained within the Project Area, this impact is not considered significant.	Site selection – shown to be effective in limited number of studies, or effectiveness varies markedly between species and landscapes, for insectivorous bats and birds.
		Minimise	Construction The CEMP will be implemented to ensure impacts to fauna habitat is limited to the extents within the Development Footprint. Management measures to limit impacts outside the Development Footprint include: - Extent of authorised disturbance will be clearly defined and demarcated on appropriate plans. Movement of construction vehicles within vegetation outside this area will be limited to avoid accidental clearing or disturbance of surrounding vegetation - Establishment of clearly delineated access points to prevent unauthorised disturbance and access - Daily inspections to visually check / review clearing boundaries and compliance during clearing activities - Inspection to verify no degradation or disturbance beyond approved clearing boundary from erosion. Operation - During operation of the Project, vehicle access will be limited to designated roads and access tracks and the risk for damage to vegetation will be negligible. - Maintenance of vegetation under transmission lines will be undertaken in accordance with the protocols and management guidelines of the responsible party (e.g. Western Power). In addition to this, activities will be undertaken in accordance with the Code of Practice for Personnel Electrical Safety for Vegetation Control Work Near Live Powerlines.		
		Rehabilitate	Clearing is required to support permanent infrastructure, limiting the potential for rehabilitation. However, any temporary construction areas will be returned to pre construction land uses.		
		Offset	Environmental offsets will be considered (if required) based on the final ecological impacts and project design.		
Injury and / or mortality of terrestrial fauna (risk of collision with turbines is discussed separately)	Direct	Avoid	The risk for injury and / or mortality of fauna may not be completely avoided.	With the implementation of the CEMP, residual impacts to the injury or mortality of terrestrial fauna are unlikely to be significant.	-
		Minimise	Construction The CEMP will be implemented to ensure impacts to fauna during construction are minimised. Management measures to limit impacts include: - Vehicles, plant, and equipment to be restricted within dedicated construction areas within the Project Area. - The extent of authorised disturbance will be clearly defined and demarcated on appropriate plans. - Vegetation clearing will be undertaken progressively and towards retained vegetation - Vehicle speed limits will be implemented in accordance with the CEMP - Any trenches or excavations are left open over night during construction, fauna egress matting or ramps will be installed to allow fauna to escape - If native fauna is encountered during clearing works it should, initially, be allowed to make its own way from the construction area. However, if this is not possible or practicable, a qualified wildlife handler will be contacted to relocate it. Operation It is unlikely operation of the Project will significantly increase the potential for fauna strike with vehicles or machinery, given the existing agricultural uses within the Project Area. Vehicle speed limits during operation of the Project will be implemented.		
		Rehabilitate	Injured animals will be provided with first aid and handled on advice from the Wildcare Helpline.		
		Offset	Terrestrial fauna offsets are not considered applicable to this impact.		
Alteration of fauna behaviour	Indirect	Avoid	The risk for alteration of fauna behaviour may not be completely avoided.	The Project will be designed to comply with the Environmental Protection (Noise) Regulations 1997 and once operational, artificial lighting will be limited to safety or navigational lighting (if required). With the implementation of the CEMP, residual impacts to terrestrial fauna are unlikely to be significant.	-
		Minimise	Construction – noise and vibration A CEMP will be implemented to ensure impacts to fauna during construction is minimised. Management measures to limit impacts include: - Standard construction noise management measures - Vehicles, plant, and equipment to be restricted within dedicated construction areas within the Project Area. - Vegetation clearing and construction activities will be undertaken during daylight hours, reducing the risk for disturbing fauna species during peak activity times. Construction – Lighting		

Potential environmental impacts	Impact class	Mitigation hierarchy	Proposed mitigation measures	Residual impacts	Effectiveness of collision risk avoidance and mitigation (van Harten 2026)
			Vegetation clearing and construction activities will be undertaken during daylight hours, reducing the need for lighting. Any lighting during construction will be designed and managed in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023). If lighting is required, the following measures will be implemented: • Use adaptive light controls to manage light timing, intensity and colour • Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill • Use the lowest intensity lighting appropriate for the task • Use lights with reduced or filtered blue, violet and ultra-violet wavelengths • Lighting will be directed to light specified areas of the construction footprint. Operation - noise and vibration It is unlikely operation of the Project will significantly impact fauna behaviour, given the existing agricultural uses within the Project Area. Operation - lighting • The requirement for lighting will be confirmed by CASA and any resulting impacts addressed in environmental referrals. Lighting will only be added for specific purposes (e.g. navigation and safety) and where possible will be designed and managed in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023). • Avoiding the placement of turbines within 1km of known breeding or roosting habitat, on advice from BCE. BCE advised that Carnaby's cockatoo had been observed nesting in areas of high disturbance such as near carparks, busy roads and in a chimney and that the species appear to tolerate disturbances.		
			Rehabilitate	There is no opportunity to rehabilitate this impact.	-
			Offset	Terrestrial fauna offsets are not considered applicable to this impact.	-
Indirect loss or impact to terrestrial fauna habitat from habitat degradation	Indirect	Avoid	There is no opportunity to avoid the movement of construction vehicles within the area, as such the risk for the spread and introduction of weed species cannot be completely avoided.	With the implementation of standard hygiene management practices outlined in the CEMP, residual impacts to potential fauna habitat through indirect loss or impact from habitat degradation during construction are unlikely to be significant.	-
		Minimise	Construction Construction management and monitoring measures to minimise impacts to potential fauna habitat from the spread or introduction of weeds and / or pathogens are detailed in the CEMP, and will include: • Weekly inspections during clearing and construction activities • Inspections to verify no degradation or disturbance has occurred beyond the Development Footprint • Appropriate hygiene measures to minimise the risk of the spread and introduction of weed species or pathogens, including: – Weekly spot checks of mobile equipment and vehicles – Implementation of the weed management protocol (if required) outlined in the CEMP. • Stockpile management, including stockpile locations (within the Development Footprint), erosion and stabilisation techniques and height limits • Designated areas for the temporary placement of cleared vegetation (within the Development Footprint) to minimise the increased risk of weed and disease spread and bushfire • The contractor will supply weed free certificates prior to mobilising machinery. Construction management measures to minimise impacts to potential fauna habitat from erosion will be detailed in the CEMP and include: • Installation of temporary fencing, inclusive of sediment controls, along the interface between remnant vegetation and the construction area to minimise localised erosion • Establishment of clearly delineated access points to prevent unauthorised disturbance and access which may exacerbate erosion • Daily inspections and photographic records during clearing and construction activities • Inspections to verify no degradation or disturbance has occurred beyond the development envelope. Operation Operational management measures to minimise impacts to fauna habitat will include: • Vehicle access is controlled to designated roads and access • If observations / incidents of vehicle related impacts on flora and vegetation are reported, then further contingency actions will be implemented. These include additional staff education and installation of barrier fencing (if required).		-
			Rehabilitate		-
			Offset		-
Accidental clearing	Indirect	Avoid	The risk for accidental vegetation clearing may not be completely avoided.	With the implementation of the CEMP, residual impacts to potential fauna habitat	-
		Minimise	Construction Construction management and monitoring measures to minimise impacts to potential fauna habitat will be detailed in the CEMP, and will include:		-

Potential environmental impacts	Impact class	Mitigation hierarchy	Proposed mitigation measures	Residual impacts	Effectiveness of collision risk avoidance and mitigation (van Harten 2026)
			- Extent of authorised disturbance will be clearly defined and demarcated on appropriate plans. Movement of construction vehicles within vegetation outside this area will be limited to avoid accidental clearing or disturbance of surrounding vegetation - Establishment of clearly delineated access points to prevent unauthorised disturbance and access - Installation of temporary fencing, inclusive of sediment controls, along the interface between remnant vegetation extents and the construction works area to restrict machinery access to be within the approved disturbance area - Daily inspections to visually check / review clearing boundaries and compliance during clearing activities - Inspection to verify no degradation or disturbance beyond approved clearing boundary from erosion. Operation - During operation of the Project, vehicle access will be limited to designated roads and access tracks and the risk for damage to vegetation will be negligible. - Maintenance of vegetation under transmission lines will be undertaken in accordance with the protocols and management guidelines of the responsible party (e.g. Western Power). In addition to this, activities will be undertaken in accordance with the Code of Practice for Personnel Electrical Safety for Vegetation Control Work Near Live Powerlines.	resulting from accidental clearing are unlikely to be significant. The assessment of the significance of this residual impact will be undertaken as part of environmental referrals once the project layout is defined.	
			Rehabilitate Any accidental clearing will be rehabilitated.		
			Offset Terrestrial fauna offsets are not considered applicable to this impact.		
Fire	Indirect	Avoid	The risk for fire cannot be fully avoided.	With the implementation of the management measures outlined in the CEMP and BMP, residual impacts to terrestrial fauna habitat resulting from fire are unlikely to be significant. The assessment of the significance of this residual impact will be undertaken as part of environmental referrals once the project layout is defined.	-
		Minimise	Construction A CEMP will be implemented to ensure indirect impacts to native vegetation comprising potential fauna habitat during construction are minimised. Measures relating to construction will include: - No fires will be deliberately lit within the Project Area. Vegetation cleared during construction activities will not be burnt - All vehicles equipped with fire extinguishers - The under carriage and radiators of site plant and vehicles will be free from vegetation, with regular checks undertaken - Emergency channels (including but not limited to Shire notifications and EmergencyWA) will be monitored for warnings such as but not limited to vehicle movement bans and bushfires - If a vehicle movement ban is in place, clearing and construction activities will cease until the ban is lifted. Operation The risk for operation of the Project to result in fire is low. This risk will be further mitigated through implementation of a Bushfire Management Plan.		
		Rehabilitate	There is no opportunity to rehabilitate the areas directly impacted by construction of the Project.		
		Offset	Environmental offsets are not applicable to this impact.		
Injury or death of fauna due to turbine collision.	Direct	Avoid	This risk cannot be fully avoided for Carnaby's cockatoos, non conservation significant bird species or bat species. However, placement of the Project Area and associated infrastructure away from migratory bird habitat has avoided impacts to these species, as BCE did not record migratory bird species flying through the Project Area.	Implementation of the proposed mitigation measures will minimise impacts to bird and bat species from turbine collision.	Site selection – shown to be effective in limited number of studies, or effectiveness varies markedly between species and landscapes, for insectivorous bats and birds.
		Minimise	Construction This impact is not applicable to the construction phase and mitigation measures are not proposed. Operation The potential risk of injury or mortality to birds and bats from turbine collision will be minimised through implementation of the following measures: - Adoption of a minimum turbine blade ground clearance of 60 m AGL to minimise the risk of collision with bird species as summarised below: - Flight heights for the majority of Carnaby's cockatoo were low, with 99.96% of observations estimated to be at or below 30 m. With the exception of two birds observed flying at an estimated 60 m for a very brief period, all other observations were estimated at 50 m or below. This brief flight was not timed. However, has been given an estimate of 10 seconds, in which case the proportion of flights below 60 m would be 99.997% of all record time and 99.9999% of all bird time. The CLS concluded that the risk of collision was unlikely 71% of flight records for the Peregrine falcon were estimated to be at or below 50m, outside of the proposed RSA. The CLS concluded that the risk of collision was unlikely - Nankeen kestrels spent more than 87% of flight time at or below 50 m, outside the proposed RSA. Nankeen Kestrels were predicted to have a loss of around a median of three birds every two years (95% CI: 0.57-4.13) due to rotor-strike - Flight data for Wedge-tailed shows that 68.6% of the recording time birds were between 50 and 250 m high. When adjusted for bird numbers, this rose to 71.2%. Flights for this species were frequently within the RSA. CRM analysis predicts that the number of collisions involving Wedge-tailed eagles is around a median of four to five birds per annum (95% CI: 2.16 – 10.27 birds)		

Potential environmental impacts	Impact class	Mitigation hierarchy	Proposed mitigation measures	Residual impacts	Effectiveness of collision risk avoidance and mitigation (van Harten 2026)
Barotrauma	Direct		– Approximately 66.2% of flight time of the Brown falcon was at or below 50 m AGL. When adjusting for group size or “bird time”, this changed slightly to 68.9% of observations below 50 m AGL. Predictions of annual mortalities for the Brown falcon are very low at a median of 0.08 birds (95% CI: 0.02-0.23) which equates to one collision every 12.5 years. • Avoiding the placement of turbines within 1km of known black cockatoo breeding or roosting habitat, on advice from BCE. Implementation of these buffers will minimise the risk of injury of breeding birds, as well as minimising any disturbance or change in behaviour during operation • The BBAMP will be implemented to minimise and mitigate the potential impacts of turbine strike on birds and bats through trigger based, adaptive management measures. • Carcass searches will be undertaken in accordance with the BBAMP • A carrion removal program will be implemented to minimise the attraction of scavenging fauna should any turbine collision with a bird or bat occur • Lighting will be managed in accordance with this report to minimise the risk for bird or bat species to be attracted to insects around the lighting.	Implementation of the proposed mitigation measures will minimise impacts to bat species from barotrauma.	varies markedly between species and landscapes, for insectivorous bats and nocturnal or night migrating birds. • Habitat management – shown to be effective in limited number of studies, or effectiveness varies markedly between species and landscapes, to reduce attraction by land birds to turbine site.
		Rehabilitate	There is no opportunity to rehabilitate this impact.		-
		Offset	Environmental offsets are not applicable to this impact.		-
		Avoid	This risk cannot be fully avoided. However, no conservation significant bat species would be impacted by the Project based on data gathered to date from the first year of survey data from the BBUS.		-
		Minimise	Construction This impact is not applicable to the construction phase and mitigation measures are not proposed. Operation The potential risk of injury or mortality to bats from barotrauma will be minimised through implementation of the following measures: • The Preliminary BBAMP will be implemented to minimise and mitigate the potential impacts of turbine strike on birds and bats through trigger based, adaptive management measures. • Lighting will be managed in accordance with this report to minimise the risk for bat species to be attracted to insects around the lighting.		Modifying aviation and maritime lighting – shown to be effective in limited number of studies, or effectiveness varies markedly between species and landscapes, for insectivorous bats and nocturnal or night migrating birds.
		Rehabilitate	There is no opportunity to rehabilitate this impact.		-
Fragmentation of fauna habitat	Indirect	Offset	Environmental offsets are not applicable to this impact.	Based on the mitigation proposed, increase in fragmentation of fauna habitat is unlikely to be significant.	-
		Avoid	Avoidance of impacts to vegetation in excellent condition along the Hill River to the north of the Project Area was avoided. Engineering design will ensure direct impacts to native vegetation within the Hill River Reserve is avoided where possible.		-
		Minimise	Construction All temporary construction infrastructure will be located within areas of existing disturbance or cleared land, reducing the clearing footprint. A CEMP will be implemented delineating the areas proposed for temporary construction infrastructure and lay down areas. Operation Impacts to vegetation during operation is limited to the trimming of vegetation to maintain clearance beneath transmission lines. As this activity ensures vegetation remains in situ, it will not result in the fragmentation of fauna habitat which would impact the movement of fauna.		-
		Rehabilitate	Any accidental clearing will be rehabilitated.		-
		Offset	Environmental offsets will be considered (if required) based on the final ecological impacts and project design.		-

7.3 Bird and bat monitoring program

Monitoring during the operational phase will focus on the species identified in Section 7.1. This will provide targeted information within the adaptive management framework for addressing any bird and bat impacts from the wind farm operations and informing the need for additional mitigations specific to those species to ensure that the environmental outcomes will be achieved.

The monitoring program comprise two main elements:

- Long-term BBUS; and
- Carcass searches for bird and bat species.

The long-term BBUS will provide a post-construction comparison against the baseline data to inform an understanding of potential impacts (e.g., habitat displacement, reductions in local population) that may have occurred due to wind farm operations. The carcass searches will specifically seek to record collision impacts to birds and bats arising from wind farm operations. Both survey approaches are described in the following sections.

7.3.1 Long-term BBUS

To support long-term adaptive management and enhance understanding of bird and bat species behaviour in relation to the Project, BBUS during the operation phase is proposed. The BBUS will be undertaken to detect potential changes to Carnaby's cockatoos and locally significant and / or common bird and bat species (e.g., wedge-tailed eagle) utilisation of the Project Area and its surrounds. Potential changes to species utilisation of the Project Area and its surrounds could involve a decrease in the number of Carnaby's cockatoos during when peak group numbers are expected, decreasing trend in diversity of bird assemblage, or changes to presence, abundance and/or breeding success of breeding pairs of bird species.

The completed BBUS from 2024 to 2026 would be used as a baseline dataset so that before-after-control-impact (BACI) analysis can be conducted during construction and operation of the wind farm to identify whether any changes occur that may be attributed to disturbance or losses. The BBUS will be undertaken during the first five years of operation. The proposed timing of campaigns for the BBUS is outlined in this BBAMP, however the exact frequency of campaigns per year and length of individual campaigns would be guided by the expertise of the fauna specialist developing the BBUS survey plan.

The long-term site utilisation surveys are proposed to schedule in multiple field campaigns over a five-year period to capture details in flight patterns and site utilisation of Carnaby's cockatoos and locally significant and / or common bird and bat species (e.g., wedge-tailed eagle).

During Years 1 and 2, the BBUS campaigns will be scheduled to capture flight patterns of Carnaby's cockatoo during each of their major life stages (Shepherd and Bamford 2026a) (Table 29)

While doing this, seasonality for all other bird species can also be captured. It is expected that the campaigns will be timed to facilitate monitoring of breeding pairs of Wedge-tailed Eagles and Brown Falcons will be addressed in the BBUS. The Brown Falcon's breeding season in the south is June to November (Australian Museum 2025a), and the Wedge-tailed Eagles' breeding timing can vary from year to year and from location to location according to the local availability of food (Australian Museum 2025b). Research undertaken in Lorna Glenn on the breeding of the Wedge-tailed Eagle recorded breeding in October (iNSiGHT Ornithology 2012). This, combined with the likely increased abundance of food sources in spring, makes it likely that the Wedge-tailed Eagle most commonly breeds in spring.

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Table 29: Key ecological windows

Ecological window for species	January	February	March	April	May	June	July	August	September	October	November	December
Carnaby's cockatoo late winter/autumn roosting												
Carnaby's cockatoo dispersion from roost sites to nesting sites												
Carnaby's cockatoo nesting												
Carnaby's cockatoo dispersion from nest sites to autumn roosts												
Carnaby's cockatoo autumn peak roosting												
Carnaby's cockatoo winter roosting												
Wedge-tailed Eagle breeding												
Brown Falcon breeding												

During Years 3 to 5, the BBUS campaign frequency will be determined based on a review of the Years 1 and 2 results, including observed timing of observed presence and associated statistical analysis. The BBUS will be discontinued at end of Year 5 unless there is compelling scientific evidence that significant impacts are occurring, mitigation measures are implemented as a result and an additional BBUS program is required to assess the effectiveness of the mitigation measures.

The completed BBUS were designed to be compliant with a before-after-control-impact (BACI) approach and established control sites to sample background trends. The BBUS methodology will be aligned with the methodology employed for the completed BBUS (i.e. the same VP locations; similar monitoring durations) implemented by Shepherd and Bamford (2026a). It is noted that the breeding migration of Carnaby's cockatoo is influenced by local resource availability driven by the onset of rainfall, therefore the biannual migration flight periods may vary subject to available resources.

Shepherd and Bamford (2026a) recommended that the BBUS should address these key aspects:

- Ongoing observations on movements of Carnaby's cockatoo to document how they interact with the operating wind farm.
- Monitor breeding pairs of Carnaby's cockatoos to determine if any change in breeding distribution or success occurs as a result of wind farm construction and operation.
- Use of existing bird census data as a baseline for bird censusing to document any effect upon other birds.
- Monitoring of breeding pairs of Wedge-tailed Eagles and Brown Falcons (possibly Little Eagle if a nest or nests can be found) to determine if any change occurs in their presence, abundance and/or breeding success.

7.3.2 Carcass searches

Carcass searches will be performed at the wind turbines as a basis for an estimate of overall bird and bat mortality rates due to the Project. The results of the carcass search monitoring will be used to estimate the annual number of birds and bats that collide fatally with the wind turbines and to inform the need for adaptive management response through additional mitigations to reduce those impacts and ensure that the environmental outcomes are achieved. The need for an adaptive management response will depend on the species impacted and the level of impact.

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Mortality is defined as any dead bird or bat detected under a wind turbine and within a distance from the wind turbines in which carcasses could potentially fall if struck. Detection can be either during the formal carcass search surveys, designed to generate an estimate in accordance with a statistically rigorous sampling design, or at other times by incidental observation, often by site personnel. A protocol is triggered whenever a carcass is found, either within the formal carcass search surveys or incidentally to collect consistent and useful data on the fatality event.

Collision by birds and bats with wind turbines will be monitored through a statistically rigorous carcass-search program for a minimum period of five years. This is intended to ensure that statistically useable and robust results are generated from the carcass monitoring program that include an estimate of both bird and bat mortality rates, together with an estimate of sampling precision.

It will be assumed that any intact dead bird or bat, or feather spot, detected beneath a turbine has died because of collision or interaction with a turbine, unless there are obvious signs of another cause of death (e.g. being shot, territory dispute).

Where there are under five feathers within a square metre, it cannot be safely interpreted as a collision, as they could have been lost by a bird during preening, moulting, or fighting (Barrientos et al. 2012). Feather spots will be assumed to be remains of a bird carcass after scavenging and the scavenger correction factor will not be applied to them.

To derive accurate mortality rates, it is essential that the program is scientifically and statistically robust. A few factors, such as carcass scavenging and carcass detectability, can affect mortality rate estimates and must be measured and included in any estimate of overall mortality rates.

A scavenged carcass may reduce a mortality rate estimate so carcass persistence will be estimated from Project Area specific experimental trials (Section 7.3.2.1.5). Human detectability of carcasses is also a potential source of error as some carcasses can be missed by a detection dog and handler or ecologist searcher. Protocols have been developed to control for this factor in the final mortality estimates (Section 7.3.2.1.6).

The practical considerations that have informed the design of the carcass search program and associated trials are listed below.

- Very few carcasses are found under wind turbines in Australia compared with northern hemisphere wind farms.
- Carcasses of a suitable range of sizes for scavenger and detectability trials are difficult to source and usually involve a combination of carcasses found under turbines and those found along roads and other legal sources. It is illegal to source un-cleaned carcasses from poultry producers.
- For statistical reasons, it is likely to be very difficult to determine more than the grossest of differences in scavenging rate or detectability across the year and there is no evidence in the literature for significant differences between seasons in scavenger activity. Therefore, annual scavenger and detectability correction factors will be generated and applied.
- It is known that detectability will be easier in short grass at the dry time of the year compared with in longer grass at the wet time of the year, and detectability trials have been scheduled for both seasons.

Similar methods have been recommended in several other approved bird and bat monitoring programs in Australia. Implementation of bird and bat monitoring programs in Western Australia is still developing, and the techniques described here are based on the number of programs already implemented, knowledge of experimental design and statistical analysis, and recent feedback from the regulatory authorities.

Carcass search surveys are proposed to be carried out for the first five years of operation. After five years, a detailed report will be prepared reviewing the mortality detection program and providing recommendations for the future in response to confirmed issues.

The following sections outline:

- Stratification and turbine selection (Section 7.3.2.1.1): how the wind turbines will be selected for a search.
- Search area and survey frequency (Section 7.3.2.1.2): the size of area beneath turbines to be searched and how often this area will be systematically searched.
- Search method (Section 7.3.2.1.3): how the search area will be systematically searched.

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- Data collection and carcass detection protocol (Section 7.3.2.1.4): how the data is collected, and results recorded.
- Carcass persistence trials (Section 7.3.2.1.5): definition of carcass persistence and scavenging and how experimental trials will be conducted.
- Detectability trials (Section 7.3.2.1.6): definition of detectability and the experimental trial methodology.
- Incidental bird and bat carcass find protocol (Section 7.3.2.2): outlining the procedure to be adopted in the event of an incidental carcass or feather spot find by site personnel outside the formal carcass search surveys.
- Injured bird and bat find protocol (Section 7.3.2.3): outlining the procedure to be adopted in the event of an incidental injured bird or bat find by site personnel.
- Analysis of results and mortality estimation (Section 7.3.2.4): outlining how the data will be analysed to gain estimates of bird and bat mortality.

7.3.2.1 Turbine carcass search methods

7.3.2.1.1 Stratification and turbine selection

The Project comprises 131 WTGs across the Project Area (Figure 1). Majority of the turbines and their surrounding area (at a 260 m radius) are situated within cleared land, while the remaining turbines are situated within cleared land and native and / or planted vegetation. The turbine layout that the BBAMP will apply to will be as per the layout to be approved by Council prior to the commencement of construction.

It is proposed that at least 50% of wind turbines be searched (e.g., 66 turbines) for Years 1 and 2 of operation, on a monthly basis. This is consistent with the approach used in other PBBAMPs for Kojonup Wind Farm and Yathroo Wind Farm, where the adequacy of the PBBAMPs were assessed by the EPA under its decision to not assess the proposals with advice given (EPA 2026a and 2026b). For Years 3 to 5, survey frequency of carcass searches will be determined based on a review of the Years 1 and 2 results, including consideration of relevant operations, outcomes of the carcass persistence trials and associated statistical analysis.

Wind turbine locations will be selected randomly by those undertaking the carcass searches, based on a 'stratified random' sampling design:

- Each turbine within a stratum (e.g., cleared, cleared with vegetation) has an equal chance of being selected for the searches
- Once the turbines have been selected, the selection will not change.

The results from each stratum will be analysed separately to establish if there are differences in estimated mortality between them. They will then be combined for a whole-of-wind-farm mortality estimate using appropriate statistical methods for stratified estimates with constant selection probabilities within strata.

Information specific to each turbine that is searched for carcasses will be recorded in the carcass search data sheet (Appendix B). All wind turbine locations are presented in Figure 1.

7.3.2.1.2 Search area and survey frequency

The final carcass search area engaged for the carcass search program will be determined based on the confirmation of final specifications of the Project's turbines and the method employed for carcass searches.

A circular search area around the wind turbines with a radius of 260 m was determined from the combined length of the hub height (168 m) and the blade length (92 m) (this is based on the largest expected turbine size for the Project). This was based on International Finance Corporation's (IFC 2023) Good Practice Handbook and Decision Support Tool for Post-construction bird and bat fatality monitoring for onshore wind energy facilities in emerging market countries, which recommended this approach as bigger turbines will generally cause bird and bat carcasses to fall over a wider and more dispersed area.

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Search transect width within the search areas around the turbines will depend on the visibility of the search area (e.g., low visibility due to vegetated parts would require shorter transect widths). This will be determined based on the randomly selected turbines to be searched and the expected visibility within a 260 m radius. Optimum spacing of transects generally ranges from 4 - 20 m and should be determined based on the size class of the bird and bat target species and density of vegetation within the search area (IFC 2023).

The survey frequency of the carcass searches at each turbine will be monthly, following the commencement of operation of the wind turbines and subsequently for the first five years of operation of the Project. This will involve searches over approximately 11 consecutive days per month, as it is currently unknown how quickly carcasses will be scavenged. This assumes a rate of 6 turbines subject to carcass searches per day, however this will depend on the search method and the size of the search team. The frequency of carcass search surveys may be reduced in Years 3 to 5, if the findings of the Years 1 and 2 carcass search surveys and / or carcass persistence trials indicate that it would be necessary or appropriate.

It is assumed that the randomly selected search areas will be accessible and searchable.

7.3.2.1.3 Search method

The monthly carcass search surveys will be undertaken by suitable scent-detection dogs and trained handlers as the default if they are available and if the climatic conditions of the Project Area are suitable for detection dogs to work safely and effectively. Detection dogs have been used to improve bird and bat strike mortality estimates at wind farms and have been shown to be more accurate than humans in detecting bird and bat carcasses (Homan et al. 2001, Arnett 2006, Paula et al. 2011, Mathews et al. 2013, Smallwood et al. 2020, and Domínguez del Valle et al. 2020).

The detection dog and handler will cover the carcass search zones along paths spaced at approximately 20–30 m from each other depending on wind speed. The spacing arrangement would be subject to advice from the handler during each carcass search survey. The detection dog will be fitted with a GPS to track their movements and coverage for each survey. The handler will be experienced in identification of bird and bat species carcasses that may be found within the Project Area and understand the data collection and carcass detection protocol outlined in Section 7.3.2.1.4. The detectability of detection dogs will be assessed as detailed in Section 7.3.2.1.6.

If detection dogs and handlers are not available, the monthly carcass search surveys will be undertaken by qualified ecologists. The ecologist will cover the carcass search zones along transects. The ecologist will use a handheld GPS device to track their movements and coverage for each survey. The ecologist will be experienced in identification of bird and bat species carcasses that may be found within the Project Area and understand the data collection and carcass detection protocol outlined in Section 7.3.2.1.4. The detectability of suitably qualified personnel will be assessed as detailed in Section 7.3.2.1.6.

7.3.2.1.4 Data collection and carcass detection protocol

Data will be collected and recorded by the ecologist during the monthly carcass search surveys and carcass persistence trials using the data sheets, the carcass search survey data sheet (Appendix B), the dead or injured bird or bat data sheet (Appendix C) and the carcass persistence trial data sheet (Appendix D).

The carcass search survey data sheet (Appendix B) will be completed by the ecologist for each of the carcass search surveys. This will include weather information and basic survey information and particularly identify the extent of any variable ground substrates and any unsearchable areas, as this will have implications on accurate carcass discovery.

The dead or injured bird or bat data sheet (Appendix C) will be completed by the ecologist if a bird or bat carcass or feather spot is found during the carcass search surveys. The carcass or feather spot must be collected, photographed, and stored if a carcass and its location recorded using a GPS. The carcass will be handled according to a standard procedure:

- The carcass will be removed from the site to avoid re-counting
- The carcass will be handled by personnel wearing rubber gloves, packed into a plastic bag, wrapped in newspaper and put into a second plastic bag

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- The carcass will be clearly labelled to include a copy of the carcass search survey data sheet (Appendix B) to ensure that its origin can be traced later, if required
- The carcass will be collected and disposed of as soon as possible.

The dog handlers or ecologists will hold any DBCA licences required to undertake the carcass search surveys.

In cases where the carcass or feather spot cannot be identified by the ecologist, the following process will be undertaken:

- Photos of the carcass or feather spot will be analysed by the lead ecologist to definitively identify the find
- Feathers collection of the will also be undertaken to assist with subsequent species identification
- Methods to further identify the carcass or feather spot will involve sending the photos, feathers or carcass to a species specialist or museum. Sending the carcass or feathers for DNA testing may be undertaken if there is a strong indication that the find could potentially result in an impact trigger for migratory, threatened or specially protected species, on advice from the ecologist.

The reporting requirements for the carcass search surveys are detailed in Section 8.2.

In undertaking these works, the ecologist will take due consideration of the potential presence of high pathogenicity avian influenza (HPAI) before handling bird carcasses and include protocols compliant with the accepted practices for sampling and biosecurity in wildlife as required (Department of Agriculture, Fisheries and Forestry 2026).

7.3.2.1.5 Carcass persistence trials

It is important to ascertain the rate at which carcasses persist in the environment before being removed by scavengers. This can be used to develop a 'correction factor' that informs the estimate of wind farm impacts on birds and bats. Scavengers can include ground-based animals, such as foxes and rats (more likely to detect carcasses by scent), as well as aerial scavengers such as birds of prey and ravens (more likely to detect them visually). The carcass persistence trial is designed to ascertain the scavenging rate, usually expressed as average carcass duration.

An intact carcass will be defined as a carcass that does not appear to have been scavenged by a vertebrate scavenger. A partially eaten carcass will be any skeletal or flesh remains found. Feather and fur spots will be defined by their presence and the absence of any other remains. Intact or partial carcasses and feather/fur spots will all be recorded as a 'find'. However, the carcass persistence correction factor will not be applied to fur and feather spots as these are most likely to represent the remains of carcasses after they have been scavenged.

Carcass persistence trials will be undertaken by the ecologist twice for the first year of operational phase monitoring. The objective of having two trials is to account for different vegetation conditions, so one will be held when the grass is long and one when the grass is short. The two periods for carcass persistence trials are shown in Table 30.

Table 30: Timing for carcass persistence trials for turbines

Vegetation condition	Likely time period	Weather	Stocking
Short grass	Winter (June)	Cool weather	Heavy stock levels within paddocks
Long grass	Late spring (November)	Following rain and higher temperatures	Light stock levels within paddocks

Carcass persistence trials will be undertaken by the ecologist to determine the probability of scavenging loss, and the nature of scavenger removal (e.g. an early peak in scavenging or scavenging that peaks after carcasses have been in place for a period of time). The search area for carcass persistence trials will be the same as in the carcass search survey protocol and will be located under operating turbines, selected based on the methodology outlined in Sections 7.3.2.1.1 and 7.3.2.1.2.

To determine potentially different scavenging rates on birds, three size categories of carcass will be used. Different scavengers are active at different times of day, and this will be accounted for by placing carcasses out during the early morning and late afternoon. This will reduce the potential for

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bias in the search intervals. Based on current mortality estimation software requirements, every endeavour will be made to find ten carcasses of each size category (Table 31). Improvements on this method would require an impractical and unlikely availability of required carcass numbers, and do not lead to a commensurate improvement in the statistical power of estimates.

Table 31: Number of replicates for each carcass persistence trial for turbines

Time	Small birds	Medium sized birds	Large birds (large raptor size)	Total
Early morning	5	5	5	15
Late afternoon	5	5	5	15

The trials will be conducted at the same randomly selected turbine sites used for carcass search surveys (Section 7.3.2.1.1). The first five carcasses of each category (15 carcasses in total) will be randomly placed under different turbines in the morning (i.e. one carcass per turbine). In the afternoon, the 15 carcasses will be checked, then each of the carcasses will be checked twice daily for the first three days, then daily for two days, then every 48 hours for the following four days and then every three days until they disappear or at the end of 30 days (Table 32).

Table 32: Carcass persistence trial search timetable for turbines

Time	Day 1	Day 2	Day 3	Day 4	Day 5	Day 7	Day 9	Day 12	Day 15	Day 18	Day 21	Day 24	Day 27	Day 30
Early morning														
Late afternoon														
Anytime														

The timing of searches is based on experience and regulatory approval at several other wind farms where carcass persistence trials have been undertaken that show almost all carcasses have been scavenged within five to ten days. More frequent monitoring than that proposed will not significantly affect consideration of scavenging and its impact on mortality estimates.

Additional procedures for carcass persistence trials are:

- A mix of small and medium to very large bird carcasses (if available) will be obtained for use in the carcass persistence trial. Where carcasses of the species of concern cannot be found, a similar-sized and coloured substitute will be used to reduce bias by visual predators.
- Latex gloves will be always worn while handling carcasses to minimise contact with human scent, which may alter predator responses around carrion and to minimise disease risk to the handler.
- At each trial site, one carcass will be placed randomly within the 130 m search area, depending on the search protocol for that turbine. Carcasses will be thrown in the air and allowed to land on the ground to simulate at least some of the fall and allow for ruffling of fur or feathers.
- Carcasses used in the trial will have their coordinates recorded to ensure that they are not confused with an actual fatality found under a turbine during the trial searches.
- Notes will be taken on evidence remaining at sites where carcasses have been scavenged (e.g. scavenger scats, bones, feathers, animal parts and type of scavenging, if visible, such as tearing, pecking, complete removal of carcass, partial removal of carcass, bird or mammal predator evidence).
- Notes will be taken by the ecologist on the state of remaining carcasses in each search.

Undertaking two carcass persistence trials at seasonally different times is designed to account for occasional winter/spring increase in carrion use by some scavenger species. Previous studies have found that red foxes are reliant on rabbits and carrion in agricultural and forested areas (Brunner et al. 1975, Catling 1988, Molsher et al. 2000). Feral cats show little but uniform use of carrion throughout the year, whereas fox prey type is dependent on availability (Catling 1988). Catling (1988) found that foxes ate more carrion in winter/ spring compared with summer/autumn, when they fed on adult rabbits. However, Molsher et al. (2000) found that there was no overall significant difference between seasons for carrion use. Seasonal differences only occurred in other prey types (not carrion), such as lambs, invertebrates, and reptiles, as these are only available at certain times of the year.

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Introduced European red fox and feral cats were also confirmed present throughout the project area and are known to prey upon native fauna including birds and bats (Shepherd and Bamford 2026a).

Carcass persistence trials for large raptors will only be conducted once per year due to lack of availability of suitable carcasses for a technically sound trial. Experience from other wind farms indicates a low level of scavenging of these carcasses and a high level of detectability that is consistent across the year.

The number of carcasses per animal and size category is based on obtaining a reasonable level of statistical confidence in the estimate of average carcass duration, as reflected in software requirements for current mortality estimation processes, whilst seeking to minimise the number of carcasses used, as they can be difficult to source. Large numbers of carcasses (e.g. on-site, roadkill) are difficult to obtain, and it may be very complicated to find alternative sources (e.g. farmed and culled animals). It is also possible that large numbers of carcasses, more size categories and more replicates may attract more scavengers to the area. Previous studies (Molsher et al. 2000) have shown that fox prey use is related to availability and therefore more foxes may be attracted to the area if more carcasses are used, thereby biasing the resulting correction factor. In addition, raptors are potentially more susceptible to collision when preying on carrion beneath turbines. However, it is necessary to conduct these trials under turbines as some scavengers may alter their behaviour in response to the turbines.

The final carcass persistence trial design is therefore a necessary compromise between high numbers of trials and practicality whilst ensuring a statistically valid trial design without altering either the behaviour of scavengers or birds that may collide with turbines.

The reporting requirements for the carcass persistence trials are detailed in Section 8.1.

7.3.2.1.5.1 Alternative approach

An alternative approach to the method used above is to use motion sensor cameras that monitor for scavenger activity. This approach has advantages as opposed to using human observers, including lower survey effort and the ability to determine the exact time of carcass removal. A camera would be attached to a star picket, approximately 1 m high and placed in the ground approximately 4 m away from the carcass. The camera would record any activity by scavengers over the 30-day period. This alternative approach collects precise time and method of scavenging, thereby reducing uncertainties with the carcass persistence trials results analysis. The camera locations under operating turbines will be selected based on the methodology outlined in Sections 7.3.2.1.1 and 7.3.2.1.2.

7.3.2.1.6 Detectability trials

Detectability and carcass persistence trials will be undertaken by the ecologist concurrently, as this approach is more time efficient and cost effective.

Detectability trials will be undertaken to assess the probability that a detection dog and handler or ecologist will detect an existing carcass, given the carcass detection protocol for monthly carcass search surveys in Section 7.3.2.1.4. As humans are reliant on visual cues to determine carcass location, the two visibility categories of low and high grass cover will be compared. The detection dog and handler team would rely on scent and visual cues, as such both visibility categories will be suitable.

To account for variability in detecting carcasses, only the personnel (i.e. detection dog and handler or ecologist) who have carried out monthly searches at the Project Area will be involved in the detectability trials. Detection efficiency (per centage of carcasses detected) will then be incorporated into later analyses that derive mortality estimates. The number of carcasses to be employed in each trial is detailed in Table 33.

The carcass controller (a person not involved in monthly carcass searches who can act consistent with this method) will throw each carcass into the air and allow it to land on the ground to simulate at least some of the fall and the potential ruffling of fur and feathers. The carcass controller will note the placement of carcasses (via GPS) and is free to decide how many are deployed under each turbine, however all bats should be located within the inner carcass search zone (a 130 m radius within the larger 260 m radius).

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Table 33: Number of replicates per season for detectability trials, given two factors of size and visibility for turbines

Time	Small birds	Medium sized birds	Large birds (large raptor size)
Short grass	Five	Five	Five
Long grass / vegetated	Five	Five	Five

Analysis indicates that there is a large confidence interval on the estimate of searcher efficiency, even for a high number of trials (plus or minus ten per cent even with 50 replicates). This means that only relatively large seasonal changes in detection (~20–30% or more) will be resolvable from normal background variation. Sampling will be undertaken during the two periods that represent the greatest change in vegetation cover (therefore visibility), using a number of carcasses that is logistically manageable and aligned with the number and timing of scavenger trials. Statistical confidence analysis indicates that this will result in a reasonably precise detectability estimate after one year, and optimal precision after two.

If sufficient carcasses cannot be obtained, then stuffed, realistic-looking artificial substitutes may be used. If detection dogs and handlers are not utilised, it is noted that humans are entirely visual searchers so it would not be essential to use real carcasses as long as the substitutes appear similar once on the ground. Additionally, the artificial substitutes will not attract scavengers and should not increase the likelihood of raptor collisions and the number of introduced predators on site. As these trials can be undertaken separately from scavenger trials, artificial substitutes may be ideal (i.e. mice substitute for bats).

The reporting requirements for the detectability trials are detailed in Section 8.1.

7.3.2.2 Incidental bird and bat carcass find protocol

Site personnel may find carcasses within the Project Area during normal operational and maintenance activities. An incidental bird and bat carcass find protocol will be implemented across the Project, including both the wind farm and transmission line components. Should a bird or bat carcass be identified, the carcass will be handled according to the carcass detection protocol outlined in Section 7.3.2.1.4. Any incidental find will be reported by either the operations and maintenance contractor environment representative to the environmental compliance lead to allow for any relevant notification and reporting timeframes (Section 8.2).

All site personnel will be made aware of the carcass detection protocol and injured bird and bat protocol as part of their Health, Safety and Environment training and site induction, with records kept of personnel completing the site induction. A dead or injured bird or bat data sheet (Appendix C) will be completed for each incidental carcass found by the operations and maintenance contractor environment representative.

7.3.2.3 Injured bird and bat find protocol

Site personnel may find injured birds or bats within the Project Area during normal operational and maintenance activities, and as such will be advised of the correct procedure for assisting injured wildlife (i.e. birds). Site personnel who find injured wildlife will be required to report the find to the operations and maintenance contractor environment representative.

The operations and maintenance contractor environment representative will arrange as soon as possible (within 72 hours after taking possession of the animal) for the animal to be returned to the place it was originally taken if it is capable of fending for itself, or to place the animal immediately into a dark place (e.g. box or cloth bag, if safe to do so) for transfer to the nearest DBCA wildlife officer, veterinary surgeon or a person who is authorised under a licence to rehabilitate fauna (i.e. holder of a Fauna possessing (other purposes) licence) (DBCA 2019).

Contact details of local veterinary staff and wildlife carers are provided below to ensure that if injured wildlife is found and cannot readily be released back to the wild, they are treated accordingly and in a timely manner:

- Wheatbelt Vet Services Jurien Bay (08) 9652 1973 (<https://www.localvet.com.au/Wheatbelt-Veterinary-Service/JurienBay.aspx>)
- Moora Veterinary Service (08) 9651 1420 (<https://www.acountrypracticevet.com.au/contact-us/moora-veterinary-service/>)

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- Wildcare Helpline (08) 9474 9055 (<https://www.dbca.wa.gov.au/wildlife-and-ecosystems/animals/wildcare-helpline>)
- FAWNA 0438 526 660 (<https://www.fawna.com.au/emergency/>).

Site personnel are prohibited from touching or handling any live bats (injured or otherwise). A qualified and appropriately vaccinated ecologist or wildlife carer must be called to handle any bats. Only persons vaccinated against Australian bat lyssavirus may handle live bats.

If site personnel see dead or sick birds showing signs of H5 bird flu, they should (Department of Primary Industries and Regional Development 2026):

- Avoid contact and keep your distance.
- Record the date, time, location and take photos.
- Report it to the 24-hour Emergency Animal Disease Hotline on 1800 675 888.

Within 24 hours of taking possession of a species listed as migratory, threatened or specially protected under the BC Act, written notice must be given to the CEO of DBCA by completing the Injured or Abandoned Fauna Notification form at <https://www.dbca.wa.gov.au/licences-and-permits/fauna> and emailing it to wildlife.protection@dbca.wa.gov.au (DBCA 2019).

This injured bird and bat protocol is valid for the operational life of the Project.

7.3.2.4 Analysis of results and mortality estimation

The results of the carcass search surveys will be analysed to provide information on:

- The species, number, age, and sex (if possible) of birds and bats being struck by the turbines
- Any variation in the number of bird and bat strikes.

The results will be detailed in the annual report and will provide a basis for identifying if further detailed investigations or mitigation measures are required (Section 8.2).

Statistically robust projections of bird and bat mortality for the entire Project Area will be presented, based on the data collected from carcass search surveys. It is acknowledged that this is a current and dynamic aspect of research and that the outcomes from such programs may be equally dynamic. The current program is designed to provide an acceptably accurate and precise estimate of wind farm related bird and bat mortality within two years (Years 1 and 2), so a full analysis and estimate will be provided in the second annual report, together with recommendations on the survey frequency for Years 3 to 5.

All data will be analysed to provide the average estimated mortality of birds and bats, their standard error (variability) and ranges for the Project Area. The mortality rate of each species (if estimates of individual species are possible) and size class detected will be calculated after two years of data (Years 1 and 2) have been collected. If possible, the standard error and range of these estimates will be reported. Note that it may not be possible practically to provide this due to the likely small number of carcasses detected. Where this is an issue, it will be reported. Mortality estimates will also take into consideration the actual operational time of the turbines (obtained from the Project operator).

The estimated mortality rate will be generated by modelling the scavenger losses and results of the human detectability trials and using sampling inference to account for the selection and stratification of turbines. The data from the scavenger and detectability trials will be analysed using relevant techniques based on Generalised Linear Modelling (GLM) and (censored) Survival Analysis. Censored measurements are only partially known, such as the exact time of mortality or the exact time to scavenger loss (see, for example, Kaplan and Meier 1958). In addition to providing mortality estimates, this analysis will determine if any of the factors (i.e. size class or habitat stratification of turbines) are significant, where possible.

7.3.3 Survey schedule

An overview of the survey schedule for the different survey components of the bird and bat monitoring program is provided in Table 34.

Table 34: Survey schedule³

Survey	Timing	Duration
Long-term BBUS	Years 1 and 2: During Years 1 and 2, the BBUS campaigns will be scheduled to capture flight patterns of Carnaby's cockatoo during each of their major life stages (Shepherd and Bamford 2026a): • Late winter/autumn roosting – August and September • Dispersion from roost sites to nesting sites September • Nesting – September to early December • Dispersion from nest sites to autumn roosts – December to March • Autumn peak roosting to coincide with Great Cocky Count 2025 – March and April • Winter roosting – May to July Years 3 to 5: Timing and frequency of surveys to be determined based on a review of the Years 1 and 2 results, including observed timing of observed presence and associated statistical analysis	Up to five years if required
Carcass search surveys	Years 1 and 2: Monthly (over 2 – 3 consecutive days per month). Years 3 to 5: Timing and frequency of carcass search surveys to be determined based on a review of the Years 1 and 2 results, including the findings of carcass persistence and detectability trials.	Up to five years if required
Carcass persistence trials	During winter (likely June) and late spring (likely November).	One year
Detectability trials	During winter (likely June) and late spring (likely November).	One year
Incidental bird and bat finds	Conducted opportunistically through the operational life of the Project.	Operational life of the Project.

7.4 Adaptive management approach

The Project has been informed by a rigorous suite of ecological surveys undertaken over an extended period and in accordance with the relevant Western Australian guidelines, including a two-year BBUS. On the basis of these investigations, the potential impacts of the Project on ecological values are considered to be minimal for a project of this scale (RPS 2026c). Predicted residual impacts and risks to birds and bats from the Project following the application of a range of built in avoidance and minimisation measures, are predicted to be manageable. As this is a prediction process however, low levels of residual uncertainty about potential collision risk remain. A program of monitoring during Project operations will be used to inform the potential need for adaptive management to reduce impacts back to acceptable levels if monitoring results demonstrate that it is necessary. An adaptive management approach is consistent with the principles of ecologically sustainable development, outlined in Section 3A of the EPBC Act, and allows projects to move forward in the face of uncertainty by using field data to learn and improve during the implementation of the project.

The need for adaptive management and potential inclusion of new or different mitigation measures will be reviewed if quantified impact trigger levels, specific to the species of interest, are reached or breached during the monitoring program.

Options for adaptive management will vary depending on the species that is affected. For example, acoustic and/or visual deterrents may only work for some species of birds. In all cases, the priority will be to explore options for mitigation or management measures that can reduce the likelihood of

³ Note: Where timing is presented as indicative based on seasonal fluctuations, it is the responsibility of the ecologist to determine the ideal weather conditions to allow for optimal timing to undertake the relevant trials.

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collisions if detected at unacceptable levels, however consideration will also be given to technological readiness of specific mitigation, cost and complexity of implementation and minimising negative impacts to energy production.

Mitigation involves the prevention, avoidance and/or reduction of the likelihood of a risk occurring or continuing to occur or a reduction in the consequence after it has occurred. Specific impact trigger levels are defined in Section 7.4 as a quantified threshold at which an investigation and/or management response appropriate to the species that is potentially affected is implemented.

The overall objective of the adaptive management approach and mitigation measures (where necessary) is to ensure that the operation of the Project does not lead to significant impacts on conservation significant or common birds and bats and that the environmental outcomes are achieved.

Any future novel or new mitigation measures that are identified to be of potential benefit for birds and bats at the Project may be considered by the Proponent as part of the adaptive management framework established in this PBBAMP.

7.4.1 Collision risk

This section identifies the circumstances that will result in notification, further investigation and additional mitigation in the event that monitoring results identify unacceptable impacts to both conservation significant, locally significant and common bird and bat species from collisions with wind turbines. The need to take additional actions to further reduce risk will be actioned if a quantified impact trigger level is reached. Impact trigger levels have been set at a level below a significant impact to ensure that the Project environmental outcomes are achieved.

7.4.1.1 Carnaby's cockatoo

7.4.1.1.1 Definition of impact trigger threshold, impact trigger levels and level of unacceptable impact

The impact trigger threshold, impact trigger levels and level of unacceptable impact for Carnaby's cockatoo are defined in Table 35.

Table 35: Impact trigger threshold, impact trigger levels and level of unacceptable impact for Carnaby's cockatoo

Species of concern	Impact trigger threshold	Impact trigger levels	Rationale for impact trigger threshold, impact trigger levels and level of unacceptable impact
Carnaby's cockatoo	1 x Carnaby's cockatoos per year (or recognisable parts thereof) are found dead or injured within the Carcass Search Zone (260m from turbine) during any carcass search survey or incidentally by site personnel.	Impact trigger level #1: The impact trigger threshold is met once. Impact trigger level #2: The impact trigger threshold is met or exceeded five times over a rolling ten year period or has been met or exceeded ten times annually from the commencement of operation.	- The 'high' and 'severe' consequence outcomes for Carnaby's cockatoos (Table 24) reflect a level of unacceptable impact to the species. These consequence outcomes are prefaced on impacts to 0.1% of the total population (~34,000 cockatoos) over the 30-year operational life of the wind farm. - A reduction of the total species population by more than 0.1% over the entire operational life of the Project would be 34 Carnaby's cockatoos. The 0.1% represents an ecologically significant proportion of the population of a migratory species⁴ (Department of the Environment 2015). - Dividing this number of birds by the number of years in the operational life returns 1.13 birds per year. As such, the number was rounded down as a conservative approach for the impact trigger threshold for Carnaby's cockatoos. The value was rounded down to one individual per year based on feedback received by the DBCA on calculating an appropriate trigger threshold for Carnaby's cockatoo from its total population. - If the impact trigger threshold is met once (impact trigger level #1), this will provide the Proponent with an early warning prior to the impact trigger level #2 being reached. As such, adaptive management measures can be implemented promptly, and further investigation can be undertaken to understand the likely cause of the dead or injured Carnaby's cockatoo individual and its implications. - If the impact trigger threshold (one individual per year) is exceeded five times over a rolling ten year period or has been met or exceeded ten times annually from the commencement of operation, there is an increased risk that the level of unacceptable impact (0.1% of the total population) may be approached over the operational life of the wind farm. At this point an immediate response outcome and impact trigger review is justified (Table 36) to ensure impacts remain within acceptable limits.

⁴ Carnaby's cockatoo is not a migratory species, however it is reasonable to apply 0.1% to assess potential impacts and risks to an ecologically significant proportion of a protected species' population

7.4.1.1.2 Adaptive management framework and reporting

The framework for using and reporting the impact trigger levels outlined in Table 35 to inform an adaptive management response is detailed in Table 36.

Table 36: Adaptive management framework and reporting for Carnaby’s cockatoo

Impact trigger level	Adaptive management response	Reporting
Impact trigger level #1: The impact trigger threshold is met once.	If the impact trigger level #1 is reached: - The occurrence will be reported immediately to the environmental compliance lead, who will report it to DBCA and DCCEEW within two business days of it being recorded. - Complete a carcass search survey at all Project wind turbines within 2 km of the confirmed black-cockatoo carcass, featherspot, or injured individual detection. - Immediate investigation (within 30 business days) will be completed by a suitably qualified ecologist to determine the cause of death or injury. - If the suitably qualified ecologist deems the cause of death or injury is due to turbine collision, the investigation will: - Identify any particular risk behaviours that could have led to the collision; - Evaluate the likelihood of further occurrences for each turbine. - If the suitably qualified ecologist’s investigation concludes that meeting the impact trigger level was a one-off event or that the ongoing risk is unlikely to be significant at a population scale, no further mitigation will be necessary. However, if deemed significant, or unlikely to be a one off event, the following will be implemented: - Increase monthly carcass monitoring frequency within the Carcass Search Zone (260m from turbine) affected to fortnightly for an initial period of six weeks. If additional carcasses are found, continue monitoring on a fortnightly basis for another six weeks, or if no carcasses are recorded, return to monthly monitoring. - The next Annual Compliance Report following exceedance of impact trigger level #1 will: - Outline the findings of the suitably qualified ecologist’s investigation; - Include recommendations as to the need for adaptive management mitigation measures to ensure the risk to Carnaby’s cockatoos remains within acceptable levels over the life of the wind farm.	- Notification to DBCA and DCCEEW within two business days. - Annual Compliance Reporting to state and Commonwealth regulators in accordance with future environment approvals (e.g., DCCEEW, DBCA).
Impact trigger level #2: The impact trigger threshold is met or exceeded five times over a rolling ten year period or has been met or exceeded ten times annually from the commencement of operation.	If impact trigger level #2 is reached: - The occurrence will be reported immediately to the environmental compliance lead, who will report it to DBCA and DCCEEW within two business days of it being recorded. - Complete a carcass search survey at all Project wind turbines within 2 km of the confirmed black-cockatoo carcass, featherspot, or injured individual detection. - Undertake a review of existing mitigation and management measures to determine their adequacy. Should mitigation measures be determined to be inadequate, undertake a 12 month trial inclusive of: - Implementation of adaptive management mitigation measures at the turbine or turbines subject to the elevated risk profile. Relevant adaptive management measures mitigation measures may include (but are not limited to) those listed in Table 38 or Section 7.5.1. - Increase monthly carcass monitoring frequency to fortnightly for an initial period of six months. If additional carcasses are not found during this period, return to monthly monitoring - All subsequent Annual Compliance Reports following exceedance of impact trigger level #2 will: - Outline ongoing implementation of any adaptive management or other mitigation measures as outlined in the impact trigger review; - Detail the need for any supplementary adaptive management mitigation measures to ensure the risk to Carnaby’s cockatoos remains within acceptable levels over the life of the wind farm; and - Detail any further exceedances of the impact trigger threshold.	- Notification to DBCA and DCCEEW within two business days. - Annual Compliance Reporting to state and Commonwealth regulators in accordance with future environment approvals (e.g., DCCEEW, DBCA).

7.4.1.2 Locally significant and / or common bird and bat species

7.4.1.2.1 Definition of impact trigger levels and level of unacceptable impact

The impact trigger levels and level of unacceptable impact for locally significant and / or common bird and bat species are defined in Table 37.

Impact trigger levels were developed to address the locally significant and / or common bird and bat species, specifically the species assessed being at high, moderate and low risk of being affected by collisions with wind turbines. These species are listed below:

- Locally significant and / or common bird species:
 - Australian White Ibis
 - Straw-necked Ibis
 - White-necked Heron
 - Australian Pelican
 - Banded Lapwing
 - Wedge-tailed Eagle
 - Brown Goshawk
 - Little Corella/Western Corella
 - Galah
 - White-backed Swallow
 - Tree Martin
 - Ground Cuckoo-shrike
 - Australian Raven
- Locally significant and common bat species:
 - White-striped Freetail Bat
 - Gould's Wattled Bat.

Monitoring data collected over the first five years of operation will be important in verifying the suitability of the impact trigger levels for the locally significant and / or common bird and bat species.

Table 37: Impact trigger levels and level of unacceptable impact for locally significant and / or common bird and bat species

Locally significant and / or common bird and bat species		Rationale for impact trigger levels and level of unacceptable impact
Wedge-tailed Eagle	A total of 4 or more juvenile Wedge-tailed Eagle carcasses, or parts thereof, found within the Carcass Search Zone (260m from turbine) at the same turbine during two successive carcass search surveys. A total of 2 or more adult Wedge-tailed Eagle carcasses, or parts thereof, found within the Carcass Search Zone (260m from turbine) at the same turbine during two successive carcass search surveys.	- Where populations are known and reported by DBCA for the period concerned, the level of unacceptable impact on a common bird or bat species is defined as when the number of annual collisions is likely to: - Lead to a greater than 50% reduction over a five year period in the local population (where known) that utilises the wind farm; AND - Act in an ongoing way to reduce the wider, regional population (where known) by more than 30% over a five year period; OR - Reduce the total species' population (where known) by more than 10% over a five year period. - The level of unacceptable impact for a common bird or bat species is where there is likely to be a significant impact at a relevant population scale. As the risk assessment identified the Wedge-tailed Eagle as having a risk rating of High, species-specific impact trigger levels were developed. - Different impact trigger levels were assigned for juvenile and adult Wedge-tailed Eagles. As juvenile eagles appear most at risk from collision (T. Kelly pers. comm.), but juvenile mortality is naturally high and small losses of 4-5 juvenile birds per annum from rotor-strike may be sustainable and unlikely to impact population viability (Shepherd and Bamford 2026b). The median estimated number of collisions per turbine annually for Wedge-tailed Eagles was 4.41. - For adults, the impact trigger level was set at 2 individuals. This was selected as it represented 50% of the median estimated number of collisions per turbine annually (4.41; Shepherd and Bamford 2026b). And 2 adults could represent the loss of up to 2 breeding pairs of Wedge-tailed Eagles, particularly as the species is monogamous and apparently mate for life (Australian Museum 2025b). Noting that if one bird of the pair is killed, the survivor will find a new mate. - For juveniles, the impact trigger level was set at 4 individuals. This was selected as it was the lower range of the small losses of 4-5 juvenile birds per annum from rotor-strike that may be sustainable (Shepherd and Bamford 2026b).
Brown Goshawk	A total of 2 or more Brown Goshawk carcasses, or parts thereof, found within the Carcass Search Zone (260m from turbine) at the same turbine during two successive carcass search surveys.	- Where populations are known and reported by DBCA for the period concerned, the level of unacceptable impact on a common bird or bat species is defined as when the number of annual collisions is likely to: - Lead to a greater than 50% reduction over a five year period in the local population (where known) that utilises the wind farm; AND - Act in an ongoing way to reduce the wider, regional population (where known) by more than 30% over a five year period; OR - Reduce the total species' population (where known) by more than 10% over a five year period. - The level of unacceptable impact for a common bird or bat species is where there is likely to be a significant impact at a relevant population scale. As the risk assessment identified the Brown Goshawk as having a risk rating of Moderate, a species-specific impact trigger level was developed. - The impact trigger level was set at 2 individuals. This was selected as the species may be represented by a few resident pairs in the region (Shepherd and Bamford 2026b) and the loss of up to 2 birds could represent the loss of up to 2 breeding pairs.
Locally significant and / or common bird and bat species, including: - Australian White Ibis - Straw-necked Ibis - White-necked Heron - Australian Pelican - Banded Lapwing - Little Corella / Western Corella - Galah - White-backed Swallow - Tree Martin - Ground Cuckoo-shrike - Australian Raven - Southern freetail bat - White-striped freetail bat.	A total of 5 or more locally significant and / or common bird carcasses, or parts thereof, of the same species found within the Carcass Search Zone (260m from turbine) at the same turbine during two successive carcass search surveys. A total of 5 or more locally significant and / or common bat carcasses or parts thereof, of the same species found within the Carcass Search Zone (260m from turbine) at the same turbine during two successive carcass search surveys.	- Where populations are known and reported by DBCA for the period concerned, the level of unacceptable impact on a common bird or bat species is defined as when the number of annual collisions is likely to: - Lead to a greater than 50% reduction over a five year period in the local population (where known) that utilises the wind farm; AND - Act in an ongoing way to reduce the wider, regional population (where known) by more than 30% over a five year period; OR - Reduce the total species' population (where known) by more than 10% over a five year period. - The level of unacceptable impact for a common bird or bat species is where there is likely to be a significant impact at a relevant population scale. - Of these locally significant and / or common bird species, they had a risk rating of Low, the species are well represented in the region and populations are stable. As such, they will be addressed under one impact trigger level. - The impact trigger level was set at 5 individuals of locally significant and / or common bird species. This was selected as it represented 75% of the median estimated number of collisions per turbine annually for Straw-necked Ibis (6.55; Shepherd and Bamford 2026b). The Straw-necked Ibis was selected as a representative species, as it had the highest likelihood rating (very likely), it is a regular visitor to the Project Area, and it was subject to a CRM analysis. - The impact trigger level for locally significant and / or common bat species (Southern freetail bat, White-striped freetail bat) was set at a total of 5 or more, as outlined below: - There was limited information available on the total, regional or local populations of the two bat species. In the absence of population information, a conservative approach was taken to align the impact trigger level with estimated mortality rates (per turbine per year) for white-striped freetail bat at two wind farms in Victoria. This species was found to have the highest annual mortality rate of any native species of bird or bat at both wind farms (Moloney et al 2019), although on wind farms with generally lower RSAs (Shepherd and Bamford 2026b). - While no losses can be estimated, mortality of perhaps ten or so individuals per year may be expected (based on mortality studies of moderate size wind farms elsewhere) (Shepherd and Bamford 2026ab). As a conservative approach to set the level to 50% of the estimated annual mortality of 10 bats, the impact trigger level was set at a total of 5 or more locally significant and / or common bat carcasses. - If an impact trigger level is exceeded, the adaptive management framework for locally significant and / or common bird and bat species will involve an evaluation of relevant population scale impacts on species, and the likelihood of an unacceptable impact at a relevant population scale.

7.4.1.2.2 Adaptive management framework and reporting

The process for considering monitoring results and using an impact trigger level to inform an adaptive management response for locally significant and / or common bird and bat species is illustrated in Figure 38.

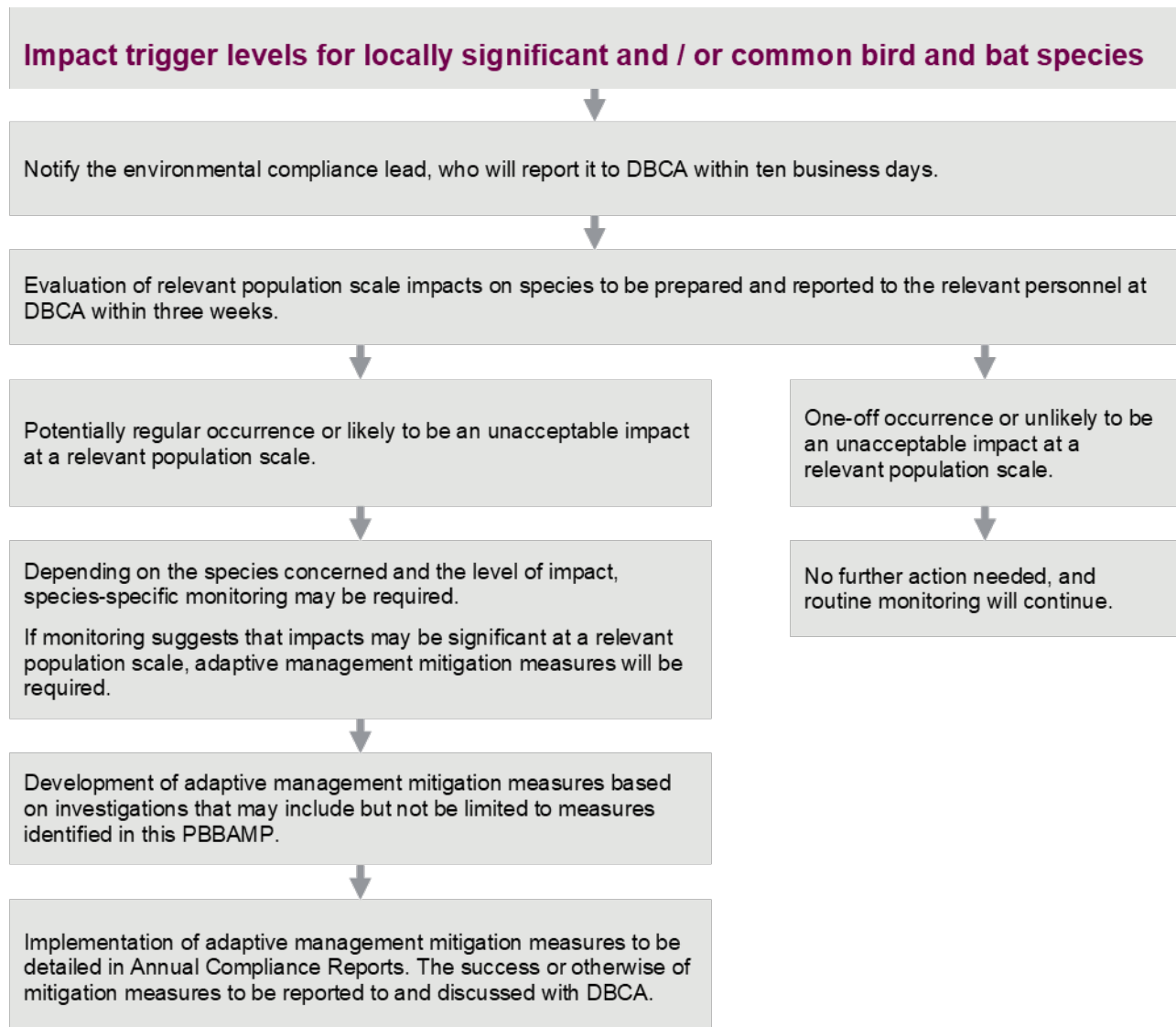


Figure 38: Adaptive management framework for identifying and mitigating impact trigger levels for locally significant and / or common bird and bat species

7.5 Adaptive management mitigation measures

Adaptive management mitigation measures may be implemented if an impact trigger level is reached. The purpose of adaptive management mitigation measures is to either reduce the likelihood of collision occurring or reduce the consequences of it occurring at a population level. Specific adaptive management mitigation measures will be implemented depending on the nature, cause and significance of recorded collisions. Flexibility in the range of adaptive management mitigation measures is necessary so that measures adopted are responsive to the results of collision investigations, the affected species, and future technological and scientific developments.

It is not possible at this stage to know what the cause of an unacceptable impact trigger will be, nor which species may be affected. Relevant adaptive management mitigation measures may include (but are not limited to) those outlined in Table 38.

Note that a combination of measures that may or may not include those in Table 38 may need to be implemented, depending on particular circumstances and affected species in the event of impact trigger

level exceedance. The availability and viability of particular measures may also evolve as a result of future technological and scientific developments.

Table 38: Adaptive management mitigation measures

Adaptive management mitigation measure Description	
Environmental controls	
Altered land management practices	- Modification of existing land management practices within the Project Area and adjacent land to reduce attraction of species to the Project Area. - Examples include relocation of grain stock feeding, particular crop species and/or water sources.
Enhancement or propagation of impacted species and their local population	Installation of artificial nest boxes or restoration of natural nest hollows for bird species impacted, with inclusion of post installation monitoring.
Supporting conservation programmes	- Funding contributions to published recovery programs for bird and/or bat species impacted. - Funding contributions to breeding and/or monitoring programmes for bird and/or bat species impacted.
Carion removal	Removal or increased frequency of removal of carrion (e.g. stock/pest carcasses) around wind turbines.
Technological controls	
Acoustic deterrent	Implementation of acoustic and/or ultrasonic deterrent devices targeted at the particular turbine(s) responsible for collision.
Camera, radar and artificial intelligence detection systems	- Prepare a testing and monitoring programme for the implementation of radar systems (e.g. Identiflight or similar) at the particular turbine(s) responsible for collision. - Radars would be used to control wind turbine speeds and even shut-down wind turbines if collision is deemed likely.
Blade painting	Painting one of the wind turbine blades or a subset of blades black/red (or in stripes) to minimise motion smear and reduce avian collision risk.

7.5.1 Wind turbine curtailment

Altering wind turbine cut-in speeds and/or temporary shut-down of wind turbines (broadly defined as curtailment) is not considered the default or first mitigation option. Altering cut-in speeds: Involves increasing the wind speed at which the particular turbine(s) begin generating electricity. This adjustment reduces the risk of collisions for birds and bats during low-wind periods.

A decision to implement this measure will be based on specific scientific evidence and advice that it would be effective in meeting the environmental outcomes of the PBBAMP, including information relating to:

- Ongoing unacceptable impacts, including the level of risk to the species' regional and overall populations, where known.
- The findings of detailed investigations undertaken in response to the impact trigger, focussing on the species' use of the immediate area around affected turbines.
- Clear scope for on-going monitoring to identify triggers for turbine shutdown.
- Agreed triggers for turbine shutdown and restart.
- Reporting and consultation arrangements.

Any curtailment program would be prepared in consultation with DCCEEW and DWER and will consider the potential effects to the ongoing economic viability of the Project as well as reduced renewable energy generation (and climate mitigation benefits). Any curtailment proposal should be targeted to specific wind turbines and distinct time periods aimed at addressing the specific impact trigger under consideration.

8 REPORTING AND REVIEW

8.1 Roles and responsibilities

Meeting the environmental outcomes of this PBBAMP is ultimately the responsibility of the Proponent. The Proponent will ensure that it engages suitably qualified and trained people to supervise and implement the monitoring program. The roles and responsibilities of key personnel in relation to this PBBAMP are summarised in Table 39. This table will be reviewed prior to the commencement of construction to reflect the roles available on site. However, the Proponent will ensure that all responsibilities are allocated.

Table 39: Roles and responsibilities

Role	Responsibility
Environmental compliance lead (the Proponent)	- Responsible for the environmental compliance of the Proponent in relation to the regulatory approvals and environmental management framework for the Project, including this PBBAMP. - Engagement of suitably experienced personnel to satisfy the obligations of the PBBAMP. - Reporting and review of the PBBAMP (Section 8) and determining / implementing appropriate and feasible mitigation measures in accordance with the decision-making framework (Section 7.4).
Operations and maintenance contractor environment representative	- Ensuring that site personnel are familiar with the requirements of the PBBAMP and responsibilities are clearly communicated to all relevant parties. - Ensuring that site personnel and visitors undertake a site induction that identifies key operational risks and obligations of the PBBAMP. - Assist with the monitoring and reporting of incidental finds required by this PBBAMP, including the notification of incidental finds to the environmental compliance lead. - Maintaining reporting, storage, and appropriate disposal of carcasses in consultation with the ecologist. - Undertaking regular carrion inspections for any stock, introduced or native mammal and bird carcasses and arranging for the collection and disposal of any carcasses and / or remains identified.
Suitably qualified ecologist	- Lead the site implementation of the carcass searches, species identification, carcass persistence trials and detectability trials. - Provide adequate training and support to personnel undertaking activities under the PBBAMP. - Maintaining records of monitoring and impacts to species in accordance with the requirements of the PBBAMP (Section 8.2). - Undertake data analysis and reporting of the implementation of the actions required by the PBBAMP (Section 8.2). - Notifying the environmental compliance lead of any reportable notifications or impact trigger events (Sections 7.4).
Carcass controller	Facilitate the implementation of the detectability trials (Section 7.3.2.1.6). This person may be a representative of the Proponent and/or the operations and maintenance contractor.
Employees and subcontractors	- Completing a site induction prior to commencing works. - Notifying the relevant environment representative of any incidental finds.

8.2 Reporting

The reporting requirements of this PBBAMP are identified in Table 40.

Table 40: Reporting requirements

Report	Description	Timing	Responsible person
Impact trigger	DCCEEW and DBCA will be notified within two business days of an impact trigger threshold being met or exceeded for Carnaby's cockatoo.	If an impact trigger threshold is met or	Environmental compliance lead –

Report	Description	Timing	Responsible person
threshold reporting	• DBCA will be notified within ten business days of an impact trigger threshold being met or exceeded for locally significant and / or common bird and bat species.	exceeded in accordance with Section 7.4.	impact trigger level breach notification
Annual compliance reporting	• Annual Compliance Reports are expected to be required under future Commonwealth and / or state environmental approvals. Annual Compliance Reports will detail, in relation to this PBBAMP: – Results of carcass detectability and persistence trials, carcass search surveys and associated analysis (Years 1 to 5 only) – Results of operational site utilisation surveys (Years 1 to 5 only) – Annual turbine strike reports comprising raw strike data including incidental finds (Years 1 to 5, however this may be required annually or less frequently throughout the operational life of 30 years, depending on the requirements of the future Commonwealth and / or state environmental approvals). – Exceedances of any impact trigger levels – Estimations of annual mortality rate (including margin of error) for each EPBC Act listed species (Years 1 to 5, however this may be required annually or less frequently throughout the operational life of 30 years, depending on the requirements of the future Commonwealth and / or state environmental approvals). – Recommendations to refine monitoring activities, if required • A copy of the Annual Compliance Report shall be provided to DBCA for the first two years of operation upon request and for two years following the exceedance of any impact trigger level.	At a frequency of 12 months, subject to the requirements of the future Commonwealth and / or state environmental approvals.	Environmental compliance lead – submission of annual compliance reports

8.3 Audit and review

This PBBAMP and its implementation will be reviewed following Years 1 and 2 of operation of the Project. Following this, the PBBAMP will be reviewed on an as needs basis during operation of the Project and prior to decommissioning. Reviews will consider the following:

- Efficacy of management practices and mitigation strategies in relation to level of risk to avifauna
- Complaints
- Incident reports
- Changes in organisational structure
- Changes in novel monitoring and mitigation strategies
- Changes in legislation and standards.

If this PBBAMP is required to be approved by DCCEE in accordance with a future EPBC Act approval, then any revisions to the PBBAMP may require applying to the Minister to approve a revised version of the plan.

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Appendix A: **Bird and Bat Risk Assessment Report**

DINNER HILL WIND FARM, Bird and Bat Risk Assessment Report



Nankeen Kestrel mobbing a Black-shouldered Kite adjacent Windjardie Rd, 15th July 2025 (B Shepherd).

Prepared for: OX2 Holdings Pty Ltd

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14th July 2026

Executive Summary

Introduction

OX2 Holdings Pty Ltd (OX2) is proposing to develop the Dinner Hill Wind Farm, in the north-west Wheatbelt region of Western Australia, approximately 18 kilometres (km) to the north-west of Badgingarra, within the Shire of Dandaragan. The Dinner Hill Wind Farm is anticipated to exceed 800 megawatts (MW) of renewable energy generation capability. The main infrastructure elements comprise a wind farm and a transmission line to connect to the electricity network. The layout and specifications of the turbines are yet to be determined but the ground clearance of the rotor blades will be a minimum of 60 metres (m). The area swept by the turbine blades are notionally set between 60 and 270 m for the sake of the collision risk assessment. This had been raised from a notional value of 50 m in the early stages of the Dinner Hill Wind Farm.

Bamford Consulting Ecologists (BCE) was commissioned through RPS AAP Consulting Pty Ltd (RPS) on behalf of OX2 to conduct a collision risk assessment for birds and bats. The collision risk assessment is to apply quantitative and semi-quantitative methods. This risk assessment is based on the findings from the bird and bat utilisation survey (BBUS) that was conducted by BCE between October 2024 and May 2026 (Shepherd and Bamford, 2026).

Survey Summary

Fourteen campaigns were completed with those in the first year being almost monthly to critically investigate the presence, status and flight profile of Carnaby's Black-Cockatoo, a key species for the risk assessment, being abundant, of high conservation significance and having some flight characteristics making it a species potentially at risk of rotor strike. In the second year, quarterly campaigns were completed to satisfy the requirements of Department of Climate Change, Energy, the Environment and Water (DCCEEW 2024).

During all campaigns, a range of sampling methods was employed including vantage point (VP), bird census (BC), focal follow (FF) and acoustics. In addition, periodic water bird counts on regional lakes were completed between September year? and May year? to examine the potential of migrant waders.

Teams of between three and five surveyors completed 1,422 hours of formal bird sampling of which 937 hours were on VPs and 318 hours of FF. An average of 69 hours was spent on each VP through the entire BBUS.

Bird and Bat Species at Risk

The desktop assessment identified that 184 bird and eight bat species could potentially occur in the project area.

Twenty eight birds were recorded at heights consistent with the proposed rotor swept area (RSA) (≥ 60 m, <270 m). Of significance to the wind farm, 11 raptor species were recorded with the Wedge-tailed Eagle (*Aquila audax*) and Nankeen Kestrel (*Falco cenchroides*) being recorded across the project area on all campaigns. The Wedge-tailed Eagle in particular was observed flying at heights typical of wind turbines for the majority of time they were being monitored. The Straw-necked Ibis was recorded a number of times in relatively large flocks soaring on thermals from ground-level to higher altitudes, and was the bird species with highest numbers observed flying above 60 m.

The White-striped Freetail Bat (*Austronomus australis*) and Gould's Wattled Bat (*Chalinolobus gouldii*) were recorded throughout the acoustic sampling campaign and across the project area. These two species are known to be commonly impacted by wind farm developments in eastern Australia.

Risk Assessment Methods

The tools within the online Australian Collision Risk Framework (ACRF) were used to assess the risk to birds and bats from collision with wind turbines. Conservation and locally significant species that had been recorded with timed flights within the RSA and within the project area, were assessed quantitatively using the Collision Risk Model (CRM), and estimates of annual losses generated. All other species were assessed qualitatively using the Collision Likelihood Score (CLS) and given a risk rating.

Collision Risk on Conservation Significant Bird and Bat Species

Four species of birds listed as threatened or migratory in state and/or commonwealth legislation were considered potentially at risk of collision with wind turbines on the Dinner Hill Wind Farm. These were Carnaby's Black-Cockatoo, Forest Red-tailed Black-Cockatoo, Fork-tailed Swift and Peregrine Falcon. Carnaby's and Forest Red-tailed Black-Cockatoos were not observed flying within RSA and the Fork-tailed Swift was not encountered. Due to lack of timed flights within the RSA, all four conservation significant species were therefore assessed using the CLS tool.

Carnaby's and Forest Red-tailed Black-Cockatoos were given risk ratings of unlikely and very unlikely of colliding with the turbines respectively. Carnaby's has been observed extensively in the region of the project area, and all data indicate the risk to be low.

The Fork-tailed Swift was absent from the data records over several extensive sampling programmes and a nearby bird monitoring programme that has continued for 40 years. The risk of collision is reflected in the extremely sporadic occurrence and was determined to be unlikely through CLS.

Peregrine Falcons were encountered on three occasions within the project area; due to the infrequency of records and mostly low flight height it was determined to have an unlikely risk of colliding with turbines.

CLS was applied to two bat species deemed to be locally significant. The White-striped Freetail Bat was considered likely to collide with turbines while Gould's Wattled Bat was concluded to be possibly at risk of collision.

Collision Risk on Locally Significant Bird and Bat Species

CRM was applied to six species of birds of prey and one ibis. All four species were predicted to have flights that potentially lead to collision with the turbine blades or, less likely, with the towers and nacelles. The Straw-necked Ibis was predicted to have greatest collisions with a median of 6-7 collisions per annum (95% CI: 0-58.04). The Wedge-tailed Eagle was predicted to have a median of 4-5 collisions per annum (95% CI: 2.16 – 10.27), while the Nankeen Kestrel was predicted to have a median of 1-2 collisions per annum (95% CI: 0.57 – 4.13). All other species were predicted to have fewer than one collision per year including Little Eagle (Median: 0.15, 95% CI: 0.00 – 0.69), Brown Falcon (Median: 0.08, 95% CI: 0.02 – 0.23), Whistling Kite (Median: 0.04, 95% CI: 0.00 – 0.66) and Black-shouldered Kite (Median: 0.02, 95% CI: 0.00 – 0.09).

It is to be noted that these are considered worst-case scenarios; where uncertainty in data selection existed, parameters were based on realistic but conservative values. Furthermore, these predictions are in the absence of applied mitigation measures.

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1 Introduction

OX2 Holdings Pty Ltd (OX2) is proposing to develop a renewable energy project in the north-west Wheatbelt region of Western Australia, approximately 175 kilometres (km) to the north of Perth's Central Business District. The proposed Dinner Hill Wind Farm is located within the Shire of Dandaragan. It lies to the east and north of Badgingarra town and comprises approximately 28,218 hectares (ha) of mostly cleared agricultural land (Figure 1-1; the project area). The wind farm extends approximately 40.2 km east to west and 19.7 km north to south and lies within the Geraldton Sandplains bioregion.

The Dinner Hill Wind Farm is anticipated to exceed 800 megawatts (MW) of renewable energy generation capability. The main infrastructure elements comprise a wind farm and a transmission line to connect to the electricity network. The layout and specifications of the turbines are yet to be determined but the ground clearance of the rotor blades will be a minimum of 60 metres (m). The area swept by the turbine blades are notionally set between 60 and 270 m for the sake of the collision risk assessment. This had been raised from a notional value of 50 m in the early stages of the Dinner Hill Wind Farm.

Bamford Consulting Ecologists (BCE) was commissioned through RPS AAP Consulting Pty Ltd (RPS) on behalf of OX2 to conduct a collision risk assessment for birds and bats. The collision risk assessment is to apply collision risk modelling (quantitative) and collision likelihood (semi-quantitative) methods as developed under the Australian Collision Risk Framework (ACRF). This risk assessment is based on the findings from the bird and bat utilisation survey (BBUS) that was conducted by BCE between October 2024 and May 2026 (Shepherd and Bamford, 2026). The BBUS Report focuses on the sampling methods used for birds and bats, results of the surveys and an interpretation of the use of the project area by birds and bats.

The BBUS and collision risk assessment was developed to address the requirements of relevant Commonwealth and State legislation, including the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environmental Protection Act 1986* (EP Act). As such, the BBUS was focused on conservation significant species that are listed under these two legislative instruments. In compliance with state environmental requirements, it also identifies birds and bats not listed under the legislation, but which occur in vulnerable populations and are considered locally significant, and which might be at particular risk from the impacts of wind farms. The bird and bat assemblage is described by Shepherd and Bamford (2025), with a summary, including target species, provided in Section 4. Carnaby's Black-Cockatoo was the key target species, but targets included some birds of prey and some waterbirds.

1.1 Purpose and Scope

The purpose of this report is to present the results of risk assessments on birds and bats from potential collision with wind turbines on the Dinner Hill Wind Farm. These results will support the regulatory submission for approving the proposal and help inform the (Preliminary) Bird and Bat Adaptive Management Plan (BBAMP). This report describes the risk assessment methods and presents data summaries and results of the collision risk assessment. For detailed information on the proposed project development, description of the regional environment, methods and results of the BBUS, please refer to the following documents:

- RPS (2026). *Dinner Hill Wind Farm Referral*.

- Kristancic, Shepherd and Bamford (2025). *Dinner Hill Wind Farm – Bird and Bat Survey Annual Report*.
- Shepherd and Bamford (2026). *Dinner Hill Wind Farm – Bird and Bat Utilisation Survey*.

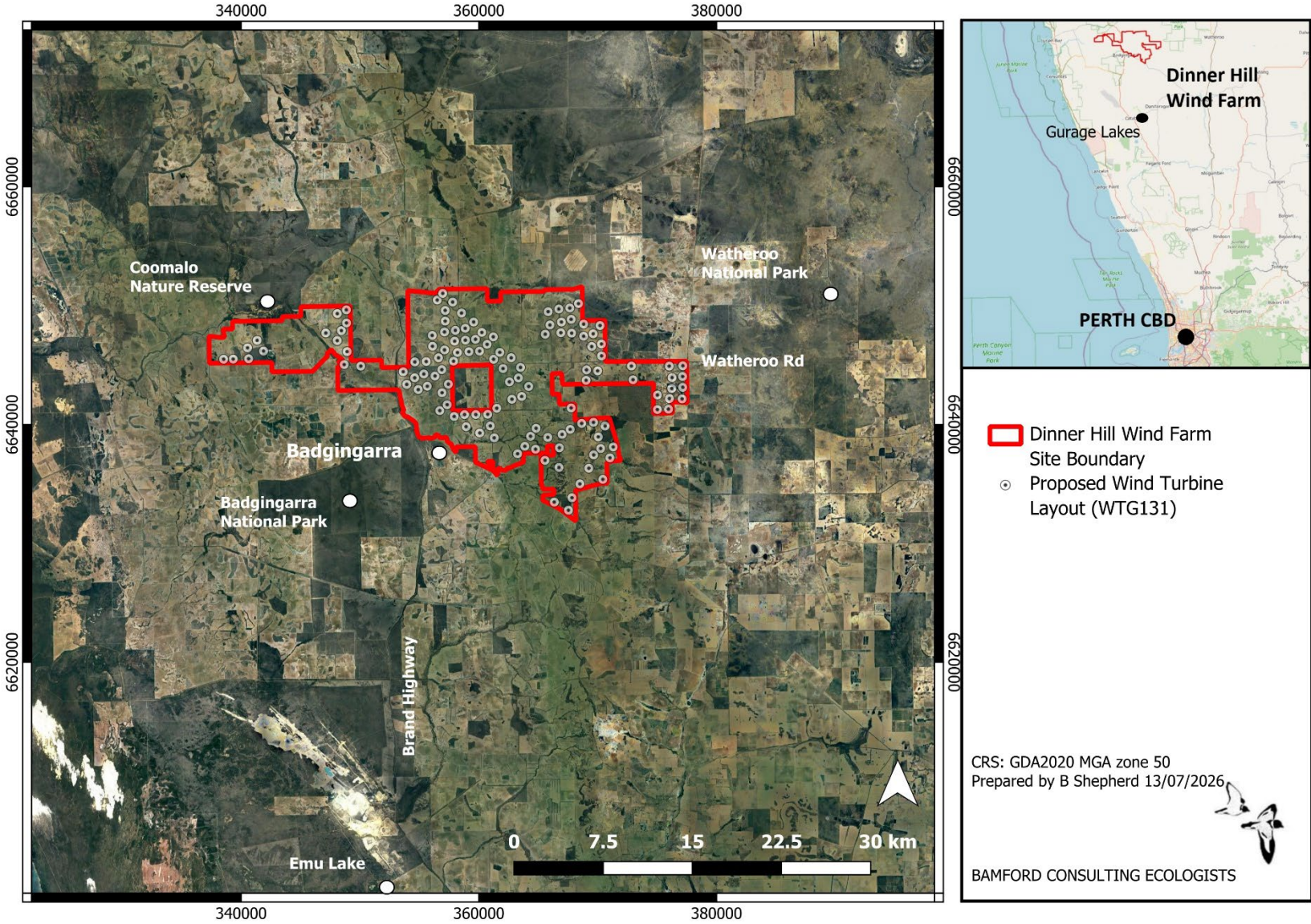


Figure 1-1. Dinner Hill Wind Farm Project Area Location Plan and proposed wind turbine layout.

2 Survey Summary

The collision risk assessment is informed by data and information acquired from the BBUS conducted between October 2024 and May 2026. One further campaign is planned in July 2026. Sampling methods employed during the BBUS were selected to be compatible with the requirements of collision risk modelling as originally developed by Band *et al.* (2007) which has since been adapted for the Australian Collision Risk Framework (ACRF). The ACRF provides a quantitative approach as described in Potter *et al.* (2026) and a risk-tool approach as described by Thompson *et al.* (2026).

The two key sampling methods were Vantage Point (VP) observations, and Focal Follows (FF). A summary of the completed campaigns is provided in Table 2-1 and sampling effort on VPs in Table 2-2.

Table 2-1. BBUS Campaign schedule.

Year	Campaign	Dates	No. Personnel
2024	Recon	23-Oct	2
	1 Spring	23-25 Oct	4
	2 Summer	4-6 Dec	5
	3 Summer	17-20 Dec	4
2025	4 Summer	7-10 Jan	6
	5 Summer	17-19 Feb	5
	6 Autumn	17-20 Mar	5
	7 Autumn	5-9 May	4
	8 Winter	17-19 Jun	5
	9 Winter	15-18 Jul	5
	10 Spring	11-14 Aug	4
	11 Spring	16-19 Sep	4
	12 Spring	11-14 Nov	4
2026	13 Summer	13-16 Jan	4
	14 Autumn	4-8 May	4

Table 2-2. Sampling effort (hours) between August 2024 and May 2026. Effort varies slightly between VPs and campaigns due to fatigue management and weather.

Dates	FF	VP01	VP02	VP03	VP04	VP05	VP06	VP07	VP08	VP09	VP10	VP11	VP12	VP13	CVP01	CVP02	CVP03
23/10/2024	9	3									2.5		2.5		2.5		
24/10/2024	13	3									6	5.5		5.5	3		
25/10/2024	5		3		3												
4/12/2024	13	2	2	2.25		2.25	1.5	3	2.5								
5/12/2024	12	2	1	3	3	2.5	3	6	3	3	2	3	2.5				
6/12/2024	4		3		3	3					2.5	3	1.75	3			3
17/12/2024																3	
18/12/2024	6	2	2	2		2	2	2	2		2	2		2.5	3		
19/12/2024	13.5	2	2	2	2	2.2	2	2	2		2	2	1.5	2			
20/12/2024	6									2			3	3		3	3
7/01/2025												2	3				
8/01/2025	11		3			3	2	1.75	2	3	1.5	2	3	2			
9/01/2025	13					4.5	3	2.5	3	3	2					3	
10/01/2025	5	3	3	3	3					3					3	2	3
17/02/2025	13	8			5	5		3		3							
18/02/2025	12	2			3	3	8.5	5	5	5							
19/02/2025	6										6	6	6			6	
17/03/2025	3		3.5							2.5		1	2.5	2.5		2	2.5
18/03/2025	4	4.25	2.5	5.5					2.5		5	4	2.5	2			
19/03/2025	6			2.5	5	4.5		4.75						2.5		2.5	2.5
20/03/2025	4								3	2.5	3				2.5		
5/05/2025	8	6	5									2.5	2.75	2.5	2.5	3	2
6/05/2025					5	6	5	2.5	3	3							

Dates	FF	VP01	VP02	VP03	VP04	VP05	VP06	VP07	VP08	VP09	VP10	VP11	VP12	VP13	CVP01	CVP02	CVP03
7/05/2025					3	3	2		5	5	4					3	
8/05/2025			2.75	2.75								5	4.5				2
9/05/2025														5	4.5		
17/06/2025	8	5											2.5	2.75		3	5
18/06/2025	8			3	3	3	3		3	2.5	6						
19/06/2025	6	3					3	3									
15/07/2025	6	5	3	3		2.25		1					2.5	3		3	2
16/07/2025	5		2.5	4	2	4	4	6		2.5							
17/07/2025					3		2.75		5	5	5	5			2.5		
18/07/2025	3			3			2						5	5	5	2	3
11/08/2025	5		3	5	3					3	3				6	4	5
12/08/2025	12	5	5	5	5	3	3	2.75	2.75								
13/08/2025	11.5	3					5	5	5	5		3	3	3			
14/08/2025	6			2							3	3	3	5	4	4	4
16/09/2025	10	4	1.5														1
17/09/2025				1.5	2	2	4	2	2					2		2	
18/09/2025	5		2					1.5	2	4	3.25	4	2	2	2		
19/09/2025	5			2	2	2							2			2	2
11/11/2026	12	3.5										2	2	3		2	2
12/11/2026	4	2	4	2				2	2	2	4	4	4				
13/11/2026	11			2	6	6	4		2					2			
14/11/2026	8							2	2	2	2.25				4	4	3.5
13/01/2026	6	2	2	2	2.25						2	2	2.25	2	2	2	2
14/01/2026	4	2.5	2	2		4	4	4.1	4		2	2					
15/01/2026	6	2	2	2	4	2	2			2		2.15	4	2			

Dates	FF	VP01	VP02	VP03	VP04	VP05	VP06	VP07	VP08	VP09	VP10	VP11	VP12	VP13	CVP01	CVP02	CVP03
16/01/2026	1							2	2	2	4.2			2.5	4.15	4	4
4/05/2026	1.5	2.4	2	3.6	1.5						2.5			3.6		0.5	3.3
5/05/2026	1	3.5		3.5			2		3			5.6	3.5				
6/05/2026	2				2	3.5	3.5	3.5		1.5			2	1.5			
7/05/2026	0.5		1.5		1.5	2.5	1.6	2	2		2						
8/05/2026	4									3.5				2	2.25	1.5	
TOTALS:	318	80.15	63.25	68.6	72.25	75.2	72.85	69.35	69.75	70	77.7	70.75	73.25	73.85	52.9	61.5	52.8

2.1 Bird Utilisation Surveys

To sample target bird species for collision risk, two complementary sampling methods were employed:

- Vantage Point (VP)
- Focal Follow (FF)

Water bird counts on regional lakes were also undertaken to assess the potential presence of migrant waders and other waterbirds in the region. Bird census (BC) sampling was conducted to describe the general bird assemblage on site, while opportunistic records were gathered for birds encountered throughout the BBUS activities and add to the overall species list. Acoustic data on birds were collected but held in reserve should further data be required and possibly for bioacoustics monitoring.

VP sampling aimed to identify the distribution of birds using the airspace across the project area and quantum of time they spend in rotor swept area (RSA) for the collision risk assessment. This is the primary method to acquire data that will drive CRM to estimate number of annual bird flights potentially at risk of rotor-strike (Scottish Natural Heritage, 2017). It also helps to identify routinely used flight paths (if any). However, VP sampling alone is not guaranteed to capture robust data that adequately describe all flight activities of Carnaby's and how often they fly within RSA. To supplement the VP data, FF observers tracked flocks of Carnaby's from roosts or individuals from nests in the morning through the day and back to their roosts in the evening. To accomplish this, it was necessary to monitor the landscape within and outside of the project area, up to the range at which Carnaby's are known to forage from roosts and nests. Stratification was not incorporated into the survey design, but VPs were located to ensure all land cover types were sampled.

Bird surveyors were trained through workshops with greatest emphasis on estimating flight height and horizontal distance to target. Accurate estimation of height is strongly influenced by horizontal distance. Distances to prominent features in the viewshed of each VP were measured with a Nikon Forester Pro II laser rangefinder and used as reference markers against which to judge distance. Estimation of height relied on a number of tools, the principal being the field of view (FoV) of the binoculars or scope at the distance to target (eg 150 m at 1,000 m). By dividing or multiplying the FoV depending on the distance to the target, the objective through a pair of binoculars has an approximate dimension. A pair of binoculars with FoV of 150 m at 1,000 m has an FoV of 75 m at 500 m or 300 m at 2,000 m. Therefore, a bird at 500 m range in the middle of the view through a pair of binoculars with a stated FoV of 150 m must be approximately 37-40 m from the bottom of the view. The observers then validated height estimates by comparing with features in the viewshed such as trees, transmission towers, communication masts, meteorological masts and buildings, measured with the laser rangefinder. Contour maps in QField were used to help the observer estimate the height of a bird over dead ground. At the beginning of the training, surveyors gained experience by working with more experienced staff. This also helped consistency across the surveyor pool. Furthermore, extraordinary events and records were challenged post-survey to ensure errors are eliminated.

Refresher workshops, photogrammetry measurements and verification of competency and feedback on acquired data was also undertaken to maintain the accuracy of flight height estimation. Workshops included trials with a drone flying at a known height above ground and distance from the observer.

2.1.1 Vantage Point Survey

A series of 13 VPs was established inside the project area and three control VPs off site. All bird activity at each VP was monitored out to 2 km by surveyors. On some VPs the view was restricted by landscape features and these restrictions are indicated on Figure 2-1. Only three VPs were affected and the reduced visibility was under ca. 10% of the viewshed. Binoculars and spotting scopes or long-focal length mirrorless cameras were used to aid species identification. Tall, fixed objects in the area were measured early in the programme and plotted in QField. The surveyors prioritised the detection of target (primary and secondary) bird species (black-cockatoos, birds of prey, some waterbirds; see Shepherd and Bamford 2026). Non-target species were recorded during the VP only if they represented extraordinary events. Otherwise, they were recorded after the VP was concluded as opportunistic sightings. All records are allocated a maximum flight height.

For presentation and data interpretation, bird data were converted in QGIS from spot records to flight tracks and represented according to height bands. These data are readily transformed for input to CRM.

Sampling at each VP was conducted over one to three-hour sessions (depending on conditions and for fatigue management) early morning, either side of noon and late afternoon/early evening, with priority given to the AM and PM sessions. Parameters collected included:

- Ambient air temperature, cloud cover, wind strength and direction
- All flight heights with a ceiling of up to 300 m
- Time spent in RSA (inherent in the point data sequences)
- Broad behavioural categories
- Flight route traced into GIS through point records along each flight track
- Observer
- Date and time.

2.1.2 Focal Follows

FF sampling initially focused on previously known roosts and habitat features in and around the project area. Once observers became familiar for a given project area, they were better able to predict where the birds may be at any one time. Observers tracked black-cockatoo movements from a respectful distance through the landscape on foot, from vehicles and from higher ground. Disturbance from this approach is considered no different than the existing personnel and vehicular movements throughout the area, to which Carnaby's are accustomed. Height estimates derived from FF sampling were used to develop a more robust flight profile and apportionment of time Carnaby's spend within the RSA.

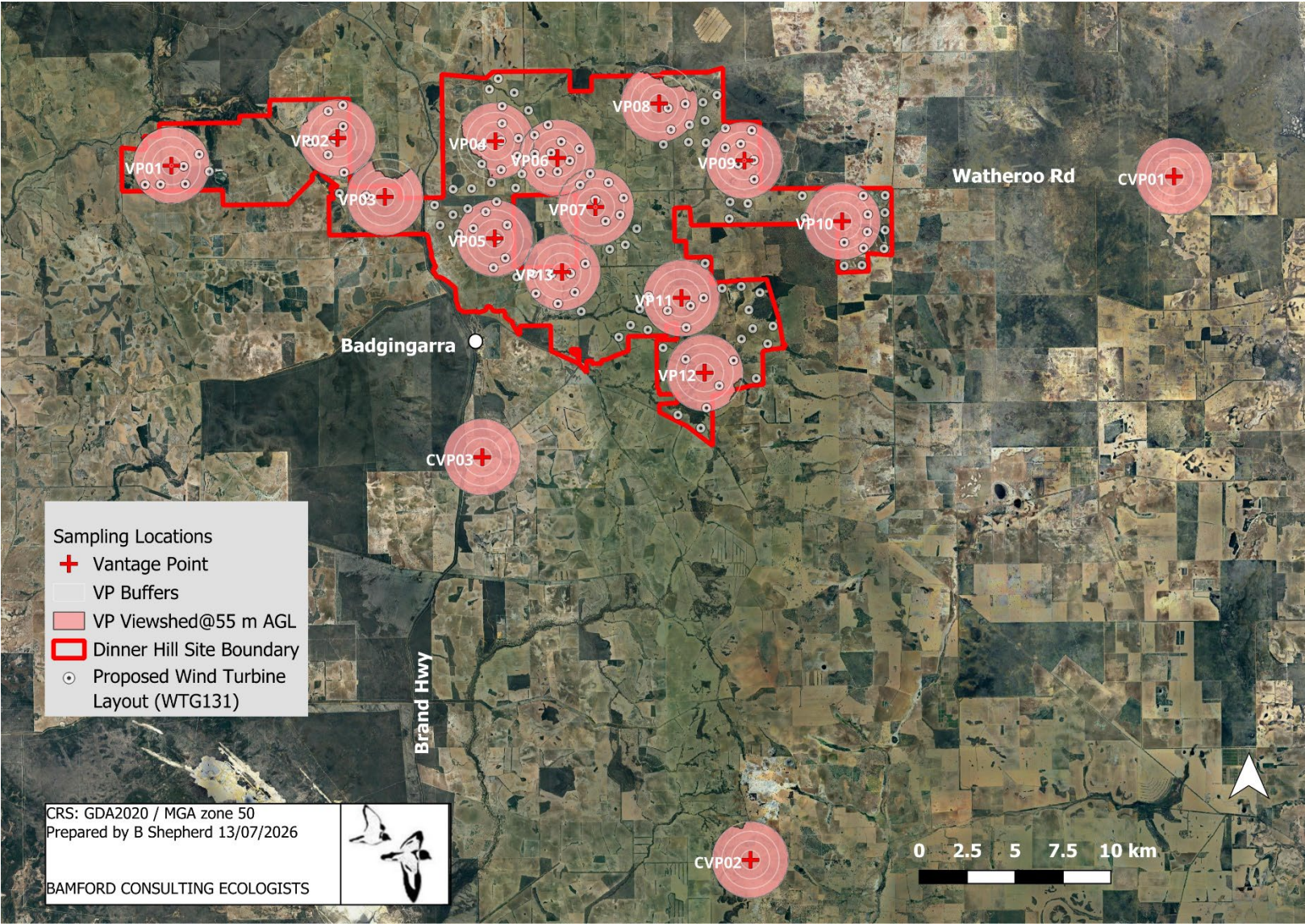


Figure 2-1. Site Layout, locations of VPs and viewshed analysis of each VP for a height of 55 m above ground level.

2.2 Bat Utilisation Survey

2.2.1 Acoustic Sampling

Five Titley Scientific “Chorus” Acoustic Recording Units (ARUs) were deployed in October 2024 and another on 17th December 2024 to record ultrasonic sounds (up to 160 kilohertz (kHz)) for bats and audible sounds (up to 20 kHz) for all other fauna. ARUs will remain in the field until mid-late winter 2026. Locations of the ARUs and details of deployment are shown on Table 2-3. All ARUs were fitted with ultrasonic microphones and set for full spectrum recording to record bat calls and acoustic microphones to sample broad-spectrum bioacoustics.

Table 2-3. Deployment schedule for the Chorus ARUs. Variation in recording duration is dependent on battery life which is depended on the number of ultrasonic recordings in particular which can be affected by other ultrasonic sound sources from leaf rustle, insects and rainfall.

Name	Deployed	Retrieved	Eastings	Northings	Nights/days Active
ARU32	25/10/2024	18/03/2025	357819	6648935	24
ARU32	18/03/2025	Ongoing	356815	6647764	69
ARU36*	25/10/2024	18/03/2025	369757	6646595	28
ARU40	17/12/2025	16/07/2025	375692	6645255	36
ARU40	16/07/2025	Ongoing	368161	6632110	34
ARU41*	25/10/2024	Ongoing	340447	6646406	50
ARU42	25/10/2024	Ongoing	363630	6645530	60
ARU43	25/10/2024	15/07/2025	361125	6638479	32
ARU43	15/07/2025	Ongoing	356805	6642690	32
ARU44	18/03/2025	Ongoing	369745	6646595	15

* Denotes technical issues during deployment, ARU36 was replaced by ARU44, ARU41 was repaired.

3 Analytical Methods

To address the risk of collision with turbines to birds and bats recorded during the BBUS within the notional RSA, the following methods were used:

1. Collision Risk Modelling (CRM)
2. Collision Likelihood Score (CLS)

CRM is applied to bird data for species that had a timed presence within the RSA (>60 m, <270 m) from one or more of the VPs. This is a quantitative approach that provides an estimate of mortality for each species that qualifies for CRM. Flight height data gathered during FF are also used to generate flight profiles and the proportion of time each species spent within the RSA. CRM is the most involved of the assessment procedures and includes the steps outlined below and in Figure 3-1:

Stage 1 – Use horizontal distances to each encounter and estimate Effective Detection Radius

Stage 2 – Define the total sampling effort across all VPs within the wind farm area in minutes

Stage 3 – Define mean and standard error for number of encounters (as number of birds in each encounter) from ground level to top of RSA within wind farm area and to edge of VP buffer (2 km)

Stage 4 – Calculate the number of encounters per minute of sampling using output from 2 and 3

Stage 5 – Calculate the proportion of time each species spent in RSA

Stage 6 – Define the turbine and species parameters

Stage 7 – Run CRM to estimate potential collision rate and confidence intervals per annum

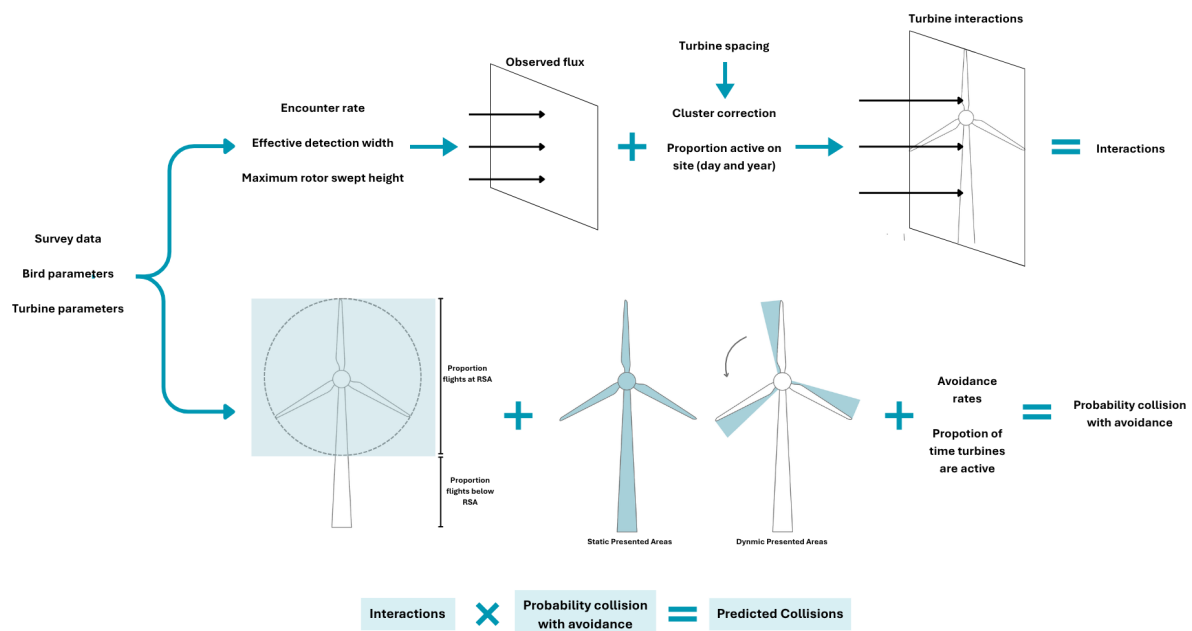


Figure 3-1. Schematic process of CRM (from Stark *et al.*, 2026).

Data for each of the target species from the 13 VPs located within the project area were used to calculate the encounter rate and each encounter was multiplied by the number of birds in each group. The data were truncated to 2 km from the VP and up to 270 m above ground level as required for the model (Stark *et al.*, 2026).

The effective detection radius (EDR) for each target species was calculated using distances between the observer and birds from all 16 VPs (including control sites) as per Buckland et al (2001).

Since BCE recorded duration of all flights (where possible) at elevations up to 300 m, the proportion of time at height for each species was used instead of the proportion of records. These were adjusted to account for flock size of each encounter so that the derived value of “bird time” is used as a more realistic representation of how many birds may be at risk of rotor-strike.

Proportion of time in RSA was calculated as total time, using all records from ground level to 270 m above ground level. The proportion spent at height was calculated from records where birds were estimated to be >60 m and <270 m above ground level. This range was selected to be precautionary and conservative to account for error in height estimation.

Bird parameters were obtained from literature including in particular Debus (2019) for raptors, HANZAB (BirdLife Australia, 2022) and the ACRF Species Traits tool (Stark and Thompson, 2026). Parameters for each species that qualified for CRM are provided in the results.

Turbine data are based on the Goldwind GWH182-7.2 wind turbines with the layout presented in Figure 2-1 and specification in Table 3-1. Data from Table 3-1 were entered into a comma delimited file for input to the ACRF CRM tool.

Table 3-1. Wind turbine parameters for the Goldwind GWH182-7.2 wind turbine. All dimensions are in metres (m) unless otherwise stated.

Number of turbines	131	Blade thinnest	0.07
Maximum turbine blade tip height	270	Blade thickest	3.0
Minimum turbine blade ground clearance	60	Max chord	4.85
Blade length	Up to 92	Min chord	1
Dia of tower at base	6.5	Rotor diameter	Up to 184
Dia of tower @low RSA	6	RRP mean	12.5
Dia of tower top RSA	4.3	RPM std. dev.	2
Hub height	Up to 168	Tilt degree (°)	5
Max nacelle height	4.05	Proportion operational	85%
Max nacelle width	6	Average turbine spacing	1158.4
Maximum nacelle length	12.5		

CLS is applied to bird and bat species that have been recorded in the project area and are known or suspected to fly within RSA heights but have insufficient data to support CRM. For a full description of the CLS, see Thompson et al (2026), and is driven by the following inputs:

- Activity (A) which is derived from:
 - species observations on site (A1)
 - habitat availability (A2)
 - keystone features (A3)
- Flight height (H)
- Duration of exposure (D)
- Ability to avoid collision (C).

These can be informed by field survey or from the literature. The ACRF offers the Species Traits Search tool to help inform the CLS in the absence of site-derived information or expert knowledge. Each component is scored out of 5 depending on its influence on the risk of collision and a collision risk score calculated from the following formula:

$$\text{Collision Likelihood Score} = \frac{A}{3} \times H + D + C$$

The maximum potential score is 35 but the result is converted to a scale out of 100 and assigned one of five risk ratings:

Collision risk score (scaled)	Risk Rating
>90	Very Likely
>60-90	Likely
>40-60	Possible
>10-40	Unlikely
≤10	Very unlikely

Ecological insight into each of the species, their use of the project area and landscape characteristics pertaining to their ecology are required; interpretation of these variables can be somewhat subjective. In all accounts, justification for the values used are provided.

4 Overview of Bird and Bat Assemblage

The desktop assessment carried out by Kristancic *et al.* (2025) returned 184 bird and eight bat species as potentially occurring in the project area, and in a preliminary risk assessment concluded that 62 bird and 2 bat species were of conservation significance and potentially at risk from rotor strike. Most of these species (44 birds and both bats) are locally significant only (CS3), with 16 bird species listed under legislation (CS1) and two species as priority (CS2). Based upon status in project area and risk according to Avistep (BirdLife International 2025) and Reid and Baker (2025), this list was refined and 14 birds (4 CS1 and 10 CS3) and the two bat species were considered most likely at risk and were therefore the target of surveys, although height records were recorded for all species encountered. Target species (indicated by shading), and any other species on which height data were collected, are listed in Table 4-1. Kristancic *et al.* (2025) provide full species lists, including Avistep and Reid and Baker (2025) risk ratings for all species.

Table 4-1. Bird and bat species that were targeted on BBUS and/or on which flight height data were collected. Risk as assessed under Avistep and by Reid and Baker (2025) is indicated. Sensitivity under Avsitep is given in parenthesis. Shading indicates species considered most at risk in the project area (target species).

Table A. Conservation Significance level 1 (CS1 – listed under legislation)

Latin Name	Common Name	Conservation Significance	Risk (Avistep)	Risk (Reid & Baker)	Status in project area
<i>Apus pacificus</i>	Pacific/Fork-tailed Swift	(MI, S1D2)	High (30.7)	High	Irregular visitor
<i>Falco peregrinus</i>	Peregrine Falcon	(S1D3)	High (15.4)	High	Irregular visitor
<i>Calyptrorhynchus banksia-naso</i>	Forest Red-tailed Black-Cockatoo	(Vu, S2)	High (10.8)	High	Irregular visitor
<i>Zanda latirostris</i>	Carnaby's Black-Cockatoo	(EN, S2D2)	High (21.4)	High	Resident

TABLE B. Species not listed under legislation but could be considered of local conservation significance (CS3) if significant mortality rates from wind farms occurred. Shaded species are those considered at highest risk.

Latin Name	English Name	Risk (Avistep)	Risk (Reid & Baker)	Status in study area
<i>Anas gracilis</i>	Grey Teal	High (10.4)	High	Resident
<i>Anas superciliosa</i>	Pacific Black Duck	High (11.6)	High	Regular visitor
<i>Cygnus atratus</i>	Black Swan	High (28.2)	High	Regular visitor
<i>Tadorna tadornoides</i>	Australian Shelduck	High (19.2)	High	Regular visitor
<i>Threskiornis molucca</i>	Australian White Ibis	High (9.4)	High	Regular visitor
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	High (9.4)	High	Regular visitor
<i>Ardea pacifica</i>	White-necked Heron	Not listed	High	Irregular visitor
<i>Pelecanus conspicillatus</i>	Australian Pelican	High (15.5)	High	Irregular visitor
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	High (13.0)	High	Irregular visitor
<i>Tachypiza cirrocephalus</i>	Collared Sparrowhawk	High (8.0)	Medium	Resident
<i>Tachypiza fasciatus</i>	Brown Goshawk	High (10.4)	Medium	Resident
<i>Aquila audax</i>	Wedge-tailed Eagle	High (66.2)	High	Resident
<i>Circus approximans</i>	Swamp Harrier	High (48.6)	High	Irregular visitor
<i>Circus assimilis</i>	Spotted Harrier	High (11.8)	High	Regular visitor
<i>Elanus caeruleus</i>	Black-shouldered Kite	Not listed	High	Regular visitor
<i>Haliastur sphenurus</i>	Whistling Kite	High (14.8)	High	Resident
<i>Hieraaetus morphnoides</i>	Little Eagle	High (15.0)	High	Regular visitor
<i>Lophoictinia isura</i>	Square-tailed Kite	High (11.9)	High	Regular visitor
<i>Vanellus tricolor</i>	Banded Lapwing	High (11.1)	Medium	Regular visitor
<i>Merops ornatus</i>	Rainbow Bee-eater	Not listed	Medium	Regular visitor
<i>Falco berigora</i>	Brown Falcon	High (45.4)	Not listed	Resident
<i>Falco cenchroides</i>	Nankeen Kestrel	High (7.2)	High	Resident
<i>Falco longipennis</i>	Australian Hobby	High (7.1)	High	Regular visitor
<i>Cacatua</i>	Western Corella	High (10.7)	High	Regular visitor

Latin Name	English Name	Risk (Avistep)	Risk (Reid & Baker)	Status in study area
<i>Cacatua</i>	Little Corella	High	High	Resident
<i>Eolophus roseicapilla</i>	Galah	High (8.9)	Medium	Resident
<i>Ninox novaehollandiae</i>	Southern Boobook	High (11.8)	High	Resident
<i>Coracian maxima</i>	Ground Cuckoo-shrike	High	Medium	Irregular visitor
<i>Gymnorhina tibicen</i>	Australian Magpie	Not listed	Medium	Resident
<i>Corvus coronoides</i>	Australian Raven	Not listed	Medium	Resident
<i>Grallina cyanoleuca</i>	Magpie-lark	Not listed	Low	Resident
<i>Cheramoeca leucosterna</i>	White-backed Swallow	Not listed	Medium	Regular visitor
<i>Petrochelidon nigricans</i>	Tree Martin	Not listed	Not listed	Regular visitor
<i>Austronomus australis</i>	White-striped Bat	NA	High	Regular visitor
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	NA	High	Resident

NB. Avistep sensitivity factors in the risk of mortality and the consequences in terms of population impact. For example, the Wedge-tailed Eagle has a high risk and a high sensitivity, because it occurs at low population densities. In contrast, the Nankeen Kestrel has a high risk but a low sensitivity because it is an abundant and seasonally mobile, thus the population consequences of mortality at one site are low.

5 Summary of results from field investigations

Ninety-one bird and six bat species were recorded during field investigations, and Table 5-1 summarises flight height records collected on 30 bird species on which collision risk analysis was conducted. Birds listed are conservation significant and deemed potentially at risk of collision, or all other species that were recorded on site and estimated to be at 60 m above ground level or greater. Risk assessments (either CRM or CLS) are presented in Section 6. None of the conservation significant species recorded in the project area was observed at RSA heights. These species could therefore only be assessed using CLS.

CRM and CLS were otherwise applied in the following cases:

- CRM: all raptor species with adequate data in the project area and within RSA, and species with relatively high abundance (eg Straw-necked Ibis) in the RSA
- CLS: all other species recorded within the project area and at RSA

Table 5-2 presents species and their flight heights recorded on lakes to the south. These were not assessed for collision risk unless they were also encountered in the project area.

Table 5-1. Summary of flight height records for conservation significant bird species and birds observed above 60 m height (eg within RSA) and from either VP or FF within the project area. Note that commonly encountered birds, such as ravens and magpies, were not targeted and height data was not always recorded.

Latin name	Name	Group Size Range	Max. Height. (m)	No. Encounters
<i>Anas gracilis</i>	Grey Teal	6-25	60	4
<i>Tadorna tadornoides</i>	Australian Shelduck	1-30	150	16

Latin name	Name	Group Size Range	Max. Height. (m)	No. Encounters
<i>Apus pacificus</i>	Fork-tailed Swift	Not recorded		
<i>Threskiornis molucca</i>	Australian White Ibis	1-12	70	3
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	1-250	400	51
<i>Ardea pacifica</i>	White-necked Heron	1 & 5	60	9
<i>Pelecanus conspicillatus</i>	Australian Pelican	5	500	1
<i>Vanellus tricolor</i>	Banded Lapwing	1-60	150	23
<i>Tachyspiza fasciatus</i>	Brown Goshawk	1	125	2
<i>Aquila audax</i> *	Wedge-tailed Eagle	1-5	1500	522
<i>Elanus axillaris</i>	Black-shouldered Kite	1	140	44
<i>Haliastur sphenurus</i>	Whistling Kite	1-2	70	8
<i>Hieraaetus morphnoides</i>	Little Eagle	1-	300	29
<i>Merops ornatus</i>	Rainbow Bee-eater	1-3	80	3
<i>Falco berigora</i> *	Brown Falcon	1-3	250	126
<i>Falco cenchroides</i>	Nankeen Kestrel	1-5	200	592
<i>Falco longipennis</i>	Australian Hobby	1-2	60	6
<i>Falco peregrinus</i>	Peregrine Falcon	1	100	6
<i>Cacatua pastinator</i>	Western Corella	1-500	200	52
<i>Cacatua sanguinea</i>	Little Corella/	1-800	70	21
<i>Calyptorhynchus</i> spp	Forest and/or Inland Red-tailed Black-Cockatoo	2 & 5	15	3
<i>Zanda latirostris</i>	Carnaby's Black-Cockatoo	1-280	60	662
<i>Eolophus roseicapilla</i>	Galah	1-250	60	57
<i>Coracina maxima</i>	Ground Cuckoo-shrike	1-40	60	4
<i>Gymnorhina tibicen</i>	Australian Magpie	1-15	60	49
<i>Grallina cyanoleuca</i>	Magpie-lark	1-7	60	38
<i>Corvus coronoides</i>	Australian Raven	1-50	120	150
<i>Cheramoeca leucosterna</i>	White-backed Swallow	1-15	100	11
<i>Hirundo neoxena</i>	Welcome Swallow	1-50	80	41
<i>Petrochelidon nigricans</i>	Tree Martin	1-30	70	19

Table 5-2. Summary of data obtained from three regional lakes to investigate the potential for the presence of migrant waders

Latin Name	Common Name	Group Size Range	Height range (m)	No. Obs
<i>Sternula nereis</i>	Fairy Tern	1-3	2-10	10
<i>Chroicocephalus novaehollandiae</i>	Silver Gull	4-15	0-35	10
<i>Anas gracilis</i>	Grey Teal	2-1200	0-30	4
<i>Anas rhynchotis</i>	Australasian Shoveler	2-80	0	4

Latin Name	Common Name	Group Size Range	Height range (m)	No. Obs
<i>Anas superciliosa</i>	Pacific Black Duck	2-75	0-200	4
<i>Aythya australis</i>	Hardhead	20	0	1
<i>Biziura lobata</i>	Musk Duck	8-55	0	5
<i>Cygnus atratus</i>	Black Swan	3-900	0	10
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck	2-30	0	3
<i>Oxyura australis</i>	Blue-billed Duck	20	0	1
<i>Tadorna tadornoides</i>	Australian Shelduck	2-2000	0-50	15
<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe	20-400	0	8
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	150	0	1
<i>Fulica atra</i>	Eurasian Coot	2-320	0-1	8
<i>Platalea flavipes</i>	Yellow-billed Spoonbill	1-21	0-12	7
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	5	100	1
<i>Ardea alba</i>	Great Egret	2	0	1
<i>Ardea pacifica</i>	White-necked Heron	3	0	1
<i>Egretta novaehollandiae</i>	White-faced Heron	5-6	0	3
<i>Pelecanus conspicillatus</i>	Australian Pelican	1-6	0	6
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	2	2	1
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	2-8	0-8	3
<i>Anhinga novaehollandiae</i>	Australasian Darter	2	70	1
<i>Himantopus himantopus</i>	Pied Stilt	20-50	0	8
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	2-300	0	5
<i>Charadrius ruficapillus</i>	Red-capped Plover	6-200	0	5
<i>Elseyornis melanops</i>	Black-fronted Dotterel	6-12	0	2
<i>Erythronyx cinctus</i>	Red-kneed Dotterel	6	0	2
<i>Tringa nebularia</i>	Common Greenshank	1-10	0-2	3
<i>Calidris ruficollis</i>	Red-necked Stint	6-400	0	3

6 Risk Assessment Results

Species deemed to be potentially at risk of collision with the turbines and require collision risk assessment are listed in Table 6-1 and assessed below.

Table 6-1. Birds and bats deemed to be potentially at risk of collision with the wind turbines and in need of detailed collision risk assessment.

Latin name	Common name	Status in project area	Cons. status
<i>Anas gracillis</i>	Grey Teal	Resident	CS3
<i>Tadorna tadornoides</i>	Australian Shelduck	Resident	CS3
<i>Threskiornis molucca</i>	Australian White Ibis	Regular visitor	CS3
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Regular visitor	CS3
<i>Ardea pacifica</i>	White-necked Heron	Irregular visitor	CS3
<i>Pelecanus conspicillatus</i>	Australian Pelican	Irregular visitor	CS3
<i>Vanellus tricolor</i>	Banded Lapwing	Regular visitor	CS3
<i>Aquila audax</i>	Wedge-tailed Eagle	Resident	Local
<i>Hieraaetus morphnoides</i>	Little Eagle	Regular visitor	Local
<i>Haliastur sphenurus</i>	Whistling Kite	Resident	Local
<i>Tachyspiza cirrocephalus</i>	Collared Sparrowhawk	Resident	CS3
<i>Tachyspiza fasciatus</i>	Brown Goshawk	Resident	CS3
<i>Circus approximans</i>	Swamp Harrier	Irregular visitor	CS3
<i>Circus assimilis</i>	Spotted Harrier	Regular visitor	CS3
<i>Elanus axillaris</i>	Black-shouldered Kite	Regular visitor	CS3
<i>Falco berigora</i>	Brown Falcon	Resident	CS3
<i>Falco cenchroides</i>	Nankeen Kestrel	Resident	CS3
<i>Falco longipennis</i>	Australian Hobby	Regular visitor	CS3
<i>Falco peregrinus</i>	Peregrine Falcon	Irregular visitor	CS1 (S1D3)
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	Irregular visitor	CS1 (Vu)
<i>Zanda latirostris</i>	Carnaby's Black-Cockatoo	Resident	CS1 (En)
<i>Cacatua</i> spp	Little Corella/Western Corella	Resident	CS3
<i>Eolophus roseicapilla</i>	Galah	Resident	CS3
<i>Merops ornatus</i>	Rainbow Bee-eater	Regular visitor	CS3
<i>Apus pacificus</i>	Fork-tailed Swift	Irregular visitor	CS1 (M)
<i>Cheramoeca leucosterna</i>	White-backed Swallow	Regular visitor	CS3
<i>Petrochelidon nigricans</i>	Tree Martin	Regular visitor	CS3
<i>Coracina maxima</i>	Ground Cuckoo-shrike	Vagrant	CS3
<i>Gymnorhina tibicen</i>	Australian Magpie	Resident	CS3
<i>Grallina cyanoleuca</i>	Magpie-lark	Resident	CS3
<i>Corvus coronoides</i>	Australian Raven	Resident	CS3
<i>Austronomus australis</i>	White-striped Freetail Bat	Regular visitor	CS3
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Resident	CS3

6.2 Listed Conservation Significant species; Collision Likelihood Score (CLS) Results

6.2.1 Carnaby's Black-Cockatoo

A total of 2,912 records was obtained for Carnaby's throughout the BBUS, documenting 670 separate events over 95.23 hours of direct observations of 12,800 birds (noting that some birds were seen across multiple events). The overall bird-time acquired for Carnaby's Black-Cockatoo amounted to 6,548.9 hours (the number of hours multiplied by the number of birds), of which more than 99.9% was spent at or below 30 m (Shepherd and Bamford 2026). There was only one flight of two birds that reached an estimated 60 m briefly before descending. Carnaby's was not observed within the RSA during the Dinner Hill BBUS. Results of the CLS are provided in Table 6-1 with an overall collision risk score of 14 – Unlikely.

Table 6-2. Summary table of the inputs and scores of the CLS for Carnaby's Black-Cockatoo (taken from the ACRF CLS report).

Component	Carnaby's Black Cockatoo, Short-billed Black-cockatoo			
	Category	Source	Comment	Score
Collision Risk Likelihood	Unlikely			14
Duration of exposure (D)	> 60 - 80%	site-collected	Based on the varied density present within the project area. During summer and autumn densities are at height and involve potentially 600 or so birds. In late winter and early spring this reduces to potentially only 100 birds that occur mostly to the SW and outside of the project area.	4
Flight height (H)	0% of flights within the rotor swept area	nearby wind farm, site-collected	Using height estimates from 2,855 records of CBCs across 6,549 hrs of bird time. One record of two birds briefly touching on 60 m height. Data from BBUSs on four nearby wind farms provide similar profiles.	0
Suitable habitat (A2)	> 10 - 25% suitable habitat	expert elicitation, site - based mapping, species habitat preferences	Vast majority of the project area is grassland and grain crops. Remnant stands of high-quality banksia heath and native woodland are scattered throughout, with some pine plantations and treelines. Canola grown in some paddocks but low percentage in 2024/25 and changes annually.	3
Species observations (A1)	Species observed on site (multiple occasions or individuals)	nearby wind farm, site-collected	Density of CBCs vary within the project area. During summer and autumn densities are at height and involve 600 or so birds. In late winter and early spring this reduces to around 100 birds which are mostly offsite to the SW.	5
Keystone features (A3)	0 - 500m from keystone feature	site-collected	High-quality Banksia heath and native woodland in small remnants across site. Two major night roosts in non-breeding season by C. 250 birds each. Several nesting trees confirmed in use by CBC.	5
Propensity to evade collision (C)	No evidence of collision, low level of uncertainty	expert elicitation, nearby wind farms	Carcass monitoring and pers. comm. from ecologists on nearby wind farms have retrieved no carcasses of CBCs. Observers on operational wind farms have observed that CBCs take evasive flight pathways by dropping below turbine blades. Similar observations have seen CBCs raise their height above busy highways showing that they have situational awareness and can avoid such threats.	1

6.2.2 Forest Red-tailed Black-Cockatoo

There was some uncertainty whether sightings of Red-tailed Black-Cockatoos were of the sub-species endemic to SW Western Australia (*Calyptorhynchus banksii naso*) or the Western Red-tailed Black-Cockatoo (*Calyptorhynchus banksii esconditus*). Both sub-species may be present. As a precaution, the sightings of Red-tailed Black-Cockatoos were assumed to be the former and assessed for collision risk using CLS. Two encounters with Red-tailed Black-Cockatoos were acquired in the project area, in October 2024 and March 2025, involving two and five birds respectively. The maximum height observed was 15 m. Calls were also heard at CVP02 in August 2025. Results of the CLS are given in Table 6-2, concluding that the risk of collision with turbines is very unlikely from a score of 6.

Table 6-3. Summary table of the inputs and scores of the CLS for Forest Red-tailed Black-Cockatoo (taken from the ACRF CLS report).

Component	Forest Red-tailed Black-Cockatoo, Karrak			
	Category	Source	Comment	Score
Collision Risk Likelihood	Very unlikely			6
Duration of exposure (D)	> 0 - 20%	site-collected	Since only one record of potential FRTBC, the duration is expected to be minimal.	1
Flight height (H)	0% of flights within the rotor swept area	nearby wind farm, site-collected	The one record of FRTBC in project area was estimated to be no higher than 15m. Many other sightings of FRTBC in SW WA by BCE team have seldom been >50m height. The one exception to this was over Perth CBD and likely a response to the high-rise buildings.	0
Suitable habitat (A2)	> 5 - 10% suitable habitat	expert elicitation, literature, site-based mapping, species habitat preferences	HANZAB identifies species associated with eucalypt (eg Marri and Sheoak) and mixed woodland of which the site has some. Project area is beyond expected distribution (Gingin and Dandaragan being quoted), but they are considered to be expanding their range north (Shephard and Warren, 2019) and into their former range which extended as far north as Dandaragan c. 28km south.	2
Species observations (A1)	Species observed on site (multiple occasions or individuals)	site-collected	12 Red-tailed Black-Cockatoos were detected on one occasion within the project area and anecdotal record from landowner of the sp in Cape Lilac trees near northern boundary. Group of FRTBC heard at control site c. 20 km south.	5
Keystone features (A3)	> 10,000m from keystone feature	literature	Data from GCC shows nearest FRTBC roost >10km to south.	1
Propensity to evade collision (C)	No evidence of collision, low level of uncertainty	nearby wind farms, post-construction monitoring	No records of carcasses of red-tailed black-cockatoo during carcass searches on wind farms in eastern states (T. Kelly pers.com.). Shepherd & Bamford (2025) note that no black-cockatoo carcasses were obtained from carcass searches on two wind farms in Dinner Hill Region.	1

6.2.3 Fork-tailed Swift

While no records of Fork-tailed Swift were obtained despite the number of hours undertaking surveys, the risk to this species from collision was assessed using CLS. Results are presented in Table 6-3 and indicate that the Fork-tailed Swift is unlikely to collide with the turbines having been given a collision risk score of 31.

Table 6-4. Summary table of the inputs and scores of the CLS for Fork-tailed Swift (taken from the ACRF CLS report).

Component	Fork-tailed Swift			
	Category	Source	Comment	Score
Collision Risk Likelihood	Unlikely			31
Duration of exposure (D)	> 0 - 20%	site-collected	Recorded in SW WA mostly in summer and autumn (HANZAB) and extremely infrequently.	1
Flight height (H)	> 40 - 60% of flights within the rotor swept area	expert elicitation, literature, site-collected	Observed at low level (B.Shepherd pers.obs.) but Reid and Baker give FTS a maximum flight time score of 5.	4
Suitable habitat (A2)	> 50% of site is suitable habitat	literature, species habitat preferences	HANZAB notes FTS as being aerial insectivore and therefore airshed over project area provides suitable habitat.	5
Species observations (A1)	Species not observed but within distribution	historical records, site-collected	BCE has not detected the sp in region from several intensive sample programmes over two years and a 40-year bird monitoring programme c. 27 km SW. One FTS observed in northern suburbs of Perth in March 2025 (B Shepherd, pers.obs.). These results highlight the extremely sporadic likelihood of occurrence and sparse scattering of this species in SW WA.	1
Keystone features (A3)	No keystone features relevant to the target species	literature	No specific features for this species to depend upon.	0
Propensity to evade collision (C)	Collision at family level	post-construction monitoring	Many records of White-throated Needletail in carcass searches on wind farms in eastern states (T.Kelly pers.com.).	2

6.2.4 Peregrine Falcon

CLS was used to assess the risk to the Peregrine Falcon as only one flight of a single bird briefly ascended to 60 m. Unfortunately, time could not be allocated to this brief occurrence. A landowner has advised that a single falcon is seen regularly in the north of the project area. Sampling at control VPs had two more encounters with some time observed within RSA. The overall proportion of time in the RSA was used as input to the CLS. Results of the CLS are provided in Table 6-4 and gives an overall collision risk score of 40 – Unlikely. Peregrines are known to soar at height when hunting prey as has been observed with a family of three falcons some 70 km to the SW (BCE records). Should a breeding pair take residence, the height profile on site may change.

Table 6-5. Summary table of the inputs and scores of the CLS for Peregrine Falcon (taken from the ACRF CLS report).

Component	Peregrine Falcon - <i>Falco peregrinus</i>			
	Category	Source	Comment	Score
Collision Risk Likelihood	Unlikely			40
Duration of exposure (D)	> 0 - 20%	site-collected	PeFa were encountered on only 7% of sampling days and therefore 0-20% selected. BCE has been monitoring birds in same area for 40 years and has recorded Peregrines only once.	1
Flight height (H)	> 20 - 40% of flights within the rotor swept area	site-collected	Four flights within wind farm and two flights at Control result in c. 39% of time in RSA. Other observations further south have them flying higher for longer. Conversely, observations along Brand Hwy have all been <50 m.	3
Suitable habitat (A2)	> 10 - 25% suitable habitat	site - based mapping	Landscape dominated by agriculture and is relatively bland for Peregrine Falcon. Large roosting/nesting trees are common especially around homesteads. Many prey items occur but no patterns or concentrations with exception of large field dam, frequented by moderate numbers of ducks. Landowner reported that PeFa roosts near this dam on occasion.	3
Species observations (A1)	Species observed on site (multiple occasions or individuals)	site-collected	Four encounters with single falcons during 937 hrs VP sampling on site and two encounters over 167 hrs on controls VPs	5
Keystone features (A3)	> 5,000 - 10,000m from keystone feature	site-collected	Other than large trees and comms towers across the site, landscape is relatively bland for this species. No cliffs and few concentrations of prey items. One large field dam frequented by several flocks of smaller ducks (eg Grey Teal).	2
Propensity to evade collision (C)	Collision at genus level	literature, post-construction monitoring	Peregrine carcasses have been found on five separate occasions on monitoring programmes in eastern states (T.Kelly pers comm.). However, Peregrine is given very high avoidance rates in UK (SNH, 2010) and is given a score of 3.	3

6.3 Locally Significant and At Risk Species; Collision Risk Modelling (CRM) Results

Six bird of prey (raptor) species and the Straw-necked Ibis had sufficient flight height data within the RSA for CRM to be carried out, with parameters used for the application of the model provided in Table 6-5 and Table 6-6. Time that each raptor species was observed in the air was a very small proportion of the overall time spent sampling with the highest being for Wedge-tailed Eagle at 4.5% from all observations including outside the project area. Although individual birds were not tracked for the entire day, this suggests that they occur at a low density and were within VP survey areas when surveys were being conducted for a small amount of time. There are few studies that have measured speed and daily flight activity of raptors in Western Australia, and therefore values were taken from literature on similar species including from wind farm risk assessments on other wind farms and, where considered necessary, adjusted to account for observations in the project area. Flight speed for Wedge-tailed Eagles for example has been quoted as 17 m/s (Smales and Muir, 2005). However, the majority of observed flights for eagles were of slow ascents and local soaring, with birds often almost stationary at height for many minutes (B. Shepherd pers. obs.). Conversely, Kestrels are generally reported to fly relatively slowly in their normal predatory flight patterns of hovering and stooping. However, when flying in RSA they were more inclined to travel faster by soaring and a higher value was selected.

Where estimates of aerial activity time were not available, upper and lower values of 0.25 and 0.35 were used respectively (as a proportion of a 24-hour period). Proportion of the day flying for each species is generally low according to BirdLife Australia (Wedge-tailed Eagle online bird profile) and Masman *et al.* (1988) (Nankeen Kestrel). However, these accounts appear to be based on anecdotal evidence and therefore have erred on the side of caution. Straw-necked Ibis were included in the CRM as these were the most abundant birds in RSA at any one time.

Results of the CRM are provided in Table 6-7 as annual collision estimates, based on 1000 Monte Carlo iterations. Median annual collision estimates ranged from 0.02 (Black-shouldered Kite) to 6.55 (Straw-necked Ibis). The Wedge-tailed Eagle and Nankeen Kestrel, both species identified as at risk on south-eastern Australian wind farms, had estimated median collision rates of 4.41 and 1.56 respectively. The Whistling Kite was included in the CRM which found an estimated median collision rate of 0.04/year. The model also provides confidence intervals for estimates.

These are modelled estimates and not absolute predictions of what may occur in any one year. CRM is a tool that can be used to inform assessment purposes and to derive monitoring and management measures. The tool assume that bird density is maintained after the turbines are operational and that birds lost to rotor-strike are immediately replaced. This is highly unlikely to be the case and if birds are replaced it will be over a period of time, depending on whether a partner remained in the area among other factors.

Note that the assumption of immediate replacement, together with some of the precautionary measures taken in acquiring, managing and filtering the data (height estimation, assigning flight height to highest bird in a flock and selecting birds that fly above 60 m respectively), is likely to result in the over-estimation of collision risk. The assumption is also made that results obtained over the two-year period of data collection are representative. It is also important to note that the collision risk estimates are only an estimate of the number of deaths that might occur in a year at the planned wind farm; the consequences of these deaths in terms of population survival are different.

Table 6-6. Parameters derived from the BBUS for locally significant raptor species and Straw-necked Ibis. Number of flights and birds are those sampled from within 2 km of the VPs in the project area and up to 270 m AGL. Values in shaded cells are taken from the ACRF's Species Traits Summary report when BBUS data for the species are deemed insufficient to calculate robust on-site values.

Species	No. flights	No. birds	$\bar{x}$ EDR (m)	SE EDR (m)	$\bar{x}$ Enc Rate (birds/min)	SE Enc. Rate (birds/min)	$\bar{x}$ Prop in RSA	SE Prop in RSA
Defined terms (Potter <i>et al.</i> (2026))			Effective detection radius (EDR) radius of a point at which estimate of undetected individuals equal the number of detected individuals. Calculated from combined distances to detections. on all VPs.	Standard error EDR.	Mean encounter rate. The number of flights observed per unit of survey effort.	Standard error encounter rate.	The mean fraction of recorded flights that occur within the RSA (0-1).	Standard error around mean proportion of flights within RSA.
Wedge-tailed Eagle	302	424	1999	42.26	0.00723	0.000941	0.7361	0.02967
Little Eagle	14	15	1235.2	155.66	0.000265	0.000159	0.605648	0.124244
Whistling Kite	6	6	1699.9	446.67	0.000107	0.000091	0.49909	0.32404
Black-shouldered Kite	11	11	1188	125.11	0.008874	0.001222	0.1	0.0249
Brown Falcon	15	19	1291.4	65.182	0.000347	0.00011	0.3238	0.11287
Nankeen Kestrel	431	514	1087	52.816	0.009112	0.001316	0.13254	0.03466
Straw-necked Ibis	38	1,292	1909.7	17.31	0.0241	0.0137	0.8054	0.06214

Table 6-7. Summary parameters used in CRM for each of the locally significant raptor species and Straw-necked Ibis.

Species	$\bar{x}$ Bird l (m)	SE Bird l (m)	$\bar{x}$ flight spd (m/s)	SDev flight spd. (m/s)	Min. prop day active	Max Prop Day active	Prop yr onsite	Min. dynamic avoidance rate	Max. dynamic avoidance rate	Dynamic avoidance rate Mode	Static avoidance rate
Defined terms (Potter <i>et al.</i> (2026))	Mean bird length. Body length (in metres) measured from the tip of the bill to the tip of the tail.	Standard error of bird length.	Mean flight speed of a bird in metres per second.	Standard deviation flight speed.	The proportion of the 24-hour period that the species is actively flying (0-1).	Maximum proportion of the 24-hr day in which the species is actively flying.	The fraction of the year during which the species is present and active at the site (0-1).	Minimum proportion of flights that birds take action to avoid collision with the blades.	Maximum proportion of flights that birds take action to avoid collision with the blades.	Modal proportion of flights that birds take action to avoid collision with the blades.	Avoidance rate relative to static turbine. The proportion of birds that avoid impacting with the turbines even if the turbine blades are not moving (0-1).
Wedge-tailed Eagle	0.945	0.2	10	5	0.25	0.35	1	0.92	0.98	0.95	0.9999
Little Eagle	0.5	0.15	17	5	0.35	0.45	0.8	0.92	0.98	0.95	0.9999
Whistling Kite	0.63	0.15	15	0.35	0.35	0.45	0.8	0.92	0.98	0.95	0.9999
Black-shouldered Kite	0.35	0.12	15	3	0.35	0.5	0.3	0.92	0.95	0.93	0.9999
Brown Falcon	0.46	0.07	17	4	0.15	0.25	1	0.92	0.98	0.95	0.9999
Nankeen Kestrel	0.32	0.12	15	3	0.15	0.3	1	0.92	0.95	0.93	0.9999
Straw-necked Ibis	0.63	0.15	10	5	0.1	0.35	0.8	0.92	0.98	0.95	0.9999

Table 6-8. Annual collision estimates for raptors (where sufficient data allowed) and the Straw-necked Ibis using the ACRF CRM tool. Behavioural avoidance has been accounted for.

Species	Mean	Median	Standard deviation	Min	Max	90% CI	95% CI
Defined terms (Potter <i>et al.</i> (2026))	The average estimated number of collisions per turbine	The median estimated number of collisions per turbine	How much the collision risk estimates vary around the average	The lowest estimated collision risk	The highest estimated collision risk	The range in which we are 90% confident the true collision risk lies	The range in which we are 95% confident the true collision risk lies
Wedge-tailed Eagle	4.86	4.41	2.11	1.34	16.74	2.39 – 8.65	2.16 – 10.27
Little Eagle	0.2	0.15	0.19	0.00	1.49	0.00 – 0.54	0.00 – 0.69
Whistling Kite	0.1	0.04	0.22	0	2.8	0.00 – 0.39	0.00 – 0.66
Black-shouldered Kite	0.03	0.02	0.02	0.00	0.22	0.00 – 0.07	0.00 – 0.09
Brown Falcon	0.09	0.08	0.06	0.00	0.42	0.02 – 0.20	0.02 – 0.23
Nankeen Kestrel	1.78	1.56	0.93	0.34	6.91	0.68 – 3.58	0.57 – 4.13
Straw-necked Ibis	11.39	6.55	15.92	0.00	126.78	0.17 – 37.32	0.00 – 58.04

6.4 Locally Significant and At-risk Species; Collision Likelihood Score (CLS) Results

At least 20 bird species that are considered locally significant due to potential risk from wind farm impacts, but not otherwise of conservation significance, were recorded in RSA. These species had sufficient flight height data in the RSA to be analysed only using CLS (Table 6-8). For most species, the CLS was concluded to be Unlikely, but for the White-necked Heron, Australian White Ibis, Australian Pelican, Brown Goshawk, Galah, corella (Little and/or Western) and Australia Raven, the CLS was considered Possible. For one species, the Australian Magpie, the CLS was considered Likely. The CLS analysis does not consider local abundance and therefore does not provide an assessment of consequence. Species such as the White-necked Heron, Australian White Ibis and Australian Pelican are present intermittently and in small numbers, and are much more abundant elsewhere, and the consequences of deaths would be different compared with for the Brown Goshawk, which may be represented by a few resident pairs in the region.

6.5 Bat species at Risk of Collision

The two locally significant bat species were assessed using the CLS due to the absence of data for flight height. The data input and results from the CLS are presented in Table 6-9 for the two bat species, resulting in a CLS of 71 – Likely, for White-striped Freetail Bat, and a CLS of 57 – Possible, for Gould's Wattled Bat.

Table 6-9. Input to and results of the CLS for other bird species with flight height data. It is noted that the CLS process doesn't specifically account for number of birds in a flight. The risk likelihood is an indication of the chance of the species being hit and does not inform the consequences on the species at the local level.

Species	Duration of exposure	Flight height	Suitable Habitat	Species observations	Keystone features	Propensity to evade collision	Score	Collision Risk Likelihood
Grey Teal <i>Anas gracillis</i>	>20-40%	>20-40%	>0-5%	Five observations of 6-25 individuals near field dam	>10 km from large lakes	Known to be hit by turbines on small number of occasions in eastern states	40	Unlikely
Australian Shelduck <i>Tadorna tadornoides</i>	>40-60%	>5-20%	>5-10%	24 flights within the project area of between 1 & 30 individuals.	>10 km from large lakes	Few found during carcass searches on wind farms in eastern states (T.Kelly, pers. comm.)	38	Unlikely
Australian White Ibis <i>Threskiornis molucca</i>	>0-20%	>20-40%	>5-10%	Four flights through BBUS of 1-12 birds.	>1-5 km from large wetlands	Few found during carcass searches on wind farms in eastern states (T.Kelly, pers. comm.)	46	Possible
White-necked Heron <i>Ardea pacifica</i>	>40-60	>20-40%	>0-5%	Seven flights in winter spring and early summer, of 1-5 birds	>1-5 km from large wetland systems	None found during carcass searches in eastern states but one other heron sp recorded. (T. Kelly, pers. comm.)	43	Possible
Australian Pelican <i>Pelecanus conspicillatus</i>	>0-20%	>60%	>0-5%	One flight in December of five birds. Took off from fish lakes to north of western end and was within RSA for most of flight	>10 km from large lakes and estuaries	A moderate number of pelican carcasses have been found during carcass searches on wind farms in south-eastern Australia (T. Kelly, pers. comm.).	50	Possible

Banded Lapwing <i>Vanellus tricolor</i>	>40-60%	>5-20%	>25-50%	10 flights of between 1 and 60 birds. Throughout year.	None known for sp.	Small number found during carcass searches on wind farms in south-eastern Australia (T. Kelly, pers. comm.).	40	Unlikely
Collared Sparrowhawk <i>Tachyspiza cirrocephalus</i>	>0-20%	>0-5%	>5-10%	Two flights of single birds in autumn. Considered an irregular visitor.	Large woodlands >10 km	Small number found during carcass searches on wind farms in south-eastern Australia (T. Kelly, pers. comm.).	25	Unlikely
Brown Goshawk <i>Tachyspiza fasciatus</i>	>0-20%	>40-60%	>5-10%	Flight of single birds in spring and one in autumn. Considered an irregular visitor.	Large woodlands >10 km	Numbers found during carcass searches on wind farms in south-eastern Australia (T. Kelly, pers. comm.). Since sp has low density across landscape, this may indicate higher vulnerability.	48	Possible
Swamp Harrier <i>Circus approximans</i>	>0-20%	>0-5%	>0-5%	Three flights of single birds through year. Considered an irregular visitor.	Large wetlands >10 km	Number found during carcass searches on wind farms in south-eastern Australia (T. Kelly, pers. comm.).	24	Unlikely
Spotted Harrier <i>Circus assimilis</i>	>0-20%	>0-5%	>25-50%	Two flights of single birds in spring and summer. Considered an irregular visitor.	None known for sp.	One found during carcass searches on wind farms in eastern states (T. Kelly, pers. comm.).	23	Unlikely

Rainbow Bee-eater <i>Merops ornatus</i>	>20-40%	>20-40%	>10-25%	3 flights within project area of 1-3 birds. Recorded mid-spring and summer. Likely to pass through area in larger numbers when migrating.	None known for sp.	No bee-eater carcasses retrieved during searches on wind farms in eastern states (T.Kelly, pers. comm.).	31	Unlikely
Australian Hobby <i>Falco longipennis</i>	>20-40%	>20-40%	>10-25%	6 flights within project area, 4 campaigns, summer, winter and spring	None known for sp.	One found during carcass searches on wind farms in eastern states (T. Kelly, pers. comm.).	40	Unlikely
Little Corella/Western Corella <i>Cacatua</i> spp	>80-100%	>5-20%	>50%	Most abundant taxa within project area throughout all campaigns. From 1-800 birds.	None known for sp.	Small number found during carcass searches on wind farms in eastern states (T. Kelly pers. comm.). Surprisingly low for abundance.	48	Possible
Galah <i>Eolophus roseicapilla</i>	>80-100%	>5-20%	>50%	Abundant spp and present throughout all campaigns. 1-250 birds.	None known for sp.	Moderate number found during carcass searches on wind farms in eastern states (T. Kelly pers. comm.).	48	Possible
Ground Cuckoo-shrike <i>Coracina maxima</i>	>0-20%	>20-40%	>0-5%	Recorded only in Jul 2025, 1-40 birds. Recorded once in 40 years at nearby long-term bird monitoring.	Arid and semi-arid zones >10km	Small number Genus found during carcass searches on wind farms in eastern states (T. Kelly, pers. comm.).	31	Unlikely

Australian Magpie <i>Gymnorhina tibicen</i>	>80-100%	>0-5%	>50%	Recorded throughout BBUS programme. Possibly under-recorded as not target species.	None known for sp.	Commonest sp found during carcass searches on wind farms in eastern states (T. Kelly, pers. comm.).	32*	Unlikely
Magpie-lark <i>Grallina cyanoleuca</i>	>80-100%	>0-5%	>25-50%	Recorded regularly in groups between 1 and 7 birds.	None known for sp.	Number found during carcass searches on wind farms in eastern states (T. Kelly, pers. comm.).	37	Unlikely
Australian Raven <i>Corvus coronoides</i>	>80-100%	>0-5%	>25-50%	Recorded regularly in groups between 1 and 7 birds.	None known for sp.	Number found during carcass searches on wind farms in eastern states (T.Kelly, pers. comm.).	48	Possible
White-backed Swallow <i>Cheramoeca leucosterna</i>	>20-40%	>20-40%	>10-25%	Observed on 8 occasions throughout BBUS and on 6 of 14 campaigns.	None known for sp.	Small number of family-level finds during carcass searches on wind farms in eastern states (T.Kelly, pers. comm.).	34	Unlikely
Tree Martin <i>Petrochelidon nigricans</i>	>40-60%	>5-20%	>10-25%	Regularly recorded throughout BBUS in groups between 1 and 30 birds. Considered resident.	Large lakes where >500 birds observed regularly lie >10km south.	Small number of Fairy Martins found during carcass searches on wind farms in eastern states (T.Kelly, pers. comm.).	34	Unlikely

Table 6-10. CLS input and scored results for the White-striped Freetail Bat and Gould's Wattled Bat.

Species	Duration of exposure	Flight height	Suitable Habitat	Species observations	Keystone features	Propensity to evade collision	Score	Collision Risk Likelihood
White-striped Freetail Bat <i>Austronomus australis</i>	>60-80%	>40-60%	>25-50%	Recorded occasionally on all ARUs across the project	>500-1,000 m from keystone feature	Moloney et al. (2019) reports this species to be most common species found during carcass searches on wind farms in Victoria.	71	Likely
Gould's Wattled Bat <i>Chalinolobus gouldii</i>	>80-100%	>5-20%	>50%	Recorded frequently on ARUs throughout BBUS programme. Second most active bat species.	0-500 m from keystone feature	Hull and Cawthen (2013) report most bats found in carcass searches in Tasmania were of Gould's Wattled Bat (rotor sweep to 27 and 35 m of ground).	57	Possible

7 Summary and Discussion

7.1 Carnaby's Black-Cockatoo

Carnaby's Black-Cockatoo is a high-profile species and one for which the Dinner Hill area is considered of importance. They have been shown to be present throughout the year and were observed roosting and nesting. Data gained on their flight profiles demonstrate that they remain at relatively low heights for the majority of time. A very low percentage of their flight time is above 40 m and generally only involves one or two birds. Carcass monitoring studies on wind farms in the region have not reported black-cockatoo carcasses (in Shepherd and Bamford, 2025) and anecdotal evidence suggests they identify turbine blades and actively avoid them (M. Bamford pers. obs.). The CLS tool has estimated the risk of rotor strike on Carnaby's to be unlikely and therefore few if any deaths per year are expected. In comparison to existing threats such as vehicle collisions and ongoing loss of foraging habitat, the risk of mortality from the Dinner Hill Wind Farm is concluded to be negligible.

The threat of road traffic accidents on Carnaby's may increase due to site construction traffic. The majority of transport vehicles for turbine components are very slow moving and not considered a threat. Other construction vehicles can be kept to a reduced speed when travelling near known Carnaby's haunts.

The potential of displacement from important roosting sites, nesting trees and foraging habitat remains. Nest trees in particular are increasingly scarce due to continued land clearing, and not being replaced at the rate required due to lack of forest regeneration and recruitment. Nesting resources and, the foraging habitat and drinking water required to support the breeding birds are therefore important. Turbines have been relocated a minimum of 1,000 m away from known nesting trees and native vegetation is not being targeted for removal. It requires noting that much of the foraging habitat on which breeding Carnaby's depend is outside of the project area; clearing, grazing (that leads to weed invasion and degradation) and burning of the surrounding landscape is beyond the control of the OX2. This reliance on others also applies to the Carnaby's when off-site during the non-breeding season.

Through management measures, provision of drinking water can be maintained if not through the landowners. Due to their resilience around urban, rural and industrial activities, and persistence within and around existing wind farms in the region, Carnaby's are expected to withstand the additional and relatively short-term disturbances from construction. Given their persistence on existing wind farms, they are also expected to remain active within the Dinner Hill Wind Farm area during operations of the wind farm. However, loss of foraging and breeding habitat in Western Australia remains the biggest threat to the species and may be the root-cause of any declines during operations. The risk of collision to this species can be considered negligible due to their flight profile relative to a ground clearance of 60 m.

7.2 Forest Red-tailed Black-Cockatoo

This sub-species was recorded potentially only once within the project area and at very low height. It is considered an irregular visitor but may be expected to occur more frequently in the project area as the sub-species appears to be expanding its range to the north. This reflects its former range which is noted to have extended to Dandaragan (Johnstone and Storr, 1998). The risk of collision is concluded as very unlikely through the CLS. The risk of significant consequences can be considered negligible due to irregular occurrence, very low flight profiles and no key activities such as breeding.

7.3 Fork-tailed Swift

Fork-tailed Swifts were not recorded during the BBUS but can be expected to occur in the project area occasionally; they are classed as an irregular visitor. Due to their flight profile, they are considered at risk, but due to their sparse and sporadic occurrence in the region, they are deemed to be unlikely to collide with turbines. The risk of significant consequences to this species can therefore be considered negligible due to extremely irregular occurrence.

7.4 Peregrine Falcon

Several flights of a single Peregrine Falcon were acquired through the BBUS programme. Results of the CLS suggests the risk from rotor-strike is unlikely (while a different species with some different flight characteristics, it is worth noting that CRM results for the Brown Falcon, which had 19 flights compared with the three for Peregrines, predicted the risk of collision once about every 12.5 years). The Unlikely risk for the Peregrine Falcon is due in part to the relatively low activity levels of this species within the wind farm area, relatively low flight profile recorded in the area, and documented ability to avoid wind turbines in Europe. It is also a rare mortality at wind farms in Australia (T. Kelly, pers. comm.). The risk to this species can be considered negligible to low due to very irregular occurrence and reported to have high situational awareness and behavioural avoidance of turbines (Scottish Natural Heritage, 2010).

Population density is uncertain but broadly across Australia, densities are typically within a pair per 500 – 1,500 km² (Marchant and Higgins 1986). The density is likely to be very low in the region. If a breeding pair is found to be resident in the future, it would require further monitoring to detect any possible impact.

7.5 Wedge-tailed Eagle

Wedge-tailed Eagles observed during the BBUS spent the majority of flight time within the RSA (Shepherd and Bamford 2026). CRM analysis predicts that the number of collisions involving Wedge-tailed Eagles is around a median of four to five birds per annum (95% CI: 2.16 – 10.27 birds). This assumes that any birds lost to collision will be immediately replaced, whereas replacement is more likely to be slow and vary seasonally, so the real mortality rate will be lower even without any other mitigation measures. Losses of four to five birds per annum is consistent with carcass monitoring studies conducted in south-eastern Australia (Moloney et al. 2019).

The Wedge-tailed Eagle is considered the raptor species to be most at risk from the operating wind farm due to the large proportion of time it spends within RSA heights and vulnerability to rotor-strike (Moloney et al. 2019). This species has persisted in the past despite organised persecution and appears able to withstand substantial losses (Serventy and Whittell, 1976). Juvenile eagles appear most at risk from collision (T. Kelly pers. comm.), but juvenile mortality is naturally high and small losses of 4-5 birds per annum from rotor-strike may be sustainable. However, loss of breeding adults is more of a concern and may require further monitoring. No evidence of breeding was found in the project area, but it is expected. Carrion, its primary food source, is common in the project area and seems to maintain several families throughout. Carcasses can be removed from within the turbine array and potentially reduce their exposure to rotor-strike. Adult birds appear capable of identifying turbines as a risk and can avoid them, and perhaps why they persist in a region that contains a number of operational wind farms. If there were any consequences on Wedge-tailed Eagles because of the wind farms, it may be detected in a decline in breeding pairs which doesn't seem to have happened to date, but the cumulative impact of multiple wind farms across the region over the next decade should be recognised as a risk. Juvenile birds can undertake large dispersal flights following fledging and recolonisation is therefore expected to be quite quick.

The risk to Wedge-tailed Eagles as a result of collision with turbine blades is expected to have low to moderate consequences depending on whether young birds or adults are impacted. However, cumulative impact of multiple wind farms in the region does need to be considered.

7.6 Little Eagle

Little Eagles were the fourth most commonly detected raptor species and were observed in the RSA for approximately 60% of the recorded time. Predictions of flights at risk of colliding with turbines was relatively low at a median of 0.15 strikes per annum (95% CI: 0.00 – 0.69) or one bird every six years. A pair of Little Eagles was observed near a suitable nest and was therefore suspected of breeding. The Little Eagle has a sparse distribution but is regularly recorded throughout the region. In a similar way to Wedge-tailed Eagles, if juveniles were lost through collision, it would likely be within the natural attrition rate for the species. If, however, breeding adults were impacted, the losses would be more wide-reaching and replacement may take longer.

Monitoring of breeding and nesting activities will be important to understand whether the species is persisting following the commencement of operations. This issue is compounded considering the number of existing and proposed wind farm projects in the Northern Coastal Plain area. The risk to this species can be considered negligible due to irregular occurrence and predicted losses of one collision every six years or so.

7.7 Whistling Kite

Whistling Kites were observed irregularly with only six encounters which are considered too few for robust CRM. Therefore, CRM results should be read in conjunction with the results from CLS. CRM predicted annual collisions of a median of 0.04 birds (95% CI: 0.00 – 0.66) or approximately one every 25 years, whereas CLS gave this species a collision risk score of 50 (possible). This species has higher densities than most other medium-sized raptors but seems to be relatively uncommon in the project

area. This could be a result of annual variation. However, loss of breeding adults will carry higher consequences than losses of juveniles and breeding pairs should be targeted for monitoring if found. The risk to this species can be considered negligible but there is some uncertainty regarding the output of the CRM due to the small sample size.

7.8 Black-shouldered Kite

Black-shouldered Kites are renowned for their highly varied densities following abundance of small mammal prey items (Marchant and Higgins 1989). Corresponding crashes in their abundance follow the collapse in the number of prey items. This appeared to be the case for this species in the project area in 2025/2026 with low numbers present. Encounters were few and the predicted loss of around a median of 0.02 birds per annum (95% CI: 0.00 – 0.09) is relatively low, equating to one collision about every 50 years. During future irruptions of the species, this is likely to increase, but the consequences of higher collision rates when the population level is rising are low. The natural state of this species is of high population flux and high mortality/emigration.

7.9 Brown Falcon

The Brown Falcon was the third most commonly-detected raptor in the project area, but its occurrence was sporadic and in low numbers compared with other areas in which BCE has been sampling (B. Shepherd pers. obs.). Predictions of annual mortalities are very low at a median of 0.08 birds (95% CI: 0.02-0.23) which equates to one collision every 12.5 years. Some mortality over time is inevitable and while these may often be juvenile birds, there exists the possibility of members of breeding pairs being killed. This has implications for local persistence of the species. Note that the species is widespread at low to moderate densities, so recolonisation potential is likely to be high. The Brown Falcon is regularly found during carcass searches on wind farms in south-eastern Australia (Moloney et al, 2019), but the turbines are possibly lower, and bird densities may be higher than currently expected on Dinner Hill. The consequences on this species through collision with the wind turbines can be considered negligible.

7.10 Nankeen Kestrel

Nankeen Kestrels were observed within RSA for around 13% of the time (Shepherd and Bamford 2026) and were predicted to have a median loss of around a median of three birds every two years (95% CI: 0.57-4.13) due to rotor-strike. This is consistent with the expectation that Nankeen Kestrels are at higher risk than most other raptors from wind farms (Moloney et al. 2019), due in part to their relatively high density across the landscape, despite being at lower elevations for most of the time when compared with Wedge-tailed Eagles for example.

Some mortality is inevitable and while these may often be juvenile birds, there exists the possibility of members of breeding pairs being killed. This has implications for local persistence of the species. However, the species is widespread at moderate densities so recolonisation potential is high. Therefore, the potential consequences on this species can be considered low.

7.11 Straw-necked Ibis

While Straw-necked Ibis were only occasionally observed in the project area, they were in flocks of up to 250 individuals and were regularly observed soaring within RSA to get elevation before transiting elsewhere at height. They were therefore the most abundant bird in RSA heights but were present only occasionally. Predicted losses of around a median of six to seven birds per annum (95% CI: 0.00 – 58.04), appear low considering their flight height profile and numbers within RSA. However, they are not commonly found during carcass searches on wind farms in south-eastern Australia (Moloney et al. 2019) and must therefore be adept at avoiding turbines. This species is very common in the region and often associated with waste dumps or agricultural systems in elevated numbers when food and invertebrate prey is abundant. The loss of around five birds per annum is unlikely to be ecologically significant.

7.12 Other Bird Species

Twenty-one other bird species were recorded flying within RSA heights during the Dinner Hill WF BBUS. Of these, the Australian Magpie was deemed likely to collide with wind turbines mostly through high numbers of carcasses found during monitoring on other wind farms. Eight were determined to have a possible chance of collision while the remaining 12 were concluded to be unlikely to collide with turbines.

Australian Magpies are generally very abundant in the region and potentially have an elevated abundance across agricultural landscapes. Losses are unlikely to be ecologically impactful and numbers will likely be replenished from surrounding areas.

Other raptor species and some water birds (e.g. Australian Shelduck) were also recorded within RSA on occasion. However, all were far less active either in the project area or within RSA than those formally assessed in this report. The Australian Hobby can be expected to have a lower risk of rotor-strike than the Brown Falcon which is already very low. Australian Shelduck were observed flying at height in substantially lower numbers and for much less time than the Straw-necked Ibis and therefore can expect to have substantially fewer predictions of rotor-strike than the ibis.

7.13 White-striped Freetail Bat

The White-striped Freetail-Bat was detected frequently but with low call abundance during the BBUS and appears to have a sporadic presence through the year. The species is known to be an internal migrant in Australia and retreats to the lower south-west over summer. The Dinner Hill area may lie between its northern and southern haunts and could therefore be present at any time, but possibly with autumn and spring peaks in abundance during migration. Substantial numbers of deaths for this species are reported in south-eastern Australia (Moloney et al. 2019) although on wind farms with generally lower RSAs. While no losses can be estimated, mortality of perhaps ten or so individuals per year may be expected (based on mortality studies of moderate size wind farms elsewhere). Data from carcass searches on wind farms in the Badgingarra area are important to share and may provide better information.

7.14 Gould's Wattled Bat

Gould's Wattled Bat was detected during the BBUS and is considered one of the most abundant microbat species in Australia. The species is widespread throughout rural and urban landscapes (Churchill, 2008). It is frequently found during carcass searches in eastern states of Australia (T. Kelly pers. comm.). However, this has been below turbines that generally have lower RSA than current specifications. Data from carcass searches on wind farms in the Badgingarra area are important to share and may provide better information. Due to this species abundance and widespread range, some losses per annum can be sustainable.

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Appendix B: **Example carcass search survey data sheet**

APPENDIX B: Example Carcass Search Survey Data

DINNER HILL WIND FARM PROJECT

Survey timing and location details

Date:		Type of survey location:	Turbine
Start time:		Survey location ID:	
Finish time:		Survey location coordinates:	Easting: Northing:
Portion of time the turbine was operational over the past five days (%):		Portion of time the turbine was operational over the past 30 days (%):	

Survey area details

Shape of survey area: (tick one)	☐ Circle ☐ Other:	GPS track taken: (tick one)	☐ Yes ☐ No
Dimensions of survey area: (tick one)	☐ Radius = 120 m from turbine ☐ Other:	Transect width (m):	
Size of survey area (m ²):			

Survey area stratum and environmental setting

Distance to key habitat feature(s) (i.e. dam or wetland, watercourse, woodland):

Description of vegetation within survey area (i.e. type, height, density):

Ground visibility within survey area (%):	Bare ground = Short or sparse vegetation = Long or dense vegetation =	
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Weather conditions

Temperature (°C):		Wind direction:	
Rainfall: (tick one)	☐ Fine ☐ Rain ☐ Drizzle ☐ Heavy rain	Wind strength: (tick one)	☐ Calm ☐ Strong ☐ Breeze ☐ Moderate
Cloud cover (%):		☐ Speed (km/hr) =	

Carcass search survey method

Survey method: (tick one)	☐ Detection dogs and handlers ☐ Ecologists	Names of searchers:	
Number of searchers:			

Carcass search survey findings

Dead or injured bird or bat data sheet(s) completed for each find: (tick one)	☐ Yes ☐ No	Photograph(s) taken for each find: (tick one)	☐ Yes ☐ No
Total number of carcasses recorded:			

Additional notes:

Appendix C: **Example dead of injured bird or bat data** **sheet**

APPENDIX C: Example Dead or Injured Bird or Bat Data Sheet

DINNER HILL WIND FARM PROJECT

Timing and location details

Date:		Location:	
Time carcass/injured animal was found:		Carcass coordinates:	Easting: Northing:
Observer / personnel (company) involved:			

Detection

Survey method: (tick one)	☐ Planned carcass search survey by detection dogs and handlers ☐ Planned carcass search survey by ecologists ☐ Incidental find		
Distance of find from observer after detection (m):		Behavioural change in dog, if relevant:	
Distance of find from turbine (m):		Direction of find from turbine (bearing):	
Photograph(s) taken and attached to the data sheet: (tick one)	☐ Yes ☐ No	Ground visibility within 1 m radius of find: (tick one)	☐ Bare ground ☐ Short or sparse vegetation ☐ Long or dense vegetation
Describe detection area: (i.e. stratum / vegetation)			

Weather conditions

Temperature (°C):		Wind direction:	
Rainfall: (tick one)	☐ Fine ☐ Rain ☐ Drizzle ☐ Heavy rain	Wind strength: (tick one)	☐ Calm ☐ Breeze ☐ Strong ☐ Moderate
Cloud cover (%):			☐ Speed (km/hr) =
Any unusual weather in the past 48 hours:			

Carcass / injured animal details

Preliminary species identification:		Carcass identifier:	
Age of animal: (tick one)	☐ Unknown ☐ Adult ☐ Juvenile	Sex of animal: (tick one)	☐ Unknown ☐ Female ☐ Male
Condition of animal: (tick one)	☐ Injured ☐ Intact carcass ☐ Partial remains ☐ Scavenged ☐ Feathers only ☐ Other:	Degree of decay: (tick one)	☐ Fresh ☐ >3 days ☐ 1–3 days ☐ Other:
		Signs of scavenging, if relevant:	

DINNER HILL WIND FARM PROJECT

Fate of carcasses from incidental finds: (tick one)	☐ Removed ☐ Left in place (if ≤ 5 days from planned survey)	Signs of injury, if relevant:	
If a carcass is found, post-find actions include: 1. Report to the O&M contractor environment representative and follow carcass detection / find protocol.		If an injured animal is found, post-find actions include: 1. Report to the O&M contractor environment representative and follow injured bird and bat find protocol.	

Safety note: Do not touch any bats, instead call in a qualified and appropriately vaccinated ecologist or wildlife carer.

Photograph(s) of the carcass / injured animal:

Appendix D: **Example carcass persistence trial data sheet**

D: Example Carcass Persistence Trials

WIND FARM PROJECT

Carcass persistence trial method

Weather conditions and trial area stratum

Carcass persistence trial records

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DINNER HILL WIND FARM PROJECT

Additional notes:

Appendix E: **Likelihood of occurrence for conservation significant fauna**

E.1 Likelihood of occurrence

Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
Birds				
<i>Aphelocephala leucopsis</i> Southern whiteface	-	Vulnerable	- The Southern whiteface lives in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover (DCCEEW 2025a) - The species has not been recorded within the Project Area, based on a review of the DBCA's Threatened and Priority Fauna database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025) - Habitat critical to the survival of the Southern Whiteface includes areas of: - Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both - Habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat - Living and dead trees with hollows and crevices which are essential for roosting and nesting (DCCEEW, 2023).	Unlikely - No records occur within 30 km of the Project Area - No suitable habitat (undisturbed woodlands or shrublands with an undisturbed understorey and litter cover) is present in the Project Area - This species was not observed within the Project Area during the basic fauna survey - The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
<i>Apus pacificus</i> Fork-tailed swift	Migratory	Migratory	- The Fork-tailed swift is an aerial species that occurs widely over a range of habitats at elevations ranging from quite close to the ground to at least 300 m above ground level, although likely higher. - It occurs across a wide range of habitats within Australia and is mostly observed over inland plains and is seen over coastal beaches and cliffs. A non-breeding visitor to Australian skies from the northern hemisphere, it is more frequently observed in coastal eastern Australia than elsewhere, potentially due to a higher density of observers (DCCEEW 2025b) - The species has not been recorded within the Project Area, based on a review of the DBCA's Threatened and Priority Fauna database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025).	Vagrant - The swift is an aerial forager and unlikely to be dependent on any of the habitats present within the Project Area - Any occurrence of swift in the Project Area would likely be in the air space and largely independent from terrestrial habitat - Anecdotal evidence suggests that presence of a swift in the northern-west Wheatbelt is extremely rare. The species is considered very

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Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
				unlikely to be recorded in the air space above the Project Area.
<i>Falco hypoleucos</i> Grey falcon	Vulnerable	Vulnerable	- The species has not been recorded within the Project Area, based on a review of the DBCA's Threatened and Priority Fauna database - The Grey falcon prefers arid or semi-arid parts of Western Australia where rainfall is less than 500 mm (DCCEEW 2025c).	Vagrant - No records occur within 50 km of the Project Area - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present. However, the species may opportunistically fly over or forage in the Project Area - The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
<i>Falco peregrinus</i> Peregrine falcon	Other specially protected	-	- The species has not been recorded within the Project Area, based on a review of the DBCA's Threatened and Priority Fauna database. However, was recorded within 12 km of the Project Area including approximately 10km north-east of the Project Area in 2010 - The Peregrine falcon prefers cliffs, watercourse, cliff ledges, wooded watercourses and granite outcrops (DCCEEW 2025d).	Regular visitor - BCE (2025) made one observation of the Peregrine falcon during the bird and bat utilisation surveys. The Project Area is likely within the home range of a pair, but breeding habitat is limited. This species may occur opportunistically within the survey area. - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present for this species - The species may opportunistically fly over or forage in the Project Area.
<i>Leipoa ocellata</i> Malleefowl	Vulnerable	Vulnerable	- The original distribution of the Malleefowl covered much of the southern half of the continent from the west coast to the Great Dividing Range in the east. The species was widespread in every mainland state except Queensland (Barrett et al. 2003; Garnett et al. 2011). - Malleefowl occur in a wide range of habitat types; common elements include a sandy substrate with trees (i.e. eucalypt species) 3–8 m in	Irregular visitor Malleefowl is unlikely to persist within the site due to the highly fragmented nature and limited extent of this potential habitat, however based on

REPORT

Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
			height and a shrub layer providing horizontal cover. They mostly feed on ants and the seeds of wattle and other legume plants with slight seasonal variation (Benshemesh 2007). - The DBCA's database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025) did not record this species within the Project Area. - An anecdotal record was provided by a landowner for a single Malleefowl crossing Watheroo Road in June 2025 (BCE 2025).	one anecdotal record it may be a very irregular visitor.
<i>Pezoporus flaviventris</i> Western ground parrot	Critically Endangered	Critically Endangered	- The western ground parrot is a ground-dwelling bird that occupies low, dry or swampy near-coastal heathlands on sand plains and uplands. - The species is usually recorded in habitats that are unburnt for long periods of time. They can forage in recently burnt habitats; however, these habitats are unsuitable for breeding and are only used on an occasional basis. - The western ground parrot's distribution is restricted to near coastal regions of south-western Western Australia. They are currently known to occur in two locations, Fitzgerald River National Park and Cape Arid National Park - Nuytsland Nature Reserve (Threatened Species Scientific Committee (TSSC) 2013a). - A search of the DBCA's database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025) did not identify records of this species within the Project Area.	Locally extinct The Western ground parrot is a ground-dwelling bird which inhabits low, dry, or swampy near-coastal heathland, however has not been officially recorded outside of the Fitzgerald River National Park and Cape Arid National Park - Nuytsland Nature Reserve in over 20 years (DCCEEW 2025f). The Project Area is over 500 km from these known occurrences of the Western ground parrot populations and this species is likely to be locally extinct.
<i>Rostratula australis</i> Australian painted snipe	Endangered	Endangered	- The Australian painted snipe favours the margins and shallow waters of well vegetated wetlands including artificial wetlands (dams, and pastures) (DCCEEW 2025g) - The species listed was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database.	Unlikely - This species has not been recorded within 170 km of the Project Area - No suitable habitat (shallow waters, well vegetated wetlands, artificial dams) is present within the Project Area. It is therefore considered unlikely for this species to be present.
<i>Zanda latirostris</i> Carnaby's cockatoo	Endangered	Endangered	Carnaby's cockatoo is endemic to, and widespread, in the south-west of Western Australia. Its range extends from Cape Arid in the south-east to Kalbarri in the north, and inland to Hatter Hill, Gibb Rock, Narembreen, Noongar, Wongan Hills, Nugadong, near Perenjori, Wilroy and Nabawa.	Seasonal visitor There are known roosting trees present to the north of the Project Area directly adjacent to the Hill River, which would provide a

REPORT

Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
			- A search of the DBCA's Threatened and Priority Fauna database did not identify any records of this species within the Project Area. However, several records were listed proximate to the Project Area, primarily along Hill River in the Coomallo Nature Reserve, including approximately 2.5km north-east of the Project Area. The Coomallo Creek Important Bird Area, which includes an eastern portion of the Coomallo Nature Reserve and patches of remnant vegetation future to the east outside of the reserve, lies approximately 10 km north-east of the Project Area. It is a known Carnaby's cockatoo breeding location with around 40 pairs nesting annually (Department of Parks and Wildlife 2013). Carnaby's cockatoos mainly forage in areas up to 12 km from nesting trees during the breeding season and in areas up to 20 km, or higher, from known night-roosting habitat during the non-breeding season. The Project Area is within the foraging range of nesting Carnaby's cockatoos in the Coomallo Creek Important Bird Area and roosting cockatoos along Hill River. - Carnaby's cockatoo occurs in uncleared or remnant native eucalypt woodlands, especially those that contain salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture (DCCEEW 2025h) - Breeding habitat for Carnaby's cockatoo comprises woodland or forest and partially cleared woodland or forest including isolated trees. They nest in hollows of live or dead trees, and many Eucalyptus species may provide suitable hollows. Carnaby's cockatoos roost in or near riparian environments or natural or artificial water sources. Any tall trees may provide roosting habitat, particularly flat-topped yate (<i>Eucalyptus occidentalis</i>), salmon gum, wandoo, marri, karri, blackbutt, tuart, introduced eucalypts and introduced pines. They forage in native shrubland, heathland and woodland on seeds, nectar and flowers of native proteaceous plant species. They also forage on seeds of introduced species, including <i>Pinus</i> spp., <i>Erodium</i> spp., wild radish, canola, almonds, macadamia and pecan nuts; insects and insect larvae; occasionally apples and persimmons; and liquidambar (DCCEEW 2025h). - Carnaby's are also known to forage on canola and lupin crops and wild radish as a weed species in the north-west Wheatbelt.	seasonal water source for breeding / roosting Carnaby's cockatoos Based on this, it is likely that the Carnaby's cockatoo may opportunistically forage on native vegetation, canola / lupin crops (if under rotation) / wild radish and could use taller trees for roosting / breeding (if hollows are present) within the Project Area.

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Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
<i>Calyptrorhynchus banksia</i> Forest Red-tailed black cockatoo	Vulnerable	Vulnerable	- This species generally breeds in intact or partially cleared woodland or forests, including isolated trees. It nests in hollows in live or dead trees, with many eucalypt species providing potentially suitable hollows - This species primarily forages on the seeds of jarrah and marri in woodlands and forest, and edges of karri forests, including wandoo and blackbutt. However, it also forages on <i>Allocasuarina</i> cones, fruits of Snottygobble (<i>Persoonia langifolia</i>) and Mountain marri (<i>C. haematoxylon</i>). Some introduced eucalypts also provide potential habitat, such as River red gum (<i>E. camaldulensis</i>) and Rose gum (<i>E. grandis</i>) (DAWE 2022). - This species was not recorded within or proximate to the Project Area by the DBCA's Threatened and Priority Fauna database. However, the species has been recorded within 20 km of the Project Area by Birdlife Australia's Birddata database (Birdlife Australia 2025) (including in 2005, 2009, and 2023), and within 25 km of the Project Area by Ebird's species observations (Ebird Database 2025) (including in 2009 and 2023).	Irregular visitor - Although outside the known range of this species, BCE (2025) recorded this species proximate to the Project Area. This species may occasionally occur as an irregular visitor. - The species has been recorded within 30 km of the Project Area - Based on this, it is possible that the Forest Red-tailed black cockatoo may opportunistically forage on native vegetation, canola / lupin crops (if under rotation) / wild radish and could use taller trees for roosting / breeding (if hollows are present) within the Project Area.
<i>Actitis hypoleucos</i> Common sandpiper	Migratory	Migratory	- This species inhabits the edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal salt lakes (including saltwater ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available (Johnstone, 1998). - This species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025).	Vagrant - The species has been recorded within 30 km of the Project Area - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present. However, the species may opportunistically fly over or forage in the Project Area - The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
<i>Calidris acuminata</i> Sharp-tailed sandpiper	Vulnerable	Migratory	- Within Western Australia, this species inhabits tidal mudflats, saltmarshes and mangroves, plus shallow fresh, brackish or saline inland wetlands. It has also been recorded in floodwater areas, irrigated pastures and crops, sewage ponds, salt fields. - This species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database, Birdlife Australia's	Vagrant - The species has been recorded within 30 km of the Project Area - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be

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Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
			Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025).	present. However, the species may opportunistically fly over or forage in the Project Area The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
<i>Calidris ferruginea</i> Curlew sandpiper	Critically Endangered	Critically Endangered Migratory	- This species prefers the shallows of estuaries and near-coastal salt lakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds (Johnstone, 1998). - This species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025).	Vagrant - The species has been recorded within 35 km of the Project Area - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present. However, the species may opportunistically fly over or forage in the Project Area - The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
<i>Calidris melanotos</i> Pectoral sandpiper	Migratory	Migratory	- This species prefers fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and salt lakes (Johnstone, 1998). - This species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025).	Vagrant - The species has been recorded within 35 km of the Project Area - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present. However, the species may opportunistically fly over or forage in the Project Area - The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
<i>Tringa nebularia</i>	Migratory	Endangered	Common greenshanks are found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in	Vagrant

REPORT

Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
Common greenshank		Migratory	sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated flood plains, claypans and salt flats (DCCEEW 2025j) This species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database, Birdlife Australia's Birddata database (Birdlife Australia 2025) or Ebird's species observations (Ebird Database 2025). However, it has previously been recorded approximately 5km to the east of the Project Area.	- The species has been recorded within 30 km of the Project Area - No undisturbed habitat is present in the Project Area, and no critical or significant habitat is considered to be present. However, the species may opportunistically fly over or forage in the Project Area - The species is considered unlikely to occur within the Project Area given the cleared nature of the Project Area and lack of records within proximity of the Project Area.
Mammals				
<i>Dasyurus geoffroii</i> Western quoll	Vulnerable	Vulnerable	- The Western quoll has not previously been recorded within the Project Area by the DBCA's Threatened and Priority Fauna database - The Western quoll is restricted to the south-west of Western Australia and is generally found in most kinds of wooded habitat including eucalypt forest (especially jarrah), dry woodland and mallee shrublands. Western quolls den in hollow logs and burrows and have also been recorded in tree hollows and cavities. The western quoll's estimated home range for males is over 15 km² and for females is 3–4 km². They can travel large distances in their large home ranges and even at their most abundant, they are generally present in low numbers. The large home ranges require habitats of a suitable size and which are not excessively fragmented (Department of Environment and Conservation (DEC) 2012a)	Locally extinct - The cleared nature of the Project Area and its surroundings do not provide suitable habitat for this species - Fauna habitat recorded within the project had no understorey and is unlikely to comprise suitable den or refuge sites.
<i>Macroderma gigas</i> Ghost bat	Vulnerable	Vulnerable	- The ghost bat is found in habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. During the daytime, they roost in rock crevices, old mines, and caves. Within Western Australia, ghost bats current distribution comprises geographically discontinuous populations within the Kimberley and the Pilbara regions (Bat Call WA 2021) - The species has not previously been recorded within the Project Area by the DBCA's Threatened and Priority Fauna database.	Very unlikely This species requires undisturbed roost caves or mineshafts, usually complex systems with several openings. As such, there is no suitable habitat present for this species.

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Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
<i>Notamacropus Irma</i> Western brush wallaby	Priority 4	-	- The Western brush wallaby's optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland and is uncommon in karri forest (Maxwell et. al. 1996). - The species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database search.	Vagrant (Potential visitor) - Regionally proximate projects have recorded this species during field surveys (Spectrum Ecology 2020; approximately 25km from the Project and Astron, 2015; approximately 10km from the Project) - This species was not recorded within the survey area and due to the cleared nature of the Project Area and Development Footprint, there is no critical habitat for this species present and it would only occur within the Project Area opportunistically as an irregular visitor.
<i>Parantechinus apicalis</i> Dibbler	Endangered	Endangered	The dibbler is currently restricted to the Western Australian coastline near Jurien on three small offshore islands, Boullanger, Whitlock and Escape islands, and a small number of widely scattered mainland sites along the south coast. The dibbler can occupy a diverse range of habitats, seeming to prefer vegetation with a dense canopy greater than 1 m high that is unburnt for at least ten years or more. In some locations, the presence of Proteaceous and Myrtaceous flowering shrubs may also be important. Mainland habitat is characterised by the presence of long unburnt heathland that is typified by sandy substrates and occasionally lateritic soils (DCCEEW 2025k).	Locally extinct As this species is restricted to offshore islands in this region, and the only mainland population is found on Western Australia's south coast, it is highly unlikely to occur in the Project Area.

Reptiles

<i>Aspidites ramsayi</i> Woma	Priority 1	-	- Woma pythons are found in the arid zones of Western Australia, favouring open myrtaceous heath on sand plains, and dune fields dominated by spinifex (<i>Triodia</i> spp.) (DEC 2012b) - There are no recent records of this species within vicinity of the Project Area, with the DBCA record closest to the Project Area dated from 1966.	Unlikely Given the cleared and degraded nature of the Project Area and lack of recent records, it is considered unlikely the Woma is present within the Project Area.
<i>Egernia stokesii badia</i> Western spiny-tailed skink	Vulnerable	Endangered	The Western spiny-tailed skink occurs between Shark Bay and Minnivale in the Wheatbelt region of Western Australia and includes a population on Baudin Island within Shark Bay. Most records of this species were found in York Gum (<i>Eucalyptus loxophleba</i>) woodland, with some records found in Gimlet (<i>Eucalyptus salubris</i>) and Salmon	Unlikely Despite the recent DBCA record of a Western spiny-tail skink (2011) from the area, the fauna habitats within the

REPORT

Species name	Conservation status		Description and habitat requirements	Likelihood of occurrence with the Project Area
	BC Act / DBCA listed	EPBC Act		
			Gum (<i>Eucalyptus salmonophloia</i>) woodland. Populations persist in woodland patches as small as one hectare and surrounded by wheatfields. Greater numbers of individuals were located at sites with numerous logs and subjected to low intensity grazing by domestic stock (DCCEEW 2025I).	Project Area comprise no understorey, including logs, and no woodlands of York Gum, Gimlet or Salmon Gum were present. No suitable habitat was recorded and it is unlikely that this species occurs within the Project Area.
Invertebrates				
<i>Idiosoma nigrum</i> Shield-backed trapdoor spider	Endangered	Vulnerable	- The Shield-backed trapdoor spider is endemic to Western Australia and is known to inhabit three locations: a number of fragmented populations in the central and northern wheatbelt; Jack Hills; and Weld Range. Jack Hills and Weld Range populations are located approximately 200 km north of the wheatbelt in more arid areas (DCCEEW 2013) - In the Wheatbelt, the Shield-backed trapdoor spider typically inhabits clay soils and populations are associated with eucalypt woodland and acacia shrubland. - Habitat critical to the species is identified as open York gum (<i>Eucalyptus loxophleba</i>), Salmon gum (<i>E. salmonophloia</i>) and Wheatbelt Wandoo (<i>E. capillosa</i>) woodland, where Jam (<i>Acacia acuminata</i>) forms a sparse understorey in heavy clay soils (DCCEEW 2025). It relies heavily on leaf-litter and twigs to build its burrow (Main et al. 2000). - The species was not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database.	Unlikely - Soils at the Project Area comprise sands and gravels - Due to this species habitat preferences for open York gum (<i>Eucalyptus loxophleba</i>), Salmon gum (<i>E. salmonophloia</i>) and Wheatbelt Wandoo (<i>E. capillosa</i>) woodland with an understorey of leaf litter, and the cleared and degraded nature of the Project Area, the Project Area does not comprise critical or important habitat for this species - Due to the lack of critical or important habitat and no DBCA records within 12 km of the Project Area, this species is considered unlikely to persist within the Project Area.