Marri Wind Farm
(Preliminary) Bird and Bat Adaptive Management Plan

Female Carnaby's Black-Cockatoo (*Zanda latirostris*) taken near Regans Ford (B.Shepherd, 2025)

Prepared for: Marri Wind Farm Pty Ltd as trustee for Marri WF Unit Trust (the Proponent)

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List of Acronyms

Abbreviation	Description
BBUS	Bird and Bat Utilisation Survey
BC	Bird Census
BCE	Bamford Consulting Ecologists
BESS	Battery Energy Storage System
DCCEEW	Department of Climate Change, Energy, Environment and Water (Cwlth)
EPA	Environmental Protection Authority (Western Australia)
EP Act	Environmental Protection Act 1986
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
FF	Focal Follow
MNES	Matters of National Environmental Significance
MW	Megawatt
Phoenix	Phoenix Environmental Services Pty Ltd
PBBAMP	(Preliminary) Bird and Bat Adaptive Management Plan
PVA	Population Viability Analysis
RSA	Rotor Swept Area
VP	Vantage Point

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1 Introduction

1.1 Project Background

Marri WF Pty Ltd, as trustee for the Marri WF Unit Trust (the Proponent), a wholly owned subsidiary of Alinta Energy Pty Limited (Alinta Energy), is seeking approval to develop Marri Wind Farm (the Proposal) located approximately 20 kilometres (km) south of the township of Dandaragan within the Shire of Dandaragan (see

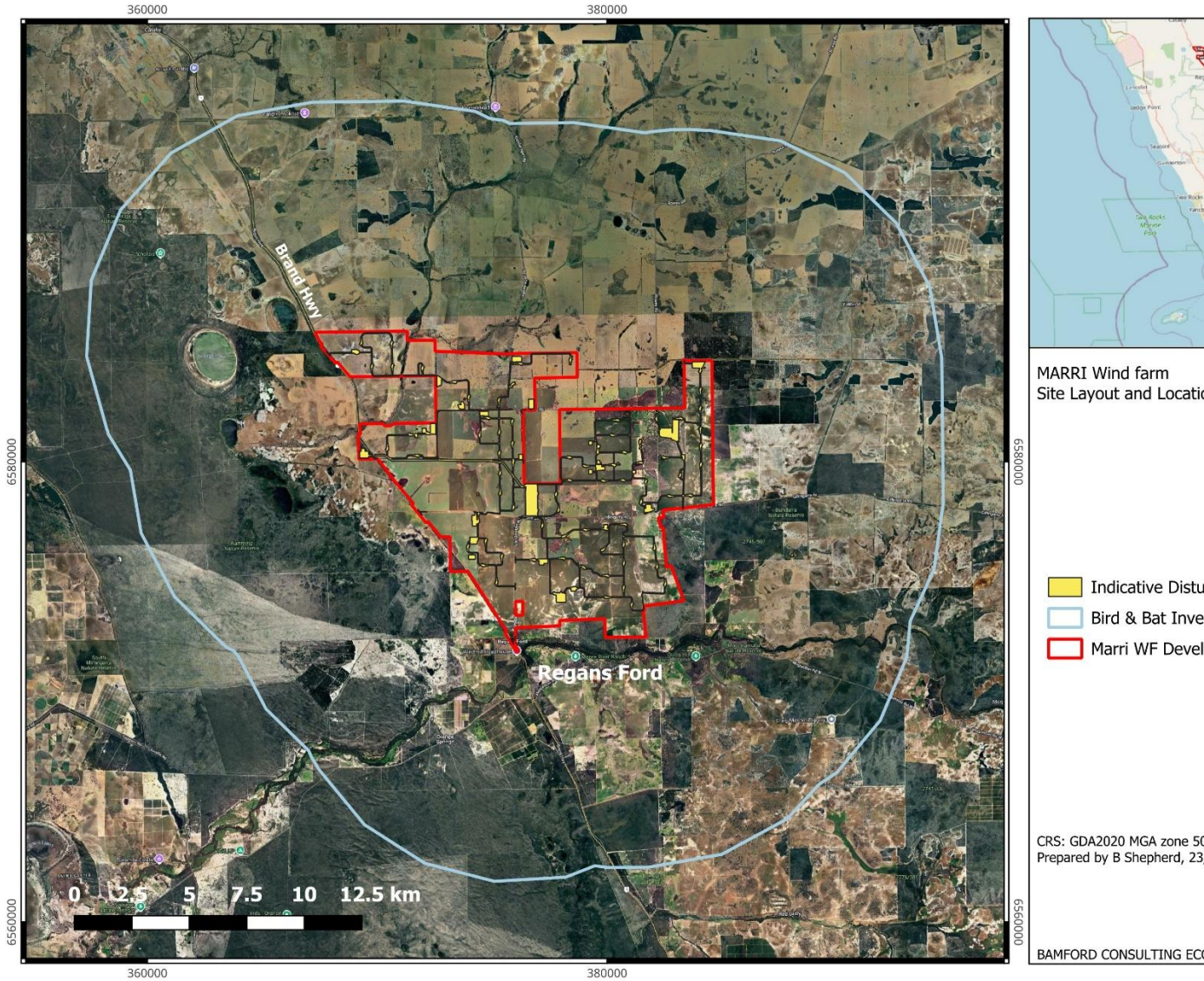

Figure 1-1).

Aurecon is supporting the Proponent as lead consultant for approval delivery. Bamford Consulting Ecologists (BCE) has been engaged by Aurecon to prepare this Preliminary Bird and Bat Adaptive Management Plan (PBBAMP). Phoenix Environmental Sciences (Phoenix) was engaged to undertake the baseline bird and bat utilisation survey (BBUS) which began in August 2024 and is ongoing to complete two full years of data collection.

1.1.1 Arrangement of this PBBAMP

The information provided in this PBBAMP broadly follows the guidelines given in EPA (2024). The process of developing a BBAMP is linear and the sequence of information is presented in Table 1-1.

Table 1-1. BBAMP sections and comparison to EPA (2024).

Subject	Section in this PBBAMP	Equivalent EPA (2024) template section
Description of the project	1.2	2.1
Regulatory framework and conditions	1.3	2.3
Description of the management approach	1.10	2.4
Summary of bird and bat baseline conditions	2	2.2
Summary of the threats and identification of key risks	3	-
Bird and bat monitoring programmes	4	3
Impact triggers and adaptive management	5	3
Environmental outcomes and management objectives	6	3
Proponent and responsibility		
Supporting information (BBUS, Risk Assessment)	Appendices	2.2

The final BBAMP will be a living document that will be implemented on site and therefore needs to be as concise as possible. Brevity has been used wherever possible in meeting this need and key documents are referred to instead of full repetition here.

1.2 Project Description

The Proposal is located approximately 20 km south of Dandaragan, 42 km north of Gingin and 110 km north of Perth's CBD, within the Shire of Dandaragan in Western Australia (See

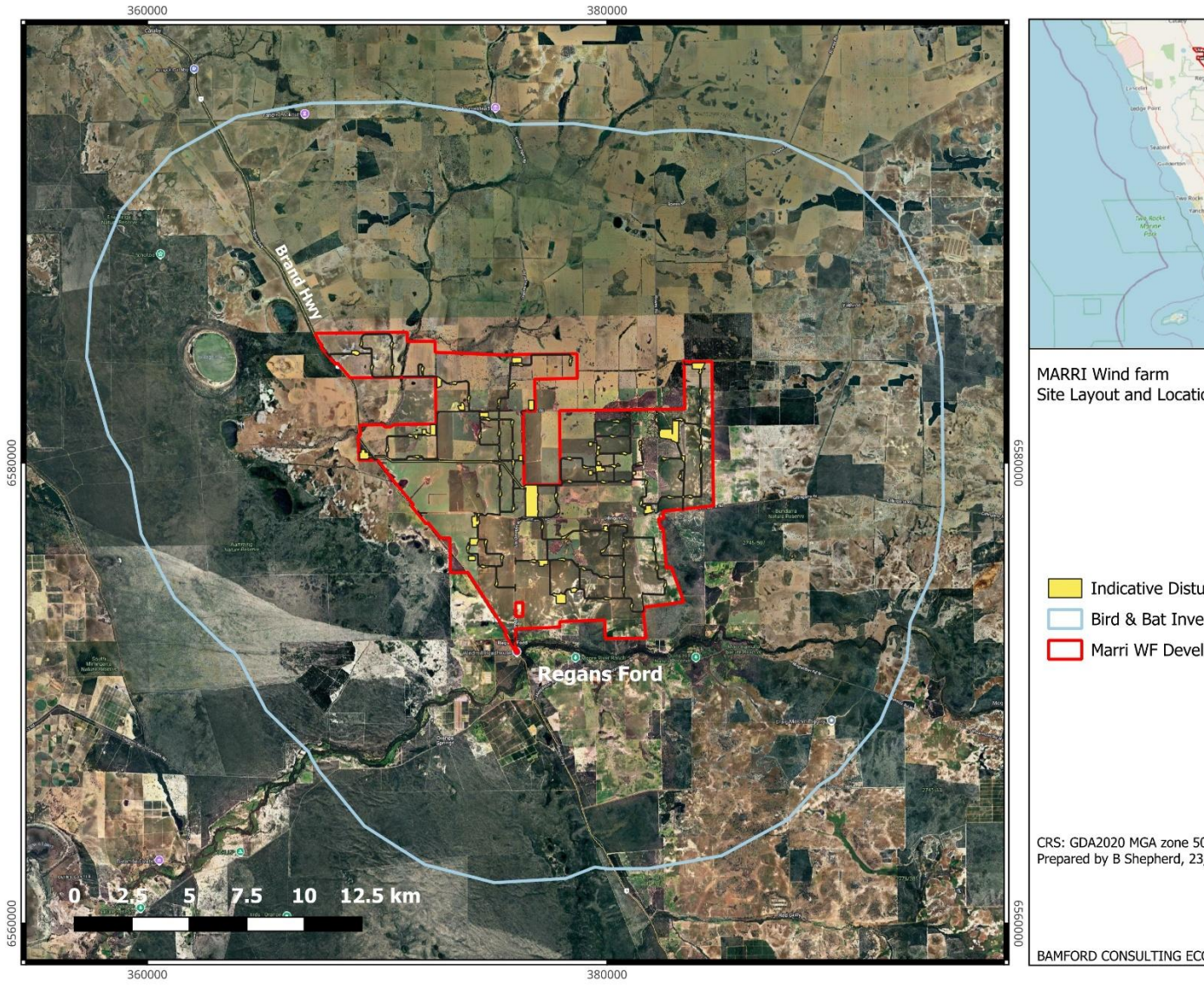

Figure 1-1). The development footprint spans predominantly private, rural agricultural properties, with minor components extending into public lots and road reserves.

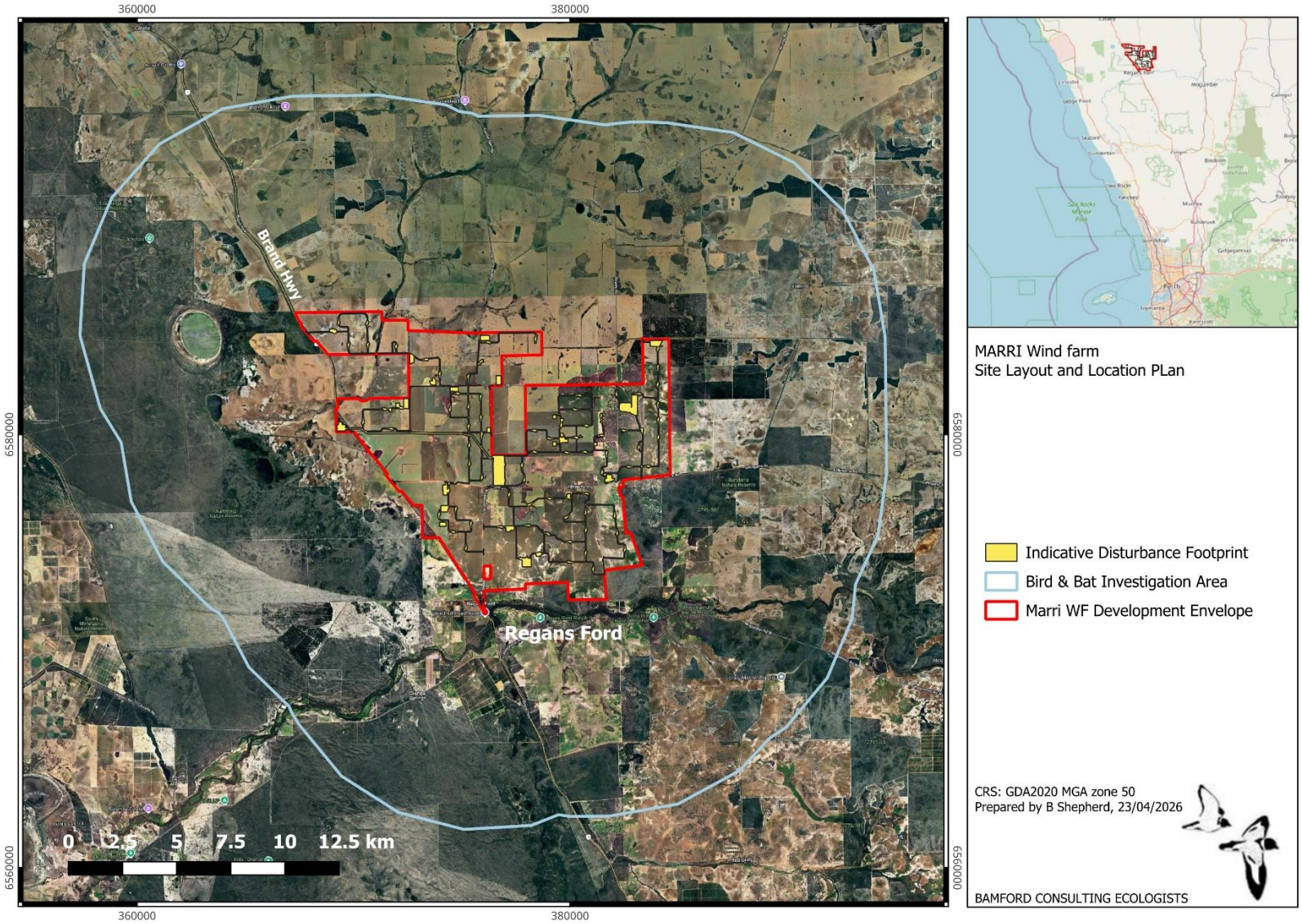

Figure 1-1. Marri Wind Farm Site Location and bird and bat investigation area.

The site was selected based on its strong wind resource potential, the large proportion of existing cleared agricultural land, and proximity to a suitable connection point on the South-West Interconnected System (SWIS), enabling reliable export of renewable energy. The Proposal is situated within a region that hosts several operational and proposed wind farms, contributing to a growing clean energy corridor in the northern Swan Coastal Plain and Wheatbelt.

The Proposal is located within a 12,483.55 hectare Development Envelope and is expected to accommodate up to 82 wind turbine generators, with the key specifications listed in Table 1-2. The layout includes supporting infrastructure such as internal roads, a substation, internal transmission lines, export transmission line and laydown areas, with potential for future integration of a Battery Energy Storage System (BESS) of up to 6,600 MW/h capacity. All construction activities including land disturbance (Indicative Disturbance Footprint – IDF) are estimated to cover an area of approximately 965 ha within the Development Envelope.

Table 1-2. Wind turbine specifications

Infrastructure Element	Key Features	Specifications
Wind Turbines	Maximum number of turbines	82
	Project generation capacity	Up to 550 MW
	Maximum tip height	Up to 275 m
	Minimum tip height	Equal to or greater than 66 m
	Hub height	Up to 184 m
	Blade Length	Up to 91 m
Turbine Foundations	Concrete gravity foundations	Approximately 0.75 hectares per turbine

The Proposal is situated within the Dandaragan Plateau subregion of Western Australia's Wheatbelt, an area characterised by predominantly agricultural land use and a growing concentration of wind energy developments. The region hosts several operational wind farms, including Yandin, Karakin, West Hills and an early-stage feasibility study; Mint Renewables Nilgen Wind Farm. In addition, there is an approved windfarm at Waddi, about 50 km to the north, an operational windfarm (Badgingarra West) about 80 km to the north, and at least four other proposed windfarms under investigation between Lancelin and Badgingarra.

The basic and targeted terrestrial fauna surveys conducted by Phoenix Environmental Sciences identified six broad landcover types within the Development Envelope:

- Cleared land (92.5%)
- Open woodland (4.4%)
- Shrubland (1.7%)
- Pine plantations (0.8%)
- Drainage line & riparian zones (0.5%)
- Wetlands (<0.1%)

Although highly modified, cleared areas are notable due to the presence of isolated trees, farm dams and agricultural crops such as canola, which are known to be foraged on by species like Carnaby's Black-Cockatoo. Native vegetation was limited to fragmented patches, primarily along roadside verges

and small bush plots, offering modest ecological value but potential refugia for fauna, and with a connectivity function.

1.3 Regulatory framework

The BBUS, referral documentation and this PBBAMP support compliance with relevant Commonwealth and State legislation, including the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Western Australian *Environmental Protection Act 1986* (EP Act).

These legislative instruments mandate that development proponents identify, avoid and mitigate harm to sensitive fauna through comprehensive environmental management. This PBBAMP contributes to that obligation by outlining the processes for assessing risk, implementing mitigation measures, and monitoring outcomes during both the construction and operational phases of the project.

In line with the requirements of the EPBC Act and the EP Act, this PBBAMP supports the protection of species listed as of national and/or state significance, including those listed as Matters of National Environmental Significance (MNES), and also supports protection of species not listed as threatened or MNES, but which occur in vulnerable populations.

1.4 Regulatory process and documentation

The respective referrals have been submitted for development approval submission to both the Western Australian Environmental Protection Authority (EPA) and Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW). The referrals will be informed and supported by a number of documents including those listed in Table 1-3.

Table 1-3. Documents supporting the environmental approval process and informing this PBBAMP

Document Title	Author(s)	Version	Date
Technical Memorandum – Summary of data collected from Phase 1 to 7 of the bird and bat utilisation surveys for the Marri Wind Farm Project	Phoenix Environmental Sciences	-	25/02/2026
Basic and Targeted terrestrial fauna survey for the Marri Wind Farm Project.	Phoenix Environmental Sciences		2025
Targeted Black-Cockatoo survey for the Marri Wind Farm Project.	Phoenix Environmental Sciences		2026
EP Act Referral Document Marri Wind Farm	Aurecon		2026
EPBC Act Referral Document Marri Wind Farm	Aurecon		7/11/2025

Following regulatory approvals, this PBBAMP will be finalised to include any changes to the project, amendments to the referral documents and conditions placed on the project by the regulators through the approval process.

1.5 Relevant documents and guidelines

This PBBAMP has been developed in consideration of feedback provided by the EPA and DCCEEW and information provided in the following relevant documents:

- *Draft Onshore Wind Farm Guidance Best practice approaches when seeking approval under Australia's national environment law* (DCCEEW, 2024)
- *Environmental Factor Guideline – Terrestrial Fauna* (Environmental Protection Authority, 2016).
- *Environmental outcomes and outcomes-based conditions, Interim Guidance*. (EPA, 2021).
- *Instructions: How to prepare Environmental Protection Act 1986 Part IV environmental management plans* (Environmental Protection Authority, 2024) and associated template
- *Onshore Wind Farms – interim guidance on bird and bat management. Department of Agriculture, Water and the Environment, ACT.* (DAWE, 2021).
- *Referral guideline for 3 WA threatened black cockatoo species Carnaby's Black-Cockatoo (*Zanda latirostris*), Baudin's Black-Cockatoo (*Zanda baudinii*) and the Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*)*. Department of Agriculture, Water and the Environment, Canberra. (DAWE, 2022).
- *Statement of Environmental principles, factors, objectives and aims of EIA.* (EPA, 2023).
- *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment*. Environmental Protection Authority, Perth, WA. (EPA, 2020).
- *Catalogue of measures to avoid and mitigate collisions of birds and bats with onshore and offshore wind farms - Draft for Consultation* (DCCEEW, 2026).

1.6 EPBC Act Approval Conditions (Commonwealth)

To be updated subject to regulatory approval.

1.7 EP Act Approval Conditions (Western Australia)

To be updated subject to regulatory approval.

1.8 Compliance Statement

The Commonwealth and State approval requirements detailed above will be addressed in the Final PBBAMP sections as detailed in Table 1-4.

Table 1-4. Sections of this PBBAMP that address the requirements of the approval conditions (to be finalised following regulatory approval)

Condition Clause	Condition Statement	PBBAMP Section

1.9 Scope and Purpose

1.9.1 Scope

The scope of this PBBAMP encompasses key activities of the Marri Wind Farm Proposal that may result in impacts on bird and bat species. It defines the extent of ecological considerations particularly with respect to species' conservation significance, migratory status or regional importance.

Management of impacts on factors other than bird and bats (e.g. groundwater, terrestrial fauna) are defined elsewhere. It does not consider:

- bird and bat species that are unlikely to occur in the area (e.g. vagrant)
- bird and bat species that are not known to exhibit behaviours that place them at risk
- risks that are not predicted to have a measurable impact on birds and bats.

Management of predicted impacts on other environmental factors such as ground fauna or hydrology are addressed elsewhere.

1.9.2 Purpose

The purpose of this PBBAMP is to define a clear and responsive framework in managing the potential impacts to bird and bat species as predicted in the referral documents. It describes the roles of the proponent responsible for the construction and operations of the wind farm. It contains an adaptive approach so that management measures can be altered where detected impacts differ from those predicted.

1.10 Approach to Management Planning

This document draws on the baseline conditions identified through the BBUS and the collision risk assessment, in particular of potential impacts arising from the construction and operations of the wind farm. It outlines mitigation strategies and monitoring protocols designed to manage those impacts within acceptable thresholds. It establishes impact triggers and a decision-making framework to guide adaptive management responses throughout the operational life of the Proposal, currently scoped to 35 years. While the scope does not extend beyond this timeframe, it incorporates flexibility to support future amendments in response to regulatory changes, technological advancements or shifts in ecological understanding.

The approach used in developing this PBBAMP broadly follows the advice given in EPA (2024) and EPA (2021). Using the results from the BBUS Technical Memorandum (Appendix A) and preliminary risk assessment (Appendix B), the key receptors and key potential risks posed on them by the proposed wind farm are first identified. This focuses on the following aspects:

- Bird and bat species considered likely to occur in the area (including resident, regular visitors and irregular visitors)
- Bird and bat species that express behaviours or that may be expected to respond in a way that place them at risk from the wind farm (e.g. fly within the rotor swept area (RSA))
- Aspects of the construction and operation of the proposed wind farm that can be predicted to have a measurable impact on the receptors exposed to the risks.

Relevant scientific literature is relied on to inform the ecological aspects and potential risks.

1.10.1 Environmental Outcomes and Management Objectives

Monitoring and management measures proposed in this PBBAMP are selected to address the specific risks posed by the development on the birds and bats considered most sensitive to a wind farm at this location. They are presented as outcomes and objectives in compliance with EPA (2024). Management measures selected are outcome-based, objective-based or a combination of these two to be fit-for-purpose in achieving the desired outcome of the measure. For ease of implementation, they are considered Specific, Measurable, Achievable and Relevant, and are given Timeframes (SMART). In this way, the Proponent and Regulators alike are assisted in executing the responsibilities and commitments identified in this PBBAMP.

The monitoring and management measures have been developed and agreed through internal consultation with the broader project development team. The resultant monitoring and management actions can help deliver one or more environmental outcomes or management objectives.

1.10.2 Key assumptions and uncertainties

The information provided in this PBBAMP is based on scientific principles, published literature and professional opinion founded on extensive field experience. Where information is considered insufficient and may undermine the veracity of the intentions of this PBBAMP, it is noted. In such cases, the best available information and professional opinion will be used to identify the most viable and defensible conclusion (not necessarily the worst-case). In this way, the precautionary principle will be applied.

1.10.3 Rationale for choice of indicators and/or management actions

All indicators and management actions have been selected to address the most important aspects of each management objective and environmental outcome. Trigger and threshold criteria have been based on the preliminary risk assessment and a preliminary review of populations provided in Appendix D. These focus on the parameters that may change due to the development proceeding, e.g. number of birds of a given species present in the development area. These may require updating following the formal risk assessment, finalised BBUS and any population viability analysis (PVA). This approach may need to be reviewed as new information becomes available through the life of the project. Changes in background conditions such as weather patterns and local land use patterns etc will need to be taken into consideration to determine whether any changes are due to the development or not. Any change would be recorded through the annual review and reporting process.

Most of the important parameters on which indicators and thresholds are based are required to have been collected during the baseline BBUS. Where this is not the case, sampling methods may need to be adjusted or added to the BBUS.

2 Bird and Bat Utilisation

2.1 BBUS Overview

Phoenix commenced a BBUS programme in August 2024 on a quarterly basis across the development envelope, transmission corridor and surrounds shown in **Error! Reference source not found.**, and is ongoing. A comprehensive suite of survey methods was developed to sample the bird and bat species most likely to be impacted by the proposed wind farm, and in particular to inform risk due to collision risk with the turbine blades. Surveys included:

- Point counts for birds at 21 sampling sites, sampling twice per phase for 15 minutes each
- Habitat assessment and roost monitoring for black-cockatoos
- Ultrasonic call recording (for bats) over 290 recorder nights
- Audible recording (for birds) over 268 recorder nights

The surveys are described in the BBUS Report attached in Appendix A. This work is complemented by an ecological assessment prepared by BCE calling on experience of similar projects in the region. A high-level risk assessment undertaken by BCE for conservation significant birds and bats is presented in Appendix B to help inform this PBBAMP pending the finalised risk assessment.

2.2 Black-cockatoos

Carnaby's Black-Cockatoos were recorded during all seven phases of the BBUS undertaken to date with all aspects of its life history being potentially observed within the survey area, therefore making it a resident. The desktop study undertaken by Phoenix (2026) obtained data for known roost and breeding locations for black-cockatoos and these are plotted in Figure 2-2. Forest Red-tailed Black-Cockatoo was also observed in low numbers during only two phases (Nov 2025 and Jan 2026) suggesting it is a regular visitor. Foraging evidence for both black-cockatoo species was observed throughout the site, indicating active use of the landscape.

Flight heights were estimated for 31 of the 61 Carnaby's records which were all low (median: 15 m; mode: 10 m) inside the Development Envelope. However, one pair was observed flying at 60 m in May 2025 and a single bird flying (somewhat uncharacteristically) to 100 m above ground level in November 2025. Both of these observations were collected at sample points outside the Development Envelope. The observation at 100 m at this time of year was potentially one of a breeding pair foraging for both parents. Time at these heights was not recorded. Heights of six from the nine records of Forest Red-tailed Black-Cockatoos were estimated with two separate groups of three and five birds being estimated at 60 m above ground level.

Studies undertaken by BCE between August 2024 and March 2026 to the west and north of the Developmentne Envelope, acquired 7,453 height records of Carnaby's that describe over 1,600 encounters, totalling more than 31,000 'bird hours'. Out of these, the mean flight height for all records was 8.29 m, maximum flight height was 80 m and, 99.97% of the time observed, Carnaby's were lower than 50 m (B.Shepherd, pers. comm.). These observations strongly indicate that Carnaby's are present at heights consistent with RSA for only a very small fraction of their time. This does not account for situational awareness and behavioural avoidance that they may also exhibit that would effectively reduce time within the RSA of operational turbines as has been observed (M.Bamford, pers. obs.).

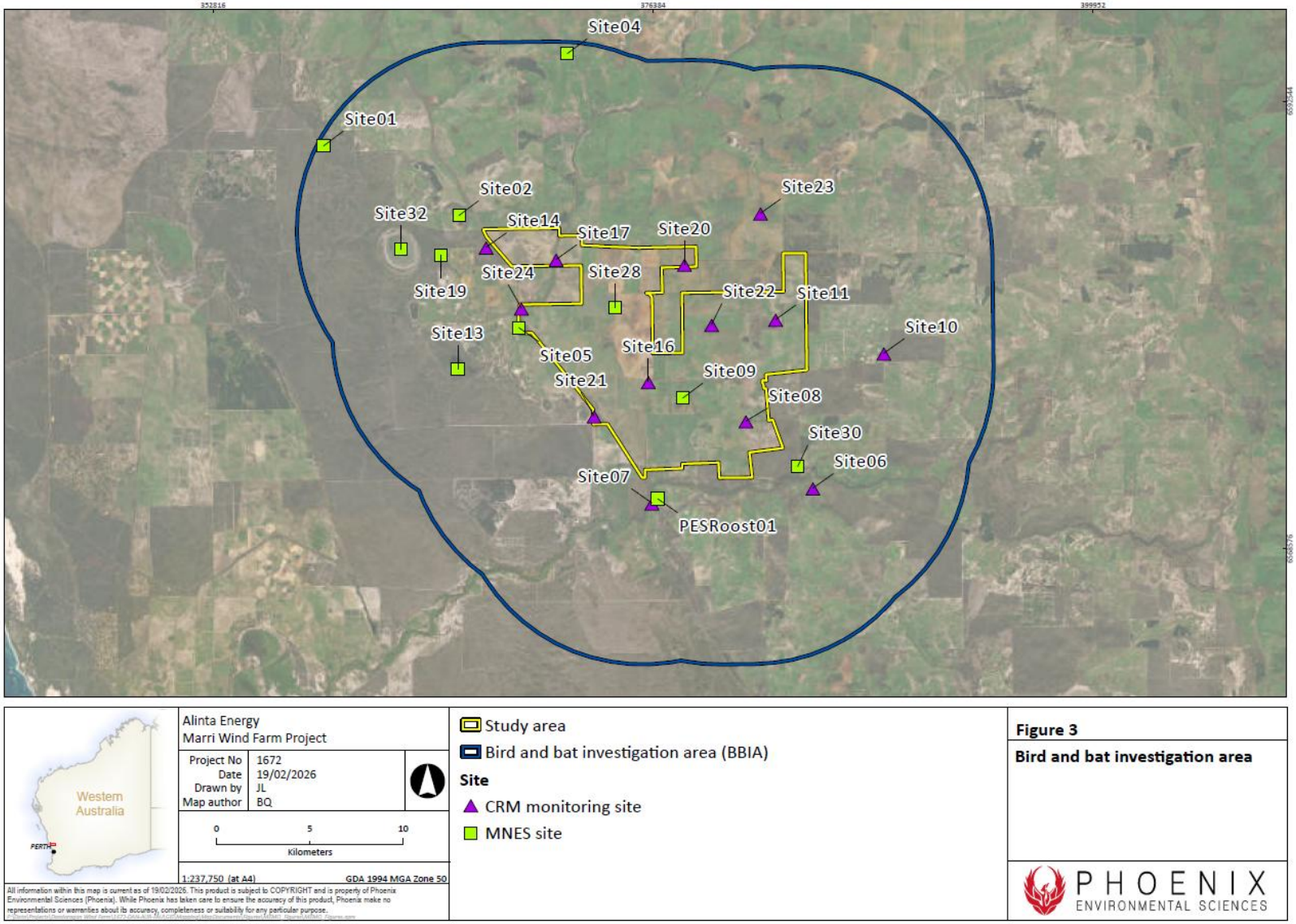

Figure 2-1. Study area and sampling locations used during the BBUS (source: Phoenix Environmental 2026).

Carnaby's and Forest Red-tailed Black-Cockatoos have previously been recorded in the region and records of roosting and nesting are plotted in Figure 2-2. The Potential Nesting Tree (PNT) survey identified 1,686 trees that met the basic DBH criterion for black-cockatoo nesting, but only 58 of these trees had hollows considered suitable for black-cockatoo nesting as plotted in Figure 2-3. The Development Envelope lies within the known breeding area of Carnaby's (DAWE, 2022) but not Forest Red-tailed. These trees are therefore expected to be used more by Carnaby's than Forest Red-tailed. Forest Red-tailed Black-Cockatoos generally breed in mature eucalypt forests further south in Western Australia (DAWE, 2022) but their range over the last few years has been extending northwards (Garnett and Baker 2021). Therefore, it is considered possible that this species could breed within the Development Envelope in the future.

One tree, located 2.7 km southeast of the Development Envelope had a hollow from which a male Carnaby's emerged while a female perched nearby, concluding it was being used for nesting. Twenty trees within the BBUS survey area had hollows with fresh chew-marks, suggesting visitation and possible use. Most of these high value hollow-bearing nesting trees were in farmland.

Three distinct Carnaby's night roosts were confirmed outside the Development Envelope along the Moore River, supported by tall vegetation, permanent water sources and adjacent foraging habitat. It is known that night roosts can vary within and between seasons by up to two kilometres (B.Shepherd pers. obs.). Some may not be used in a season at all, only to be returned to at a later time. Because of this, new roosts and extensions to known roosts are being discovered frequently. The number of birds using a given roost can also vary substantially.

Known roost sites shown in Figure 2-2 were monitored during the BBUS, with roosting activity confirmed in the woodland along the Moore River. Because black-cockatoos are known to change the precise roost locations within and between seasons, and short-term roosts also used throughout the non-breeding season, there is potential for both black-cockatoo species to roost within the Development Envelope.

Foraging vegetation has not been mapped at the time of writing, but the Development Envelope and surrounds contain many opportunities for both black-cockatoo species to forage, including agricultural paddocks. Woodland, pine plantations, Banksia woodland and heath, and isolated Marri, Jarrah and Sheoak in particular are targeted by either Carnaby's or Forest Red-tailed Black-Cockatoos and is considered of value. In addition, canola crops in particular (though lupins and wild radish are also taken) have value through the breeding season for Carnaby's and must be considered when present.

Vegetation mapping (not assigned foraging value) is given by Phoenix (Figure 2-4). Pending formal foraging habitat assessment for black-cockatoos, the value of each broad vegetation type is negligible to low for agricultural paddocks (depending on crop), low to moderate for remnant Marri/Jarrah woodland depending on the condition, and moderate to high for remnant stands of banksia woodlands/heaths, again depending on the condition. Importantly, larger stands of Banksia woodland and heath lie to the east, west and south and all within 6 km of the centroid of the Development Envelope. These larger stands are within the 12 km foraging range of roosting and nesting black-cockatoos (DAWE, 2022).

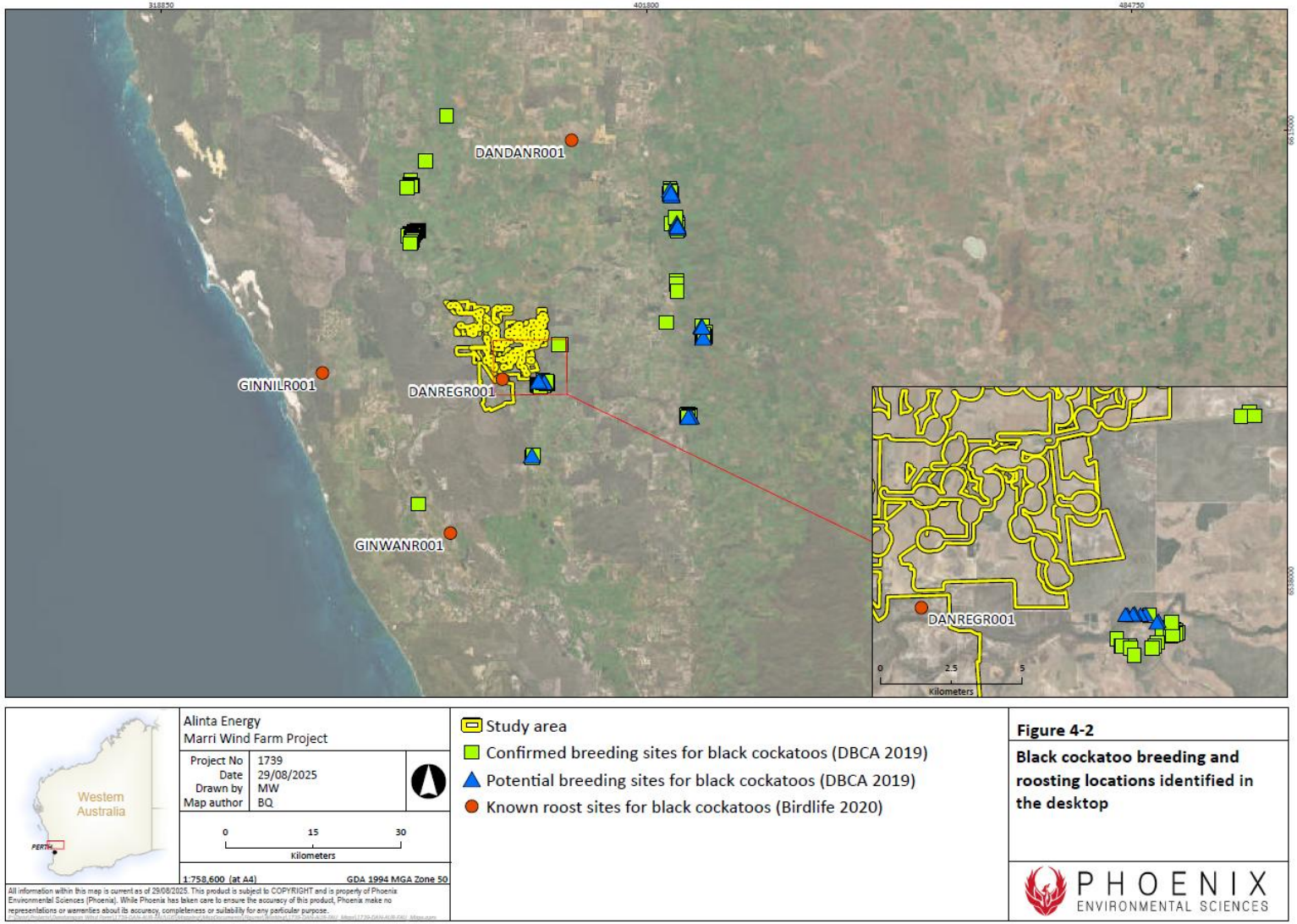

Figure 2-2. Previously recorded roosting and nesting locations for black-cockatoos (source: Phoenix Environmental 2026)

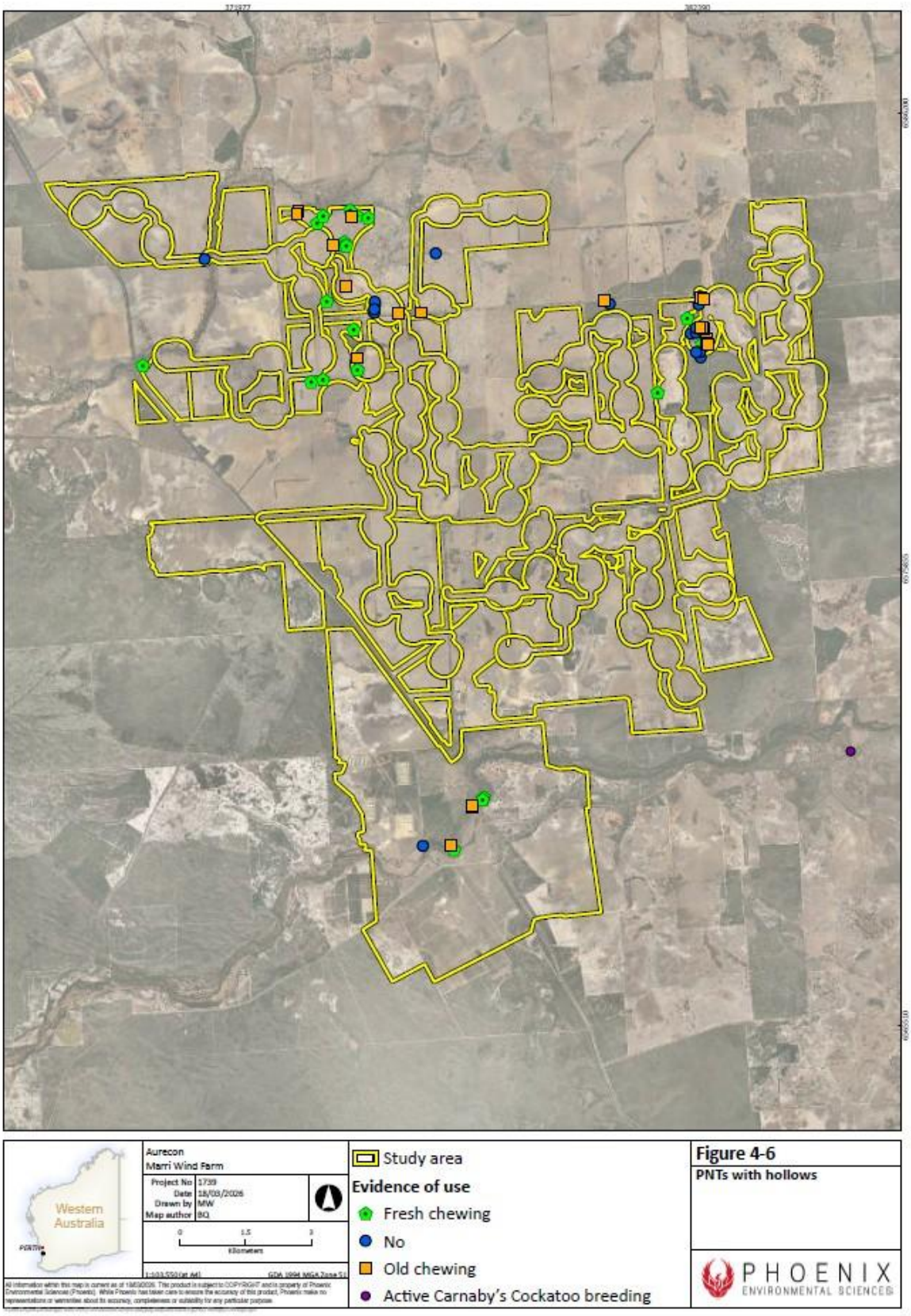

Figure 2-3. Locations of hollow-bearing and confirmed nesting trees of black-cockatoos (source: Phoenix Environmental 2026).

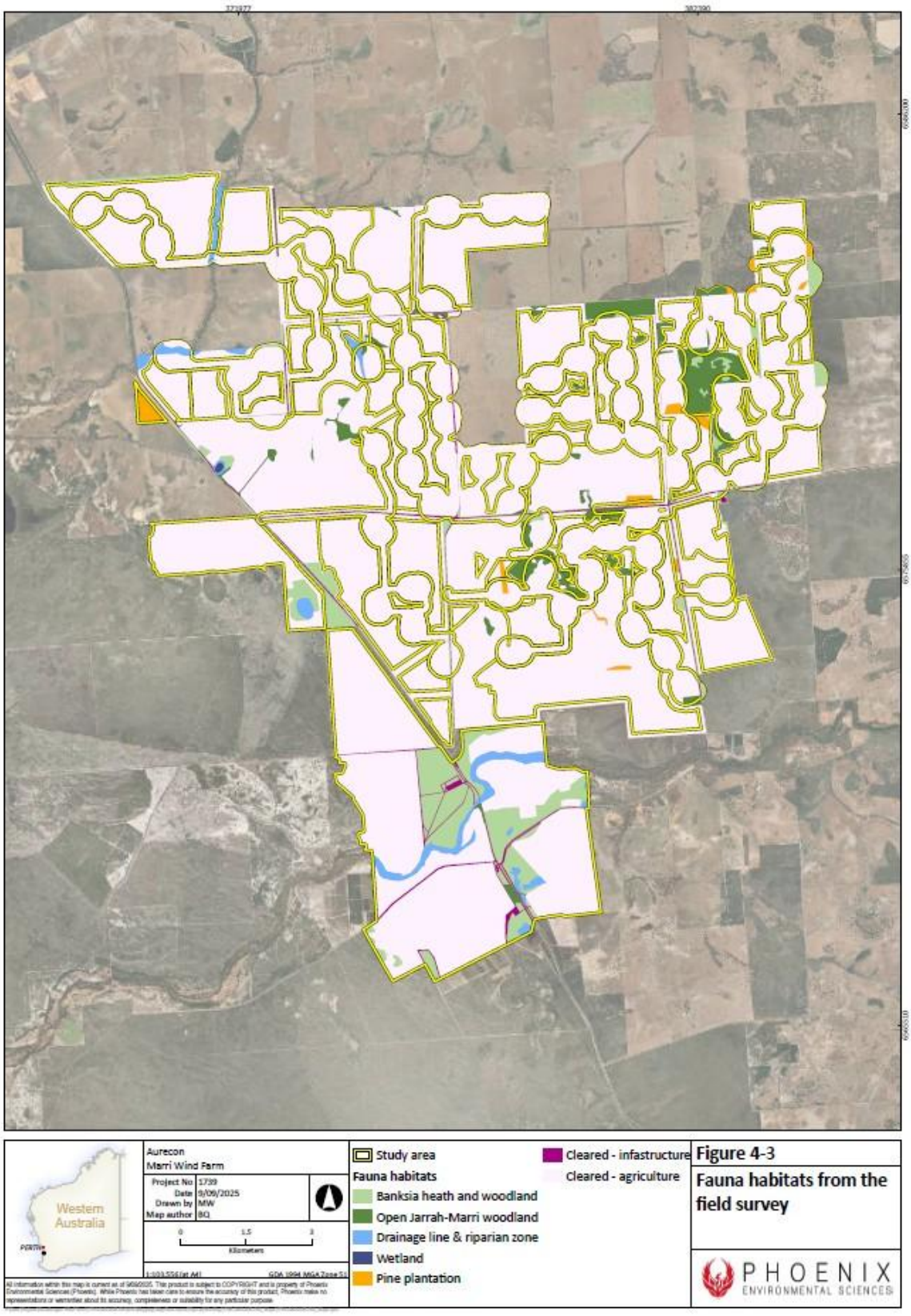

Figure 2-4. Broad vegetation types across the Development Envelope to demonstrate value for black-cockatoos (source: Phoenix Environmental 2026).

2.3 Other Listed Species

Several migrant waders and Blue-billed Duck were also recorded during the BBUS (Phoenix, 2026) but on lakes that lie on the west side of Brand Hwy. Their use of the Development Envelope will be limited to flying through the airspace when transiting between water bodies. These flights could be either in daylight hours or nighttime. The direction of these flights depend on availability of other seasonal water bodies formed following sporadic rainfall and are highly unpredictable. The migrant waders are generally present from October through to April while Blue-billed Ducks can be present year-round. The presence of these species vary depending on which lakes provide suitable conditions for each taxa.

The Peregrine Falcon was not recorded during the BBUS but has been recorded periodically on other projects in the region. However, an adult Peregrine was observed in April 2026 flying adjacent to Dandaragan Rd within the area of the proposed Marri Wind Farm (B.Shepherd, pers. obs.) and can therefore be expected to occur within the Development Envelope. This species spends a large proportion of its time within RSA heights while transiting and in hunting.

Locally important bird and bat species recorded in the Development Envelope include Wedge-tailed Eagles, Nankeen Kestrels, Brown Falcon, White-striped Freetail Bat and Gould's Wattled Bat.

3 Summary of Threats and Risks

This PBBAMP is to manage the project activities so that actual impacts on birds and bat can be identified and if they exceed those predicted in the risk assessment, management measures can be adjusted to reduce those impacts. The following is a summary of the threats and risks that the wind farm potentially poses on birds and bats.

3.1 Key Threatening Processes

The suite of key threatening processes from EPA (2020) that a wind farm poses and relevant for management of impacts on birds and bats is outlined below.

3.1.1 Loss of habitat affecting population survival

Negligible to low. Little if any direct (i.e. clearing) impact on native vegetation. Some loss of farmland for access roads and turbine footprints. Farmland may be used for foraging by Carnaby's Black-Cockatoo and the possibility of reduced access for foraging due to disturbance is discussed below.

3.1.2 Loss of habitat leading to population fragmentation

Negligible. Little if any direct (i.e. clearing) impact on native vegetation which may have a connectivity function. Loss of habitat can affect population movements by limiting movement of individuals throughout the landscape as a result of fragmentation (Gleeson & Gleeson, 2012; Soule et al., 2004). Fragmented populations may not be sustainable and may be sensitive to effects such as reduced gene flow. Note that restoration along corridors of vegetation to improve connectivity is a potential offset.

3.1.3 Degradation of habitat due to weed invasion leading to population decline

Negligible. The proposal lies in a region that is extensively cleared and therefore remnant native vegetation is of high conservation value. Remnant vegetation within the Development Envelope is already likely to be degraded by the presence of weeds. A wind farm development is unlikely to exacerbate that to the extent it would accelerate the impacts on the bird or bat baselines. However, opportunities to reverse the effects of weed infestation are presented in management measures.

3.1.4 Increased mortality

Moderate to major. There is the possibility of mortality of some birds and bats from interaction with turbines including Carnaby's and Forest Red-tailed Black-Cockatoos, migrant waders, raptors, and locally important bat species. Mortality from collision with blades (and other infrastructure) is predicted to have the greatest potential impact on birds and bats and has a proportionate level of focus within this PBBAMP.

Increased bird and bat mortality can occur during project construction or operations from roadkill, animals colliding with infrastructure or being hit by turbine blades (including barotrauma). The latter being the primary concern surround wind farm developments (DCCEEW, 2024). Increased mortality of common species is unavoidable and may not be significant for a population. Some species of bats have been shown to be attracted to operating wind turbines (Nagy et al, 2026) leading to increased risk of blade strike. However, the cumulative impacts of increased mortality from the range of causes of death on a population of a conservation significant species or species that already occur at low

densities may become significant. Taxa at risk from blade strike has been investigated in depth in the risk assessment and are addressed in the management options.

3.1.5 Species interactions, including predation and competition

Minor. There may be an increase in feral fauna activity associated with disturbance during construction and through carcasses under operational turbines attracting scavengers. An increase in feral predators has the potential to increase the indirect losses of birds and bats through the operational lifetime of the project. Mawson et al (2025) has identified that feral Cats pose a risk to wide range of native Australian birds including black-cockatoos. Therefore, monitoring and control of feral fauna is included in long-term management (see below).

3.1.6 Hydroecology

Negligible. There may be some very localised effects on surface flow along tracks and around turbine bases which may in turn, alter vegetation across large areas and may lead to reduction or loss of common bird and bat species. However, changes to hydrology resulting from construction should readily be managed through standard track and earth-works management and are routinely addressed in the site management plan.

3.1.7 Fire

Negligible. Construction and operation may provide new opportunities for ignition sources, but these should be manageable through standard procedures such as hot work permits and control of vegetation around energy infrastructure or fuel storage. The role of fire in the Australian environment and its importance to vertebrate fauna has been widely acknowledged (Fox, 1982; Gill et al., 1981; Letnic et al., 2004). It is also one of the factors that has contributed to the decline and local extinction of some bird species (Burbidge & McKenzie, 1989). Frequent, extensive fires may reduce the persistence of certain bird and bat species most sensitive to impacts of fire on vegetation including black-cockatoos. Control of fire will, however, be addressed in the general site management plan.

3.1.8 Dust, light, noise and vibration

Probably Minor but uncertain. There is likely to be some temporary disturbance during construction and could include disruption to roosting or nesting behaviour of black-cockatoos. Operation of the wind farm may result in noise, light and movement that may displace fauna or alter their behaviour and site utilisation patterns across the site. This can also involve attraction of bat species as suggested by Nagy et al (2026). Deciphering whether a reduction in species is due to losses from fatalities or through displacement due to disturbance, needs careful consideration through monitoring.

Monitoring is recommended to target black-cockatoo roosting, foraging, movement patterns and nesting. Monitoring of bird assemblages present along the Moore River and any corridors of native vegetation that may have connectivity function is also recommended. There is a large remnant of Marri/Jarrah woodland within the Development Envelope that may be a good target for monitoring of bird (and bat) abundance.

3.2 Key Risks and predicted Impacts

The formal risk assessment for birds and bats is in process, to be informed by the final BBUS report due in mid-2026 and will include a formal collision risk assessment. In its absence, a preliminary risk

assessment is provided in Appendix B. The risk process broadly follows AS/NZS 31000, 2009 and includes information from Reid and Baker (2025) and AVISTEP (BirdLife International, 2025).

The risk assessment in Appendix B identifies the potential risks to birds and bats from the Marri Wind Farm, and those concluded to have low to moderate or higher consequences are summarised in the following while being aligned to the threats listed above. It is acknowledged that the risks are likely to act in combination with each other, and all potential risks, even those deemed negligible, must be considered when addressing impacts identified from construction or operational monitoring.

3.2.1 Displacement of general bird and bat assemblage

Displacement of bird and bat species considered to be resident or regular visitors may result from loss of habitat, increase in feral predators or through disturbance from dust, light, noise and vibration. The majority of bird and bat species recorded from within the Development Envelope during the BBUS, are already habituated to agricultural landscapes and are resilient to disturbance. While the consequences of this potential on any one taxon are concluded therefore to be negligible to low, there is a large amount of uncertainty in this field due to a general lack of relevant data in the public domain. Considering the large number of existing and proposed wind turbines in the region, cumulatively, this may have greater consequences on local populations of the most sensitive species and are included here to ensure unlisted birds and bats are monitored.

3.2.2 Reduction in conservation significant species through reduction in habitat value, loss or disturbance

Conservation significant species such as black-cockatoos and, several locally significant birds of prey and two bat species could decline on site through loss of key habitat features, increased predation from feral Cats and Foxes or disturbance. These may individually or in-combination, result in the discontinuation of presence, nesting, roosting or foraging of conservation significant species from within the Development Envelope.

3.2.3 Direct losses from collision with turbines

Pending the formal collision risk assessment, it is presumed that some losses of conservation significant, locally significant and un-listed species may occur through blade strike. Conservation significant species potentially at risk include Carnaby's Black-Cockatoo, Blue-billed Ducks, several migrant waders and Peregrine Falcons. A large amount of uncertainty exists with how migrant waders may be impacted and are to be included in all ongoing monitoring. Locally significant species considered at risk of blade strike include several species of birds of prey and two bat species. Several unlisted species such as Corellas and Ravens are also predicted to be at risk of collision with blades but the consequences are deemed negligible.

4 Bird and Bat Monitoring

To meet the requirements of the Commonwealth and State legislation and ensure the impacts from the wind farm do not exceed those predicted in Section 3, a monitoring programme is to be developed that investigates changes in the assemblages or specific impacts. The risk assessment process predicted a number of potentially important impacts that raises the following questions:

1. **Displacement of general bird assemblage**:
    a. does the general diversity and abundance of all birds and bats remain the same through construction and operation?
    b. Are feral predator numbers being reduced?
2. **Reduction in conservation significant species:**
    a. are the conservation significant species recorded during the BBUS still present?
    b. in similar abundances through construction and operations?
3. **Direct losses from collision with turbines:**
    a. What are the losses of conservation significant bird and bat species from collision with turbine blades and towers?
    b. are they sustainable?
4. **Reduction in habitat value resulting from the development:**
    a. are the habitat values (nesting trees, significant seasonal roosts and foraging habitat) for black-cockatoos and birds of prey maintained or improved in relation to the baseline?
    b. do black-cockatoos continue to use key habitat features throughout construction and operations?

A range of monitoring methods is described below that are devised to answer these questions, some of which require more than one approach. Monitoring the diversity and abundance of bird species must be compatible with the methods of data collection used during the BBUS and will therefore be partially confined to these methods for collection of comparable data. Other methods are employed for impact monitoring and for adaptive measures. Where possible, new methods of bird and bat monitoring proposed for construction and operation should also be adopted for the ongoing BBUS. This will ensure the new methods have a comparable baseline and will be highlighted in the relevant sections.

Management Objectives for monitoring are presented in Appendix C. The following provides an overview of the programme subject to changes following approval.

All monitoring will be conducted by independent experts, while operator staff and visitors will be required to report any dead or injured wildlife found during site activities.

4.1.1 Scheduling

Prior to construction commencing, certain tasks that were not included in the baseline could be commenced to provide baseline data. Where considered feasible, these opportunities will be identified in the proposed monitoring programme discussed below.

Construction monitoring will commence at the beginning of major ground works and continue until major works are complete. Monitoring sites will be restricted to locations safe from construction

activities. Operational monitoring will commence following completion of commissioning and testing, and on commencement of energy generation and export and continue for two years.

Monitoring campaigns will occur four times per year and each campaign scheduled to align with peak occurrence and highest sensitivities of black-cockatoos, that being once each during the autumn and winter when roosting numbers are at their highest, once during mid to late spring when breeding reaches its peak, and once during mid-summer when dispersion is most likely to occur. The monitoring programme may be extended at any time should impacts prove to be more significant than those predicted in the risk assessment.

4.2 Bird and Bat Carcass Searches

A carcass search programme will be implemented with the objective to estimate annual losses of each species of bird and bat that have collided with the turbines. Carcass retrieval is likely to improve with control of feral Red Foxes which remove carcasses from the search area. Carcass searching will be conducted as follows and with the outcomes presented in Appendix Table C.1:

- Carcass searches will be conducted quarterly
- All turbines will be included in searches during each campaign
- During each campaign, a search will be conducted for bird and bat carcasses along roads adjacent to the wind farm Development Envelope to offer a comparative sample size of other threats
- Sniffer dogs with established performance are to be employed where available
- "E-sniffer" technology can also be investigated as an alternative
- A carcass detection programme is to be conducted over the first two campaigns to calibrate for missed carcasses given the environmental conditions under the turbines
- Based on the blade length and RSA height, a 200 m radius from turbine bases will be systematically searched using a series of transects
- Carcasses of species of conservation significance (e.g. migrant waders or black-cockatoos) will trigger a review and adjustment of search intensity
- Following the first two campaigns or on receipt of existing data from other wind farms in the area, a power analysis will be conducted to determine the most cost-effective frequency and intensity of search regime.

4.2.1 Carcass Retrieval Protocol

Carcasses found will be processed as follows:

- Location, date and time recorded
- Photographed in-situ
- Carcasses/remains are to be double-bagged using appropriate hygiene protocols
- Bags are to be tagged with a pro-forma recording reference number, species, search team, notable damage, date, time and photo reference
- Bagged carcasses to be placed on ice
- Where species identity cannot be confirmed on site, advice is to be sought from authoritative sources such as the Western Australian Museum

- Carcasses are to be stored in a freezer for identification, detection confirmation or persistence trials
- Carcasses are to be formally destroyed as biological waste once no longer required.

4.2.2 Incidental Carcass Finds

Carcasses found by site staff or visitors to the wind farm are to be formally photographed and reported using a carcass record sheet, in accordance with strict protocol advised during site inductions. Record sheets and photographs are to be provided to the carcass monitoring team for formal identification and inclusion in annual reports.

4.3 Bird Monitoring

Point count sampling is useful to monitor large areas for those species with distributions at the landscape scale (e.g. vantage points), while careful placement, point counts can also be applied to monitor species limited to within landscape features such as scrub or woodland. Both methods are broadly compatible with the method employed in Phoenix (2026). However, the two methods should not be conducted simultaneously because the demands on observers are too great and lead to ineffective sampling of one group or other. Point count monitoring will therefore be divided into Vantage Point (VP) for those species at risk of collision with turbine blades, and point counts (PC) for the broader bird assemblage. It is recommended that the remaining BBUS Programme be adapted to align with the post approval monitoring methods recommended here. Environmental Outcomes for this programme are presented in Appendix Table C.2.

4.3.1 Vantage Point (VP) Monitoring

VP monitoring will be conducted on the following terms:

A. One-hour sessions to prioritise data collection over travel
B. Use a selection of the sample points established in the BBUS programme
C. Sessions conducted three times per VP during each campaign in three time periods: one hour after dawn, between 10:00 and 14:00hrs, and up to one hour before sunset. These timings will help monitor nesting, roosting (day and night-roosts) and foraging behaviours
D. Black-cockatoos and migrant species (e.g. Fork-tailed Swifts (*Apus pacificus*) and waders) as primary targets
E. All raptors as secondary targets
F. Flights tracked through the landscape out to 2 km from VP
G. Records to include species, number of individuals, flight height, behaviour
H. Priority given to target birds flying within RSA
I. Sample parameters used for comparison with baseline data will include species presence, number of individuals and number of encounters.

4.3.2 Area search bird monitoring using point counts (PC)

Point Count (PC) monitoring will be based on the 15 minutes for 2 ha bird census and conducted on the following terms:

A. 15 minutes per PC
B. Use a selection of the sample points established in the BBUS programme

C. PCs are to be selected as representative of the various landcover types listed in Section 2.1, weighted for remnant vegetation to include sampling of the broader bird assemblage
D. Each PC is sampled once during each campaign within one hour of dawn
E. All bird species seen or heard within 80 m of the PC
F. Records to include species, number of individuals, flight height, behaviour, whether inside the 80 m or outside
G. Sample parameters used for comparison with baseline data will include species presence and number of individuals.

4.3.3 Focal Follow

BCE (2025) has identified that the focal follow (FF) method is an efficient means of sampling Carnaby's Black-Cockatoo. Depending on access across the sampling area, this may be a more effective means than VP surveys for tracking black-cockatoos through the landscape to address changes in occurrence, activities and interaction with turbines. Methods are the same as for VP sampling, but mobile and strictly only for black-cockatoos.

4.4 Bat Monitoring

Ultrasonic monitoring for bat activity will be conducted using the same model recorders used during the BBUS to ensure similar microphone sensitivity. Siting and timing of recording units will primarily target White-striped Freetail Bat (*Austronomus australis*) and Gould's Wattled Bat (*Chalinolobus gouldii*), since these are two bat species potentially most at risk from a wind farm development. The approach is to take advantage of elevated detectors and record bats from the ground and at height. Environmental Outcomes for this programme are presented in Appendix Table C.2.

The approach will be as follows:

- Prior to construction, ultrasonic recording units (or their microphones), will be elevated to heights consistent with the RSA (say 70 m) to sample bats at height. Meteorological masts are the primary means of achieving this and will provide a baseline for bat activity at height.
- During construction, an ultrasonic recording unit (sampling rate to 240 kHz minimum) placed at the foot of the meteorological mast and another at 70 m height using a pully system. If two masts are erected, more detectors should be deployed NOTE: this should be adopted as soon as meteorological masts are erected and ideally before construction begins to acquire a baseline
- During operation, minimum of two ultrasonic detectors will each be set at the base of two turbines, and minimum two more deployed on the towers to sample within the RSA (e.g. 70 m above GL) of the same turbines
- Two ultrasonic detectors deployed at two sites representative of the project and two control sites
- Detectors allowed to collect data over two weeks in each quarterly campaign

Relative bat activity (calls per night) of each species can be compared directly with the BBUS results to monitor continued use of the Development Envelope. While the above method does not allow estimates of flight height, differences in number of detections and amplitude of calls simultaneously recorded on low and high recorders, can infer height of bat activities. Numbers of detections per unit

time between baseline, construction and operations will help identify whether the bats are being attracted to the turbines (neophilia), and if so, whether they become habituated to their presence and begin avoiding them. Ultrasonic call activities can also be compared seasonally with any carcass results.

4.5 Raptor Monitoring

Known or suspected nests of the three birds of prey (Wedge-tailed Eagle, Nankeen Kestrel and Brown Falcon) most at risk of collision with turbines, will be monitored for breeding activity during the most appropriate seasonal campaign(s) throughout the two-year programme. Confirmed breeding and subsequent fledging of young will establish that the three species are still productive within or around the operational wind farm.

4.6 Black-cockatoo Habitat Monitoring

In conjunction with the VP and PC sampling, monitoring of key habitat features for black-cockatoos within the Development Envelope will help to verify ongoing presence and use of critical habitat features such as nesting trees and roost sites. The focus of habitat monitoring will be on Carnaby's, but Forest Red-tailed Black-Cockatoo will be subject to the same protocol whenever encountered.

The following monitoring actions will be undertaken:

- Prior to construction, suitably experienced expert to undertake a pole-cam, drone or visual inspection (tree climbing) of all hollow-bearing trees considered suitable for black-cockatoo nesting to re-examine use or potentially use by Carnaby's or Forest Red-tailed Black-Cockatoos
- Annually inspect all hollow-bearing nesting trees identified in the BBUS to confirm they remain undamaged
- Twice during the peak breeding period for Carnaby's, all hollow-bearing nesting trees will be monitored from a safe distance for at least an hour each to verify whether they are occupied by pairs
- Previously identified Carnaby's communal roosts will be visited in the autumn campaign and monitored at dawn or dusk to verify continued use – this can be conducted visually or acoustically but sampling shall consider that black-cockatoos change the location of their roosting sites and therefore roost monitoring will also occur on larger stands of trees within the Development Envelope.
- Because black-cockatoos change the location of their roost sites within and between seasons, further searches shall be carried out prior to construction. Stands of large trees within the Development Envelope will be monitored for 30 minutes before sunset and 60 minutes after when birds are settling for the night's roost. Flocks of Carnaby's are known to move location after sunset, requiring the extended period after sunset. Confirmation of a roost is best done by monitoring the same location 30 minutes before sunrise the following morning for increasingly vocal and active birds. Roost monitoring needs to be conducted between the end of March and August for the non-breeding season, and between October and January for the non-breeding birds in the breeding season.

Monitoring of foraging habitat quality is also of critical importance to ensure black-cockatoos can persist. This will be conducted across the Development Envelope using methods described in BCE (2024) and DAWE (2022). Scores can be compared with the results of the BBUS (Phoenix, 2026). A number of control sites for foraging habitat within 6-12 km of active nests will also need scoring to ascertain that the black-cockatoos have adequate food supplies while nesting and roosting. Should fire or severe drought affect the quality of foraging habitat within 10 km of the Development Envelope, control site sampling may need to be extended. The optimal period for conducting this is in spring when surveyors can judge flowering.

All surface water sources including livestock troughs, available within the Development Envelope, will be maintained throughout the life of the wind farm and a check included in monitoring campaigns and annual inspections.

Should changes in the hydrological regime occur caused by the wind farm, lead to damage of the native vegetation, an adaptive restoration programme may be required.

5 Management Objectives

Mitigation measures suited to onshore wind farms to help reduce impacts on birds and bats are summarised by DCCEEW (2026) and these are listed in Appendix D together with a brief appraisal. Some of these are considered of material use on the Marri Wind Farm proposed and are discussed below with others. These can be applied on and adjacent to the Development Envelope to help reduce attraction to the site and reduce losses of certain species. This will help offset any impacts on the birds and bats against the background losses from recognised and significant threats. These measures are described in the following.

5.1 Turbine Array Configuration and Specification

There are currently no hollow-bearing trees within the Development Envelope that have been seen to be used by black-cockatoos for nesting. The nearest lies 2.7 km southeast of the Development Envelope (Phoenix, 2026). However, 58 or so hollow-bearing trees lie within the Development Envelope and if these become occupied by black-cockatoos before the start of construction, a buffer of 500 m within which no development activity will take place will be applied. A 500 m buffer is selected based on:

- resilience of black-cockatoos for nesting in areas of high disturbance (M.Bamford, pers. obs.)
- black-cockatoos remain below 50 m for 99.97% of bird time in the region (B.Shepherd, pers. comm.)
- all but one sighting of black-cockatoos recorded during the BBUS were of birds 60 m or lower
- turbines are to be selected so that the blades do not sweep lower than 66 m.

5.2 Removal of Carrion and Other Attractants

A programme to remove carcasses of livestock and native species will be implemented across the wind farm and roads adjacent to the site. Removal of carrion will reduce the attention of scavenging birds of prey such as Wedge-tailed Eagles, Whistling Kites and Little Eagles. Carcasses are to be buried according to local requirements. Farm and proponent personnel will be vigilant in identifying and recording carcasses across the Development Envelope, and to arrange their removal and disposal.

Seed and grains spilled along roads are an attractant to granivorous birds including Carnaby's Black-Cockatoo (M. Bamford pers. obs; also informal advice from CBH). Bountiful access to seeds and grains also benefit Western Corella (*Cacatua pastinator*) and Galah (*Cacatua roseicapilla*) which are subsequent threats to black-cockatoos (DPW, 2013). Managing the haulage of farm produce along tracks and roads is therefore important to reduce attracting granivorous birds to the Development Envelope and risk of road casualties.

5.3 Feral Predator Control Programme

Introduced feral predators such as European Red Foxes (*Vulpes vulpes*) and Cats (*Felis catus*) are one of the greatest threats to native fauna (Dickman, 1996). Cats in particular are known to take birds and bats (as well as other fauna) up to the size of black-cockatoos (Mawson et al, 2025). Reduction or removal of these two species will remove or reduce an ongoing impact and provide a greater resilience in the bird and bat assemblages of the Development Envelope.

Expert advice on the optimal means of controlling foxes and cats will be sought following approval and a Feral Predator Management Plan (FPMP) prepared. The FPMP will be implemented on commencement of operations and continue throughout the operational life of the project. Ideally, a feral predator management plan is more effective at the large scale. It is therefore suggested, that a collaboration with other wind farm operatives, industries and WA agencies is agreed allowing benefits from economies of scale.

5.4 Native Vegetation Restoration

Where offsetting is required from possible lost native vegetation (if any), it is proposed that stands of native vegetation within the Development Envelope are protected from grazing livestock including sheep, cattle and goats to allow recovery of habitat for a range of birds and bats. Where natural regeneration is likely to occur, no action would be necessary. Where the understorey and ground-layer have been fully degraded, a restoration planting regime may be required. Restoration of native vegetation would occur on private land and would therefore require landowner approval.

Installation of a number artificial nesting tubes in suitable trees located more than 500 m from a turbine or outside of the array. They must be positioned so that foraging and water provisions are within 3 km. These can help attract nesting birds away from turbines or help supplement and increase breeding opportunities for black-cockatoos. The tubes and trees must be protected throughout the life of the wind farm.

6 Impact Triggers and Thresholds

Trigger criteria define outcomes from monitoring that may indicate significant impacts are approaching. Threshold criteria define levels of impact detected through monitoring that are deemed unacceptable and warrant measures to reverse the trends. Triggers and thresholds presented herein are based on a review of relevant factors (see Appendix D) for each of the taxa identified as at-risk from the preliminary risk assessment (Appendix B). They may be revised pending results from collision risk modelling or population viability analysis.

Identifying triggers requires an understanding of the population biology of at-risk species, which requires contextual information such as mortality from other windfarms and from other sources. Ideally, mortality triggers would be based upon Population Viability Analysis (PVA) for a species, but there is unlikely to be sufficient information for this level of investigation. A provisional assessment of triggers and thresholds for the key species' of concern are provided in Appendix D.

6.1 Trigger Criteria for Conservation Significant Species

Trigger criteria for conservation significant species include the following:

A. Unplanned damage to or clearance of black-cockatoo foraging, nesting or roosting habitat because of wind farm activities
B. Observed near-misses between listed birds and turbines
C. Carcasses of listed species within the Development Envelope not attributed to blade strike or carcasses of listed species below threshold numbers attributed to blade strike
D. Significant reduction in abundance of listed species compared with baseline conditions
E. Failure to conduct monitoring programme elements or management objectives defined in the final BBAMP.

Such events will trigger a review to assess root cause and identify whether monitoring needs to be adjusted. Losses of a listed species are to be assessed against the trigger and threshold values to identify whether the impacts are at significant levels (see thresholds below).

6.2 Threshold Criteria for Conservation Significant Species

Significant impacts on species listed in the EPBC Act are defined in DoE (2013) and used to determine the threshold criteria in this PBBAMP. Threshold criteria for impacts on species listed under the EPBC Act or EPA Act and confirmed to be utilising the Development Envelope include the following:

1. Unplanned loss due to wind farm activities of one hollow-bearing nesting tree known to have been used by breeding black-cockatoos
2. Loss due to wind farm activities of a group of trees in which Carnaby's or Forest Red-tailed Black-Cockatoos are known to roost regularly through the year
3. Loss of a resident listed species from the Development Envelope as a result of wind farm activities

Loss of listed or migratory species exceeding the threshold levels defined in

4. Table 6-1 as a result of collision with turbines or new overhead lines.

Such events are to be reported within 48 hours to the regulators with proposed corrective actions. Corrective actions will consider the use of adaptive measures suggested in Section 7.

It is important to acknowledge that Carnaby's and Forest Red-tailed Black-Cockatoos can only be sustained within the Development Envelope if their habitat within their range is maintained or improved. Unfortunately, their habitat continues to be cleared and if that doesn't abate, black-cockatoos may disappear from the Development Envelope without any impacts from the wind farm. It is therefore imperative that availability and condition of foraging habitat outside of the Development Envelope is taken into consideration in establishing why black-cockatoos may have declined or become absent. Mortalities from other threatening processes such as roadkill and other wind farm developments need to be collated and considered in the wider context and in light of changing population and breeding trends.

6.3 Trigger Criteria for Non-listed Species

Trigger criteria for impacts on locally significant bird and bat species and on the general assemblage are presented here. They are to be adjusted pending the final results from the risk assessment.

1. Retrieval of a number of carcasses of a locally significant species during carcass searches in a given campaign that project to annual trigger levels (see Appendix D) when accounting for search effort, carcass persistence and removal etc.
2. Significant reduction in species diversity or abundance compared with the baseline through bird census monitoring over one campaign
3. Statistically significant reduction in sightings of pairs or family groups of target species

6.4 Threshold Criteria for Locally Significant Species

Threshold criteria for impacts on locally significant bird and bat species and on the general assemblage are presented here. They are to be adjusted pending the final results from the risk assessment.

1. Retrieval of a number of carcasses of a locally significant species in a given campaign that equal or greater than annual threshold levels (see Appendix D) when accounting for search effort, carcass persistence and removal etc.
2. Statistically significant reduction in species diversity or abundance compared with the baseline through bird census monitoring over two consecutive campaigns and can be compared with regional long-term datasets to help understand the background conditions
3. Locally significant species breeding success and persistence of breeding pairs drop significantly compared with baseline levels.

6.5 Summary of Trigger and Threshold Criteria

Preliminary trigger and threshold criteria for all target species are summarised in

Table 6-1. This table will be updated following completion of the BBUS.

Table 6-1 Preliminary threshold criteria for migrant wader and listed waterbird species previously recorded in the BBUS or area or expected.

Species	Trigger Crit.	Threshold Crit.
Blue-billed Duck (P4)	Presence in array	2 carcasses/yr
Hooded Plover (P4)		
Sharp-tailed Sandpiper		
Curlew Sandpiper (CrEn)	Presence in array	1 carcass/yr
Red-necked Stint		
Wood Sandpiper		
Common Greenshank (Vu)		
Marsh Sandpiper		
Wedge-tailed Eagle		
Little Eagle		
Nankeen Kestrel		
Peregrine Falcon		
Carnaby's Black-Cockatoo		10 non-breeding birds 1 breeding adult 1 confirmed nesting tree
White-striped Freetail Bat		
Gould's Wattled Bat		

7 Adaptive Management

Mitigation measures suited to onshore wind farms to help reduce impacts on birds and bats are summarised by DCCEEW (2026) and these are listed in Appendix D together with a brief appraisal. Methods that could be employed to reduce otherwise unacceptable impacts identified through the monitoring programme on the Marri Wind Farm are discussed below. It is noted that changes to existing management measures may also be considered adaptive approaches. All proposed changes to this PBBAMP need to be validated and presented to the regulators through the reporting procedures.

7.1.1 Blade feathering control and curtailment

There are a range of methods that control turbine activity that can be used to reduce collision risk. While none of these are currently deemed necessary to mitigate predicted risks, they can be considered for adaptive measures depending on the findings from monitoring and are discussed in the following.

Stopping blades from turning (not freewheeling slowly) when not needed for generation can help reduce bat collisions.

Several studies have documented the effect of low wind speed at night on the flight height of bats, with greater microbat mortality at low wind speeds (Rydell, et al., 2010), (Florent and Bennett 2024). Shutting down turbines at night during periods of low wind speed has been found to reduce bat mortality (44% to 93 % according to Florent and Bennet 2024) with only a small loss in production.

Systems are available to detect at-risk birds and curtail or shut down individuals or groups of turbines to reduce mortality risk (e.g. Identiflight). Such systems are only suggested where a high risk is identified, such as where there are large numbers of significant species moving through a region or through the discovery of larger numbers of carcasses than anticipated. Ongoing VP and FF surveys, carcass monitoring and other forms of monitoring could identify where risk does occur and thus where such systems may be implemented. It should be noted that the technology for such systems is improving rapidly.

Radar is a useful monitoring tool that can be employed to better understand nocturnal flight characteristics should new information be revealed that shows night flights are more prevalent than is currently understood. Radar systems can also be used to curtail or shut down individuals or groups of turbines; if threshold levels of migrant waders, Blue-billed Ducks or owls are detected in the carcass monitoring for example.

7.1.2 Marking overhead transmission lines

New overhead transmission lines can be marked on the discovery that birds or bats are susceptible to collision leading to mortalities that, in combination with blade strike, exceed threshold levels.

7.1.3 Habitat Improvements

Outside of offsetting (if required), habitat improvement for target species may help support taxa at a given location if deemed necessary or draw taxa away from an area identified as high risk. Habitat improvement would be a perpetual responsibility for the life of the project or beyond. There are many necessary tasks, some legal, that would need completing before habitat improvement can be

committed to and would therefore be undertaken only in extreme circumstances in isolation of offsetting. If however, offsetting is required, a wider consideration of the predicted impacts such as disturbance, loss of connectivity or feral predator control for example, and not simply habitat loss, could also help determine location, extent and provisions within the habitat improvement.

7.1.4 Collaboration with nearby Wind Farms

The Proposal lies in a region with multiple similar proposals and several windfarms already in operation. The region from Lancelin to Eneabba is effectively one very large windfarm with key production areas centred around individual projects. Therefore, a regional approach needs to be taken to consider cumulative impacts, and to share learnings. Birds do not recognise project boundaries, and species such as Carnaby's Black-Cockatoo migrate throughout the region, and while individual site characteristics may affect movement patterns, consequences at a population level need to be considered by all projects.

8 Roles and Responsibilities

Responsibility for the successful implementation of the final BBAMP lies with Marri Wind Farm Pty Ltd as proponent and operator of the Marri Wind Farm. Specific responsibilities also lie with certain roles as described in the following.

Senior Management Team

Legal responsibility to deliver the resources and leadership required to implement the environmentally protective measures contained in the final BBAMP lies within the Proponent's senior management team. This responsibility will be cascaded to the implementation team with subsequent demands of all personnel and contractors employed on the project.

Implementation Team

Personnel with the daily responsibilities to implement the measures stated within the final BBAMP will be defined on commencement of on-site activities. Construction and Operations teams may be different. It will be this team's responsibility to ensure that appropriate training, resourcing and access to the site are appropriately administered. Responsibility to prepare and review reports, and timely delivery of documents lay at this level. The reporting of non-compliances, trigger and threshold criteria to the senior management team also lies here.

All Project Personnel

All personnel working in the Development Envelope including proponent staff, construction workers and visitors, are required to comply with certain requirements laid down in the final BBAMP, and in particular:

- Being vigilant to protect retained key habitat features
- Reporting impacts on bats or birds
- Reporting the discovery of carcasses of all fauna.

9 Reporting and Document Review

Outcomes from the implementation of the final BBAMP are to be reported routinely and on occurrence of an unplanned or unexpected event such as an exceedance (threshold). Reporting is to be conducted as listed in Table 9-1 or as required by approval conditions.

Table 9-1. Reporting methods

Event	Timing
Performance Report	Every 12 months following commencement of major construction work
Proposed change(s) to the BBAMP	Annually or as required
Non-compliance event	Two weeks
Threshold level exceedance	Within 48 hours of event

In compliance with AS/NZS ISO 14001:2026, the final BBAMP will be reviewed annually following commencement of construction. It will also be revised on discovery of a conservation significant species previously not expected, or the revision to the status of a species known to be present on site.

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11 Appendices

Appendix A. Phoenix Environmental Services (2026). ***Marri Wind Farm, Bird and Bat Utilisation Survey Report.***

Technical memorandum

PHOENIX ENVIRONMENTAL SCIENCES

To: Rupert Duckworth, Aurecon Group
Bryce Skarratt, Alinta Energy
From: Brooke Quick
Date: 25/02/2026
Subject: Technical Memorandum – Summary of data collected from phase 1 to 7 of the bird and bat utilisation surveys for the Marri Wind Farm Project

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1 INTRODUCTION

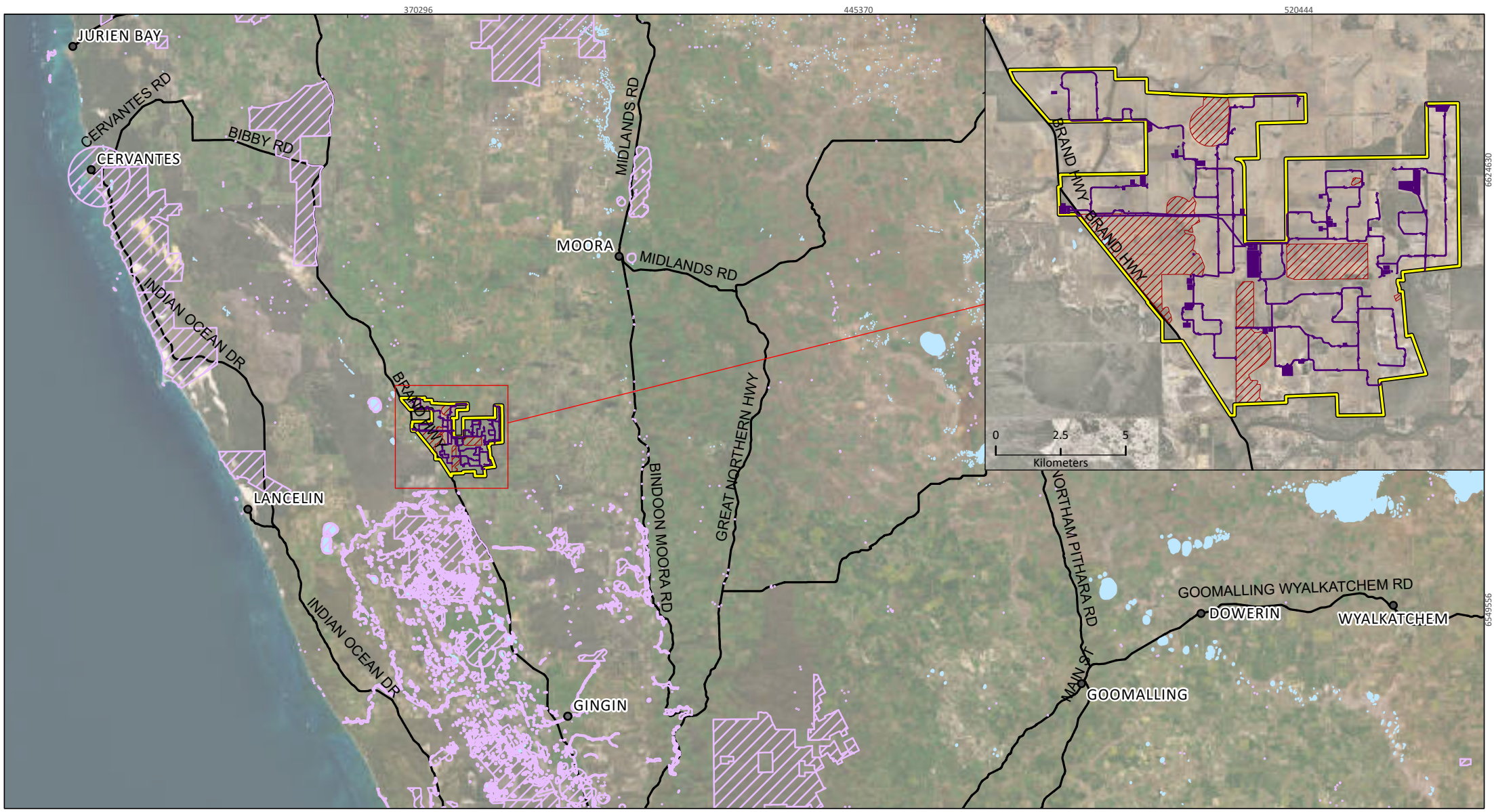
Marri WF Pty Ltd as trustee for the Marri WF Unit Trust (the Proponent), a wholly owned subsidiary of Alinta Energy Pty Limited (Alinta Energy) is seeking approval to develop the Marri Wind Farm (the Project), located approximately 20 kilometres (km) south of the township of Dandaragan, Western Australia (WA; Figure 1The study area is located in the Shire of Dandaragan and the Southern Climatic Region as defined by EPA (2020).

The Project involves the construction of a 550 MW wind farm in Dandaragan, consisting of 82 turbines that will be able to generate 2,000 GWh of energy. In March 2024, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by Aurecon Group (Aurecon), on behalf of the Proponent, to undertake bird and bat utilisation surveys (BBUS) for the Project. In February 2026, Aurecon requested a brief technical memorandum in advance of the final survey to summarise species observations over preceding surveys.

This memorandum summarises data from the BBUS between Phase 1 and Phase 7, excluding acoustic bird call recording data, which is currently being analysed. Basic and targeted surveys for the Project have been reported on separately (Phoenix 2025a, in prep).

2 STUDY AREA

The study area is approximately 12,555.5 ha (Figure 1). Current guidance for bird and bat management at onshore wind farms requires that a desktop assessment be undertaken for the Project area and its immediate surrounds (DAWE 2021). The interim guidance recommends applying a 10 km buffer around the Project area, which was adopted for this assessment (DCCEEW 2024). A 10 km buffer was applied to the study area to conduct a regional assessment of bird and bat assemblage, referred to as the bird and bat investigation area (BBIA; Figure 2).



Alinta Energy
Marri Wind Farm Project

Project No	1672
Date	18/02/2026
Drawn by	JL
Map author	BQ

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Kilometers

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- Study area
- Proposed development footprint
- Exclusion zone
- DBCA managed land
- Lakes
- Environmentally Sensitive Areas
- Roads

Figure 1

Project location and study area

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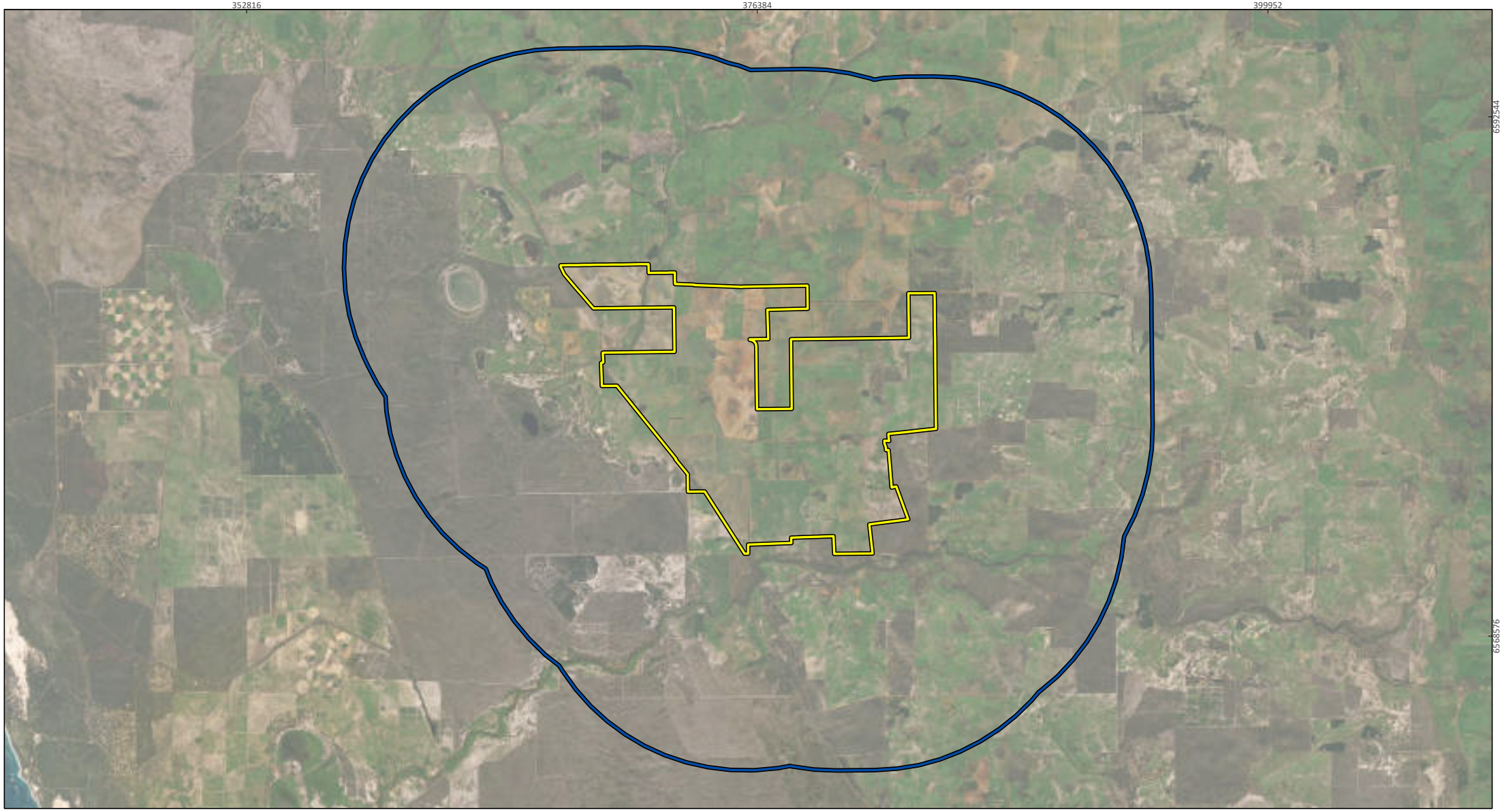

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Marri Wind Farm Project

Project No	1672
Date	19/02/2026
Drawn by	JL
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Study area
Bird and bat investigation area (BBIA)

Figure 2

Bird and bat investigation area

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3 METHODS

3.1 SURVEY TIMING

Utilisation surveys have been undertaken over 7 Phases to date since August 2024 (Table 1). Phase 1 was conducted over 2 trips due to access restrictions onto specific properties within the study area at the time.

Table 1 Survey dates

Phase	Survey type	Season	Dates
1	Utilisation survey trip 1a	Winter	5 – 9 August 2024
	Utilisation survey trip 1b	Winter	26 - 30 August 2024
2	Utilisation survey trip 2	Summer	9 – 13 December 2024
3	Utilisation survey trip 3	Summer	2 – 6 February 2025
4	Utilisation survey trip 4	Autumn	5 – 9 May 2025
5	Utilisation survey trip 5	Winter	4 – 8 August 2025
6	Utilisation survey trip 6	Spring	10 – 17 November 2025
7	Utilisation survey trip 7	Summer	12 – 16 January 2026

3.2 FIELD METHODS

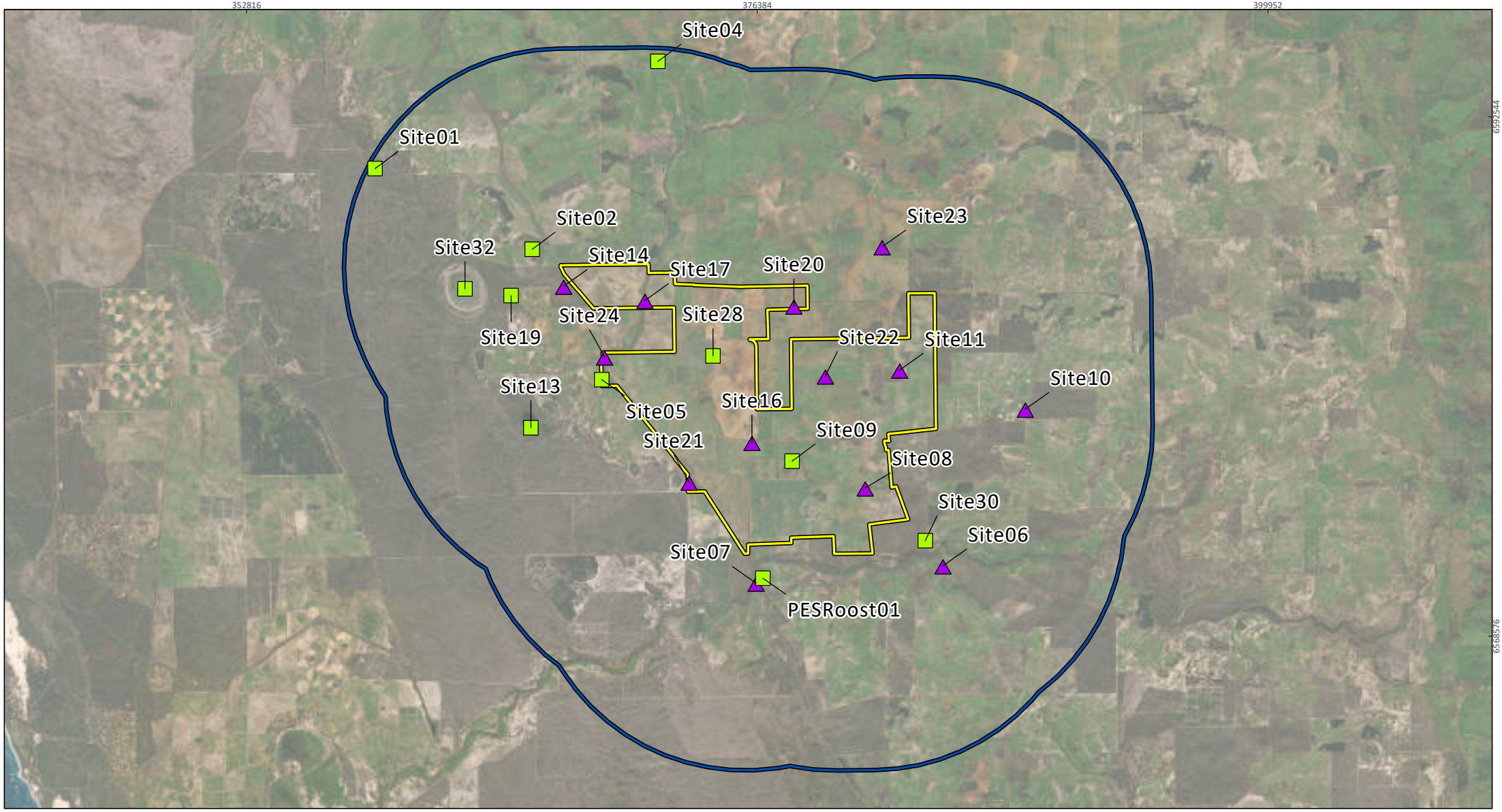
Sites sampled during Phase 1 were selected based on the 2024 draft turbine layout for the Project. After Phase 1 surveys were complete, sites were refined and selected based on the 4 broad fauna habitats that occur within the study area. These were defined as: drainage line, open woodland, shrubland, and cleared. These sites are referred to as the Collision Risk Modelling (CRM) monitoring sites. To better fit a before-after control-impact (BACI) survey design, the CRM monitoring sites were further revised to include at least 2 impact site (within the study area) and one reference site (outside the study area but within the BBIA) per habitat per season (Figure 3).

Additional sites were sampled each season to target species listed as Matters of National Environmental Significance (MNES), referred to as MNES sites (Figure 3). MNES sites were located within habitats supporting migratory shorebirds and black cockatoos, as these taxa were considered the most likely to be impacted by the Project.

A minimum of 21 sites were sampled each season, including 12 BBUS monitoring and 9 MNES sites. The following methods were employed at each BBUS monitoring site per season:

- point counts for birds (section 3.2.2)
- ultrasonic bat call recordings (section 3.2.3)
- acoustic bird call recordings (section 3.2.4).

MNES sites had at least one point count conducted per season. Habitat assessments were undertaken throughout the study area to define and delineate the extent of broad fauna habitats present in the BBIA. Opportunistic sightings were made throughout the BBIA and surrounding region across all seasons (Figure 4).



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Study area
Bird and bat investigation area (BBIA)

Site

CRM monitoring site
MNES site

Figure 3

Bird and bat investigation area

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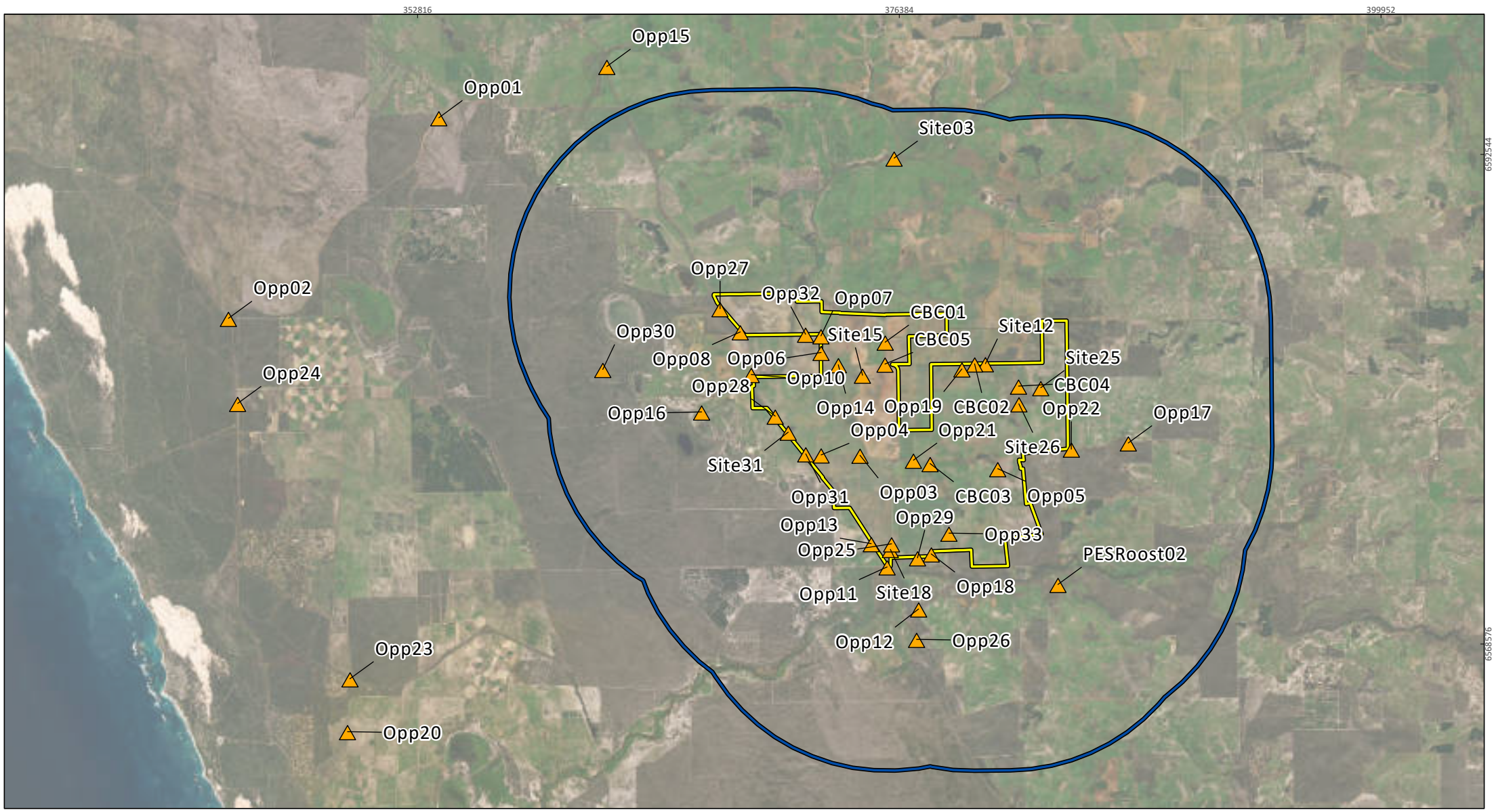

Alinta Energy
Marri Wind Farm Project

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Date	19/02/2026
Drawn by	JL
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- Study area
- Bird and bat investigation area (BBIA)
- Sites

Figure 4

Opportunistic sites

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3.2.1 Habitat assessments

Habitat assessments were undertaken at sites across the study area to define and delineate the extent of broad fauna habitats present. In total, site habitat descriptions have been recorded at 38 sites (Table 2).

3.2.2 Fixed-point counts for birds

Standardised bird point counts were undertaken for a minimum of 15 minutes for each sample at CRM monitoring and MNES sites. At CRM monitoring sites, point counts were replicated twice per Phase, with at least one point count per side completed during the early morning when bird activity was highest. Total survey effort of the point counts to date is 72.2 hours (Table 2).

The following parameters were recorded during the point counts where applicable:

- the bird distance and direction from the observer
- estimated flight height, calculated using laser rangefinder Nikon Forestry Pro II
- bird behaviour and the size of any flocks observed
- abiotic conditions (rainfall, wind speed and cloud cover).

3.2.3 Ultrasonic bat call recordings

Song Meter SM4 FS-BAT ultrasonic recording devices were deployed at all CRM sites in each survey phase to detect bat species. The recorders were deployed for a minimum of 3 nights per site and operated from sunset to sunrise. Microphones were fixed approximately 1.5-2 m off the ground at a 45° angle pointing up towards suitable microhabitats. A total of 290 nights of echolocation recordings were gathered (Table 2). Bat expert Bob Bullen was engaged to analyse the echolocation recordings per 30-minute window (Bullen 2021a, b).

3.2.4 Acoustic bird call recordings

Acoustic recordings using Song Meter SM4 audio recorders were deployed at all monitoring sites in all survey phases to detect nocturnal bird species such as owls; however, any recorded diurnal bird species were also identified (Table 2). The recorders were deployed for one to 3 nights per site and operated from 25 minutes after sunset to 25 minutes before sunrise.

In total, 268 nights of bird data was gathered and analysed using Kaleidoscope Pro v5.6.4 (Table 2). For each sample, the full audio dataset was analysed using cluster analysis and all sounds were grouped into clusters based on their characteristics; this analysis typically assigns one or more species to a cluster. Up to 30 minutes was spent on each sample identifying as many species as possible.

3.2.5 Roost monitoring

A black cockatoo night roost is an area of trees where black cockatoos congregate to rest at night, usually close to an important water source and near high-quality foraging habitat (DAWE 2022). Night roosting habitat includes all vegetation within a 500 m radius of each known roosting tree (DAWE 2022).

Roost monitoring involved counting black cockatoos as they flew into their nighttime roost until dusk. Phoenix has undertaken black cockatoo roost monitoring within the BBIA since December 2024.

Table 2 Survey effort

Site name	Site type	Habitat assessment (#)	Roost monitoring events (#)	Opportunistic sighting	Audio recording (nights)	Ultrasonic recording (nights)	Wind farm point count
CBC01	Fauna site	1		2			0.3
CBC02	Fauna site	1					
CBC03	Fauna site	1		1			
CBC04	Fauna site	1		1			
CBC05	Fauna site	1		2			
Opp05	Fauna site	1		1			
Opp32	Fauna site	1					
Opp33	Fauna site	1		1			
Site01	Fauna site	1			2	3	1.2
Site02	Fauna site	1			2	3	4.2
Site03	Fauna site	1			2	3	0.5
Site04	Fauna site	1			2	3	3.7
Site05	Fauna site	1		1	2	3	2
Site06	Fauna site	1		3	20	22	3.5
Site07	Fauna site	1			17	22	3.5
Site08	Fauna site	1			20	22	4
Site09	Fauna site	1			2	3	2
Site10	Fauna site	1			21	22	3.5
Site11	Fauna site	1		1	20	21	3.5
Site12	Fauna site	1			2	3	0.5
Site13	Fauna site	1			3	3	3.5
Site14	Fauna site	1			1	3	2
Site15	Fauna site	1			1	3	0.5
Site16	Fauna site	1			20	22	3.5
Site17	Fauna site	1		1	20	22	3.5
Site18	Fauna site	1			1	3	0.5
Site19	Fauna site	1		1	3	3	3.2
Site20	Fauna site	1			21	22	3.5
Site21	Fauna site	1		1	21	22	3.5
Site22	Fauna site	1			19	19	3.2
Site23	Fauna site	1			19	19	3
Site24	Fauna site	1		2	19	19	3
Site25	Fauna site	1					1
Site26	Fauna site	1					1
Site28	Fauna site	1					2.1
Site30	Fauna site	1		1			1
Site31	Fauna site	1					0.8

Site name	Site type	Habitat assessment (#)	Roost monitoring events (#)	Opportunistic sighting	Audio recording (nights)	Ultrasonic recording (nights)	Wind farm point count
Site32	Fauna site	1					3.3
PESRoost01	Fauna site		6	1	8		
Opp01	Fauna site			1			
Opp02	Fauna site			1			
Opp03	Fauna site			2			
Opp04	Fauna site			1			
Opp06	Fauna site			1			
Opp07	Fauna site			1			
Opp08	Fauna site			1			
Opp10	Fauna site			1			
Opp11	Fauna site			3			
Opp12	Fauna site			1			
Opp13	Fauna site			2			
Opp14	Fauna site			2			
Opp15	Fauna site			2			
Opp16	Fauna site			1			
Opp17	Fauna site			4			
Opp18	Fauna site			2			
Opp19	Fauna site			1			
Opp20	Fauna site			3			
Opp21	Fauna site			1			
Opp22	Fauna site			1			
Opp23	Fauna site			5			
Opp24	Fauna site			1			
Opp25	Fauna site			5			
Opp26	Fauna site			1			
Opp27	Fauna site			1			
Opp28	Fauna site			1			
Opp29	Fauna site			1			
Opp30	Fauna site			1			
Opp31	Fauna site			5			
PESRoost02	Fauna site			1			
Total		**38**	**6**	**74**	**268**	**290**	**72.2**

4 RESULTS

4.1 BIRDS

To date, a total of 126 bird species have been recorded to date within the BBIA (Appendix 1), pending analysis of acoustic bird call recording data. Of these, 7 are conservation significant (Table 3). A total of 1,333 Carnaby's Cockatoo, 48 Forest Red-tailed Black Cockatoo, 1 Common Greenshank, 40 Red-necked Stint, 5 Sharp-tailed Sandpiper, 10 Wood Sandpiper and 6 Blue-billed Duck have been directly sighted or heard calling to date.

The locations of Carnaby's Cockatoo are presented in Figure 5, Forest Red-tailed Cockatoos in Figure 6 and Migratory/Priority species in Figure 7. Black cockatoo breeding and roosting locations recorded during the surveys are displayed in Figure 8. Additional breeding locations were identified in the desktop review undertaken for the Project within the BBIA, discussed in Phoenix (in prep).

Table 3 Conservation significant species records within the BBIA

Common name	Taxon	Commonwealth Status	WA Status	Phase[1]							Total
				1	2	3	4	5	6	7	
Carnaby's Cockatoo	*Zanda latirostris*	EN	EN	220	235	114	52	461	217	34	**1,333**
Forest Red-tailed Black Cockatoo	*Calyptorhynchus banksii naso*	VU	VU				3	34	11		**48**
Common Greenshank	*Tringa nebularia*	EN/Mig.	Mig.							1	**1**
Red-necked Stint	*Calidris ruficollis*	Mig.	Mig.					39	1		**40**
Sharp-tailed Sandpiper	*Calidris acuminata*	VU/Mig.	Mig.						5		**5**
Wood Sandpiper	*Tringa glareola*	Mig.	Mig.							10	**10**
Blue-billed Duck	*Oxyura australis*	-	P4	4						2	**6**

[1]- Total number of individuals directly sighted and/or heard calling per phase

4.1.1 Flight heights

Flight height data has been collected for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo (Appendix 2; Appendix 3), but has not been collected for migratory shorebird species or Blue-billed Duck as individuals recorded during the survey were not in flight. Impact assessment for the Project will be undertaken when field surveys are completed. The rotor swept area (RSA) for the Project is yet to be provided to Phoenix, so any comments in this document on how observations relate to predicted rotor height are general comments only and not based on the actual RSA planned for this Project. Results below summarise direct sighting records only.

4.1.1.1 Carnaby's Cockatoo

A total of 61 direct sightings of Carnaby's Cockatoo has been made to date; of these, 31 records had flight height recorded (Appendix 2). Flight height for the species ranged from 5 to 100 m above ground level (AGL; Appendix 2). Of the 31 records that included flight height data, the median height was 15 m AGL and modal height was 10 m AGL (recorded 8 times), indicating most observations occurred at low heights within the recorded range; However notably, 2 records were at 40 m AGL, one record was at 60 m AGL, and one record was at 100 m AGL, demonstrating the species will, although less frequently, fly at higher altitudes that may be within the RSA of turbines for the Project.

4.1.1.2 Forest Red-tailed Black Cockatoo

A total of 9 direct sightings of Forest Red-tailed Black Cockatoo have been made to date; of these, 6 records had flight height recorded (Appendix 3). Flight height for the species ranged from 5 to 60 m AGL (Appendix 3). Of the 6 records that had flight height data, the median height was 10 m AGL and modal height was also 10 m AGL (recorded 3 times), indicating that most observations occurred at low heights within the recorded range. Only 2 records were at 60 m AGL indicating the species will, although less frequently, fly at higher altitudes that may be within the RSA of turbines for the Project.

4.1.2 Black cockatoo breeding activity

In January 2026, a male Carnaby's Cockatoo was recorded in a hollow with a female perching in a nearby tree (see active black cockatoo breeding tree in Figure 8). The breeding tree was located 2.7 km southeast of the study area within the BBIA near a cluster of known breeding trees identified in the desktop review (Phoenix in prep) (Figure 8).

Breeding black cockatoos will mostly use foraging habitat up to 12 km from their nest (DAWE 2022). Sightings of Carnaby's Cockatoo during the 2024 and 2025 breeding season, along with the presence of juvenile Forest Red-tailed Black Cockatoo and suitable breeding habitat indicate both species may breed within or around the study area.

4.1.3 Black cockatoo roosting activity

Three black cockatoo night roosts are known within the BBIA (Figure 8). The desktop review identified that one night roost site occurs within the BBIA (DANREGR001), located 410 m south of the study area on private property that was inaccessible at the time of the BBUS (Figure 8). Between the years of 2010 and 2012, Birdlife WA conducted 3 monitoring events at DANREGR001; a total of 22 Carnaby's Cockatoo was recorded in 2011, and no cockatoos were recorded in 2010 or 2012 (Phoenix in prep).

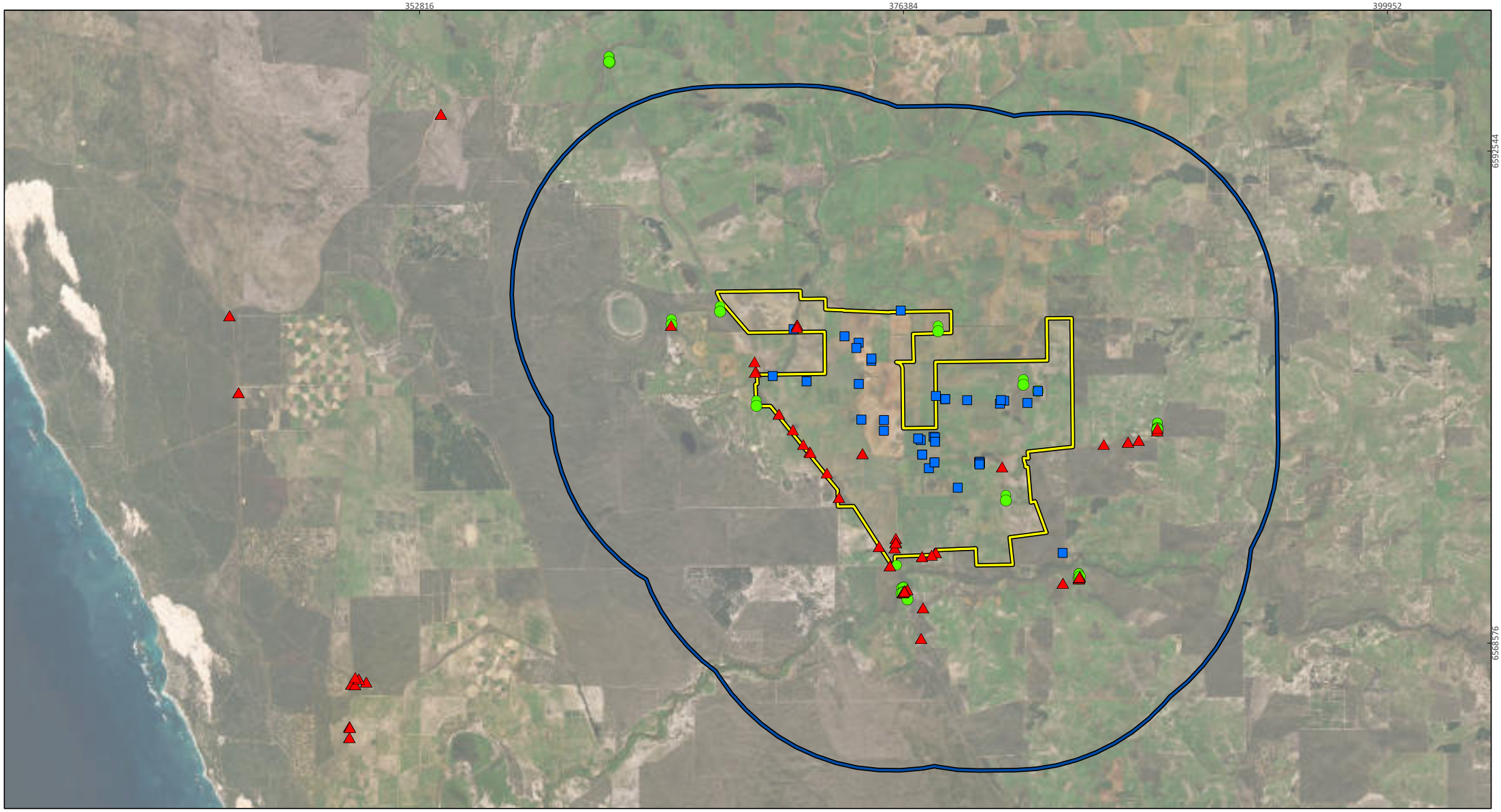
Since December 2024, Phoenix has conducted roost monitoring across 7 monitoring events within the accessible portions of the BBIA. In December 2024, a total of 100 Carnaby's Cockatoo was recorded roosting 1.3 km southwest of DANREGR001 (Figure 8). As this site was >500 m from DANREGR001 it was considered a new roost site (PESRoost01). PESRoost01 was visited again in February 2025, and small flocks of up to 45 Carnaby's Cockatoo were observed flying east from the point at dusk, indicating that they were roosting somewhere nearby along Moore River.

No black cockatoos were recorded roosting at PESRoost01 in May or August of 2025; however, both Carnaby's Cockatoo and Forest Red-tailed Black Cockatoos (including 2 juveniles) were recorded calling in the direction of Moore River around sunset the next day at a new site >500 m from PESRoost01; as such, this was considered a new roost site (PESRoost02; Figure 8). Counts could not be conducted at PESRoost02 as it was located on an inaccessible private property, but at least 2 juvenile Forest Red-tailed Black Cockatoos were heard calling. PESRoost02 was located approximately 2.6 km southeast of the study area. In November 2025, a total of 15 Carnaby's Cockatoo were observed flying over PESRoost01 before dusk, and a total of 45 Carnaby's Cockatoo were observed roosting at PESRoost01 at dusk. In January 2026, a total of 15 Carnaby's Cockatoo was observed roosting at PESRoost01. Outside of when they are breeding, black cockatoos mainly feed in foraging habitat up to 20 km from their roost (DAWE 2022).

The presence of 3 distinct night roosts along Moore River, supporting Forest Red-tailed Black Cockatoo and Carnaby's Cockatoo, along with the availability of suitable roosting habitat including tall trees, permanent water and nearby foraging areas, demonstrates that Moore River is a significant area for black cockatoos. Additional roosts may be present along Moore River.

Table 4 **Number of black cockatoos recorded during roost monitoring – white rows represent counts conducted by Phoenix and grey rows represent counts conducted by Birdlife WA volunteers**

Monitoring event	Date	Site code	Latitude	Longitude	Number of birds	
					Carnaby's Cockatoo	Forest Red-tailed Black Cockatoo
1	2010	DANREGR001	-30.9752	115.7138	0	0
2	2011	DANREGR001	-30.9752	115.7138	22	0
3	2012	DANREGR001	-30.9752	115.7138	0	0
4	9/12/2024	PESRoost01	-30.9851	115.7067	100	0
5	2/02/2025	PESRoost01	Unknown	Unknown	45 observed flying east of PESRoost01 at dusk.	0
6	5/05/2025	PESRoost01	-30.9851	115.7067	0	0
7	4/08/2025	PESRoost01	-30.9851	115.7067	0	0
8	5/08/2025	PESRoost02	-30.9844	115.7865	Unknown number heard calling around sunset towards Moore River.	Unknown number with multiple juveniles heard calling around sunset towards Moore River.
9	10/11/2025	PESRoost01	-30.9851	115.7067	45 observed roosting at PESRoost01 at dusk and an additional 15 observed flying over PESRoost01 before dusk.	0
10	12/01/2026	PESRoost01	-30.9851	115.7067	15 observed roosting at PESRoost01 at dusk.	0



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Kilometers

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- Study area
- Bird and bat investigation area (BBIA)

Evidence type

- Calling
- Direct sighting
- Foraging evidence

Figure 5

Carnaby's Cockatoo observations and foraging evidence recorded at the Project

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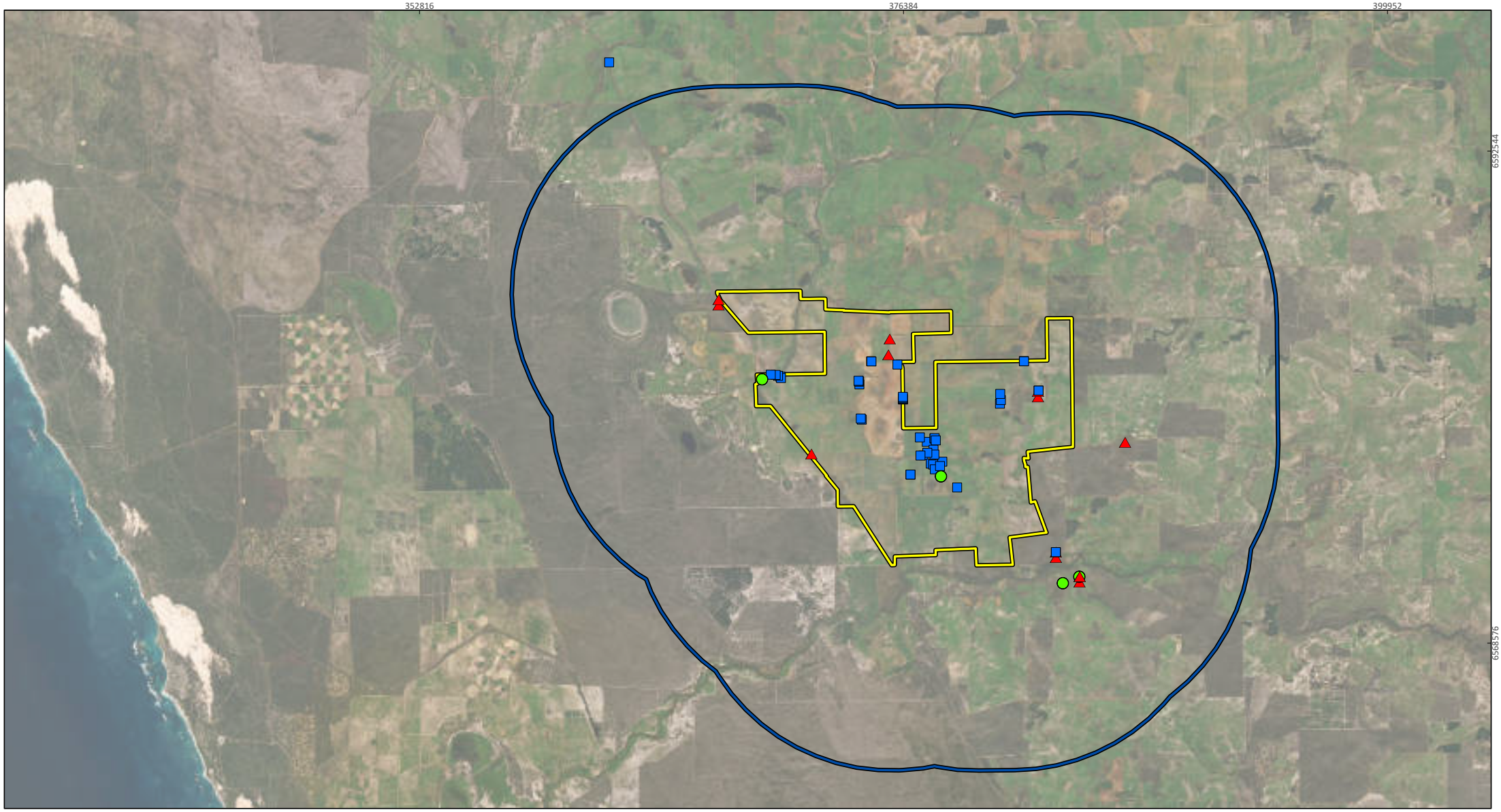

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Study area
Bird and bat investigation area (BBIA)

Evidence type

- Calling
- Direct sighting
- Foraging evidence

Figure 6

Forest Red-tail Black Cockatoo observations and foraging evidence recorded at the Project

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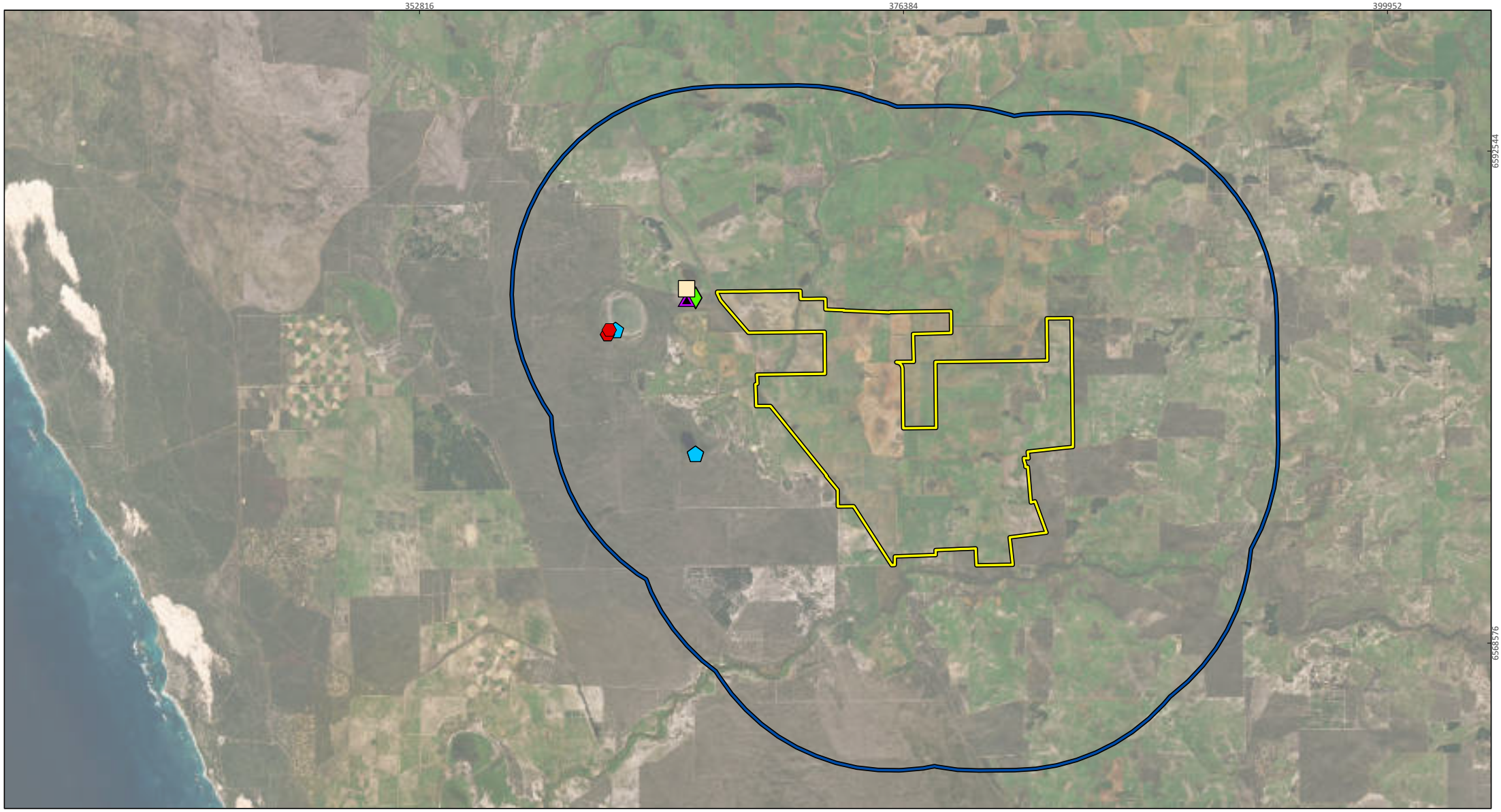

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- Study area
- Bird and bat investigation area (BBIA)

Species, status

- Blue-billed Duck,P4 (DBCA list)
- Common Greenshank,EN/Mig. (EPBC Act); Mig. (BC Act)
- Red-necked Stint,Mig. (EPBC & BC Acts)
- Sharp-tailed Sandpiper,VU/Mig. (EPBC Act); Mig. (BC Act)
- Wood Sandpiper,Mig. (EPBC & BC Acts)

Figure 7

Migratory and Priority species records

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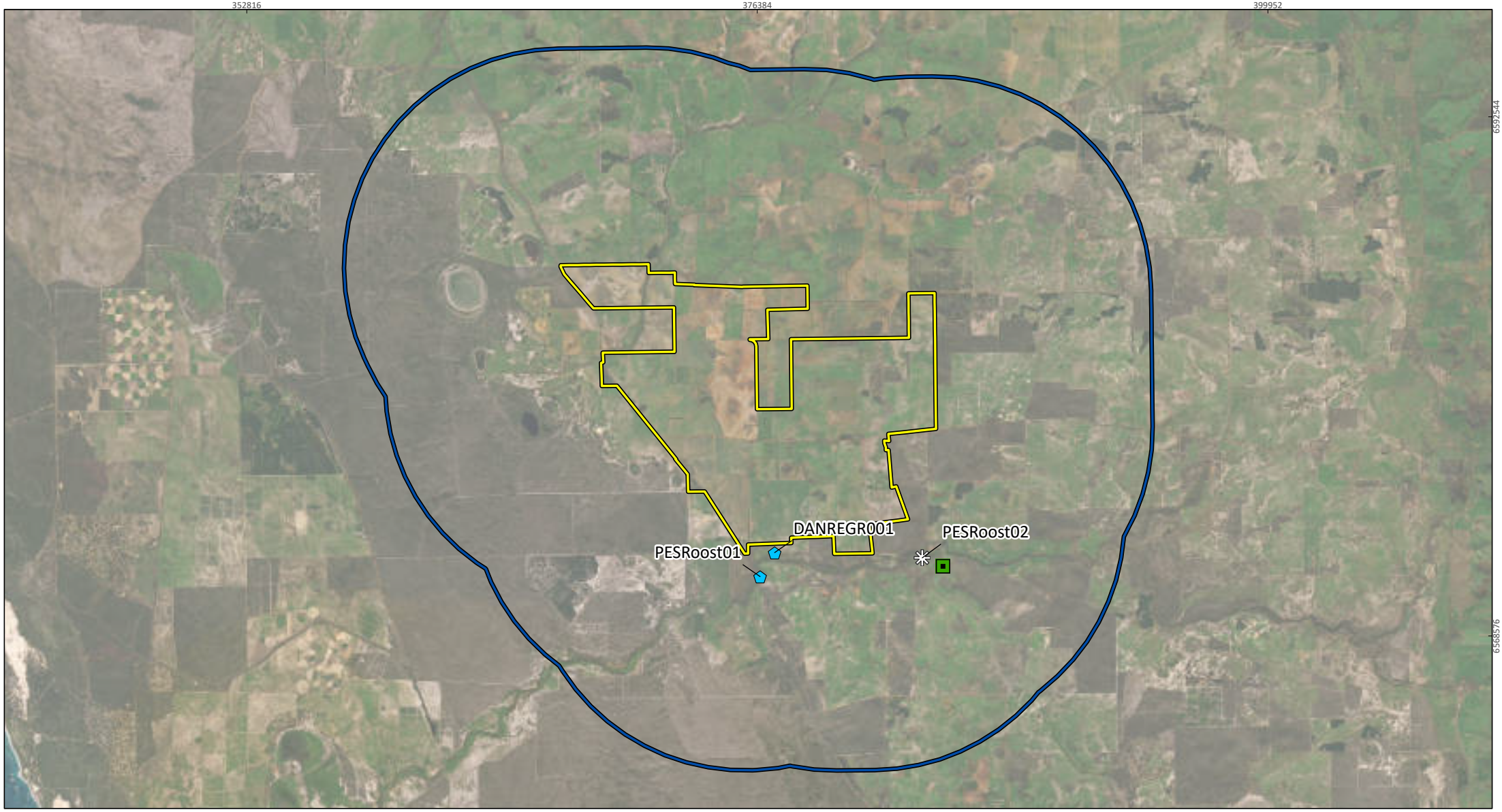

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0 5 10
Kilometers

1:237,783 (at A4) GDA 1994 MGA Zone 50

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- Study area
- Bird and bat investigation area (BBIA)
- Active black Cockatoo breeding tree
- Black cockatoo night roosts
- Black cockatoo night roosts (approximate location)

Figure 8

Black cockatoo known breeding and roosting locations

PHOENIX ENVIRONMENTAL SCIENCES

4.2 BATS

A total of 6 bat species has been recorded within the BBIA to date, including (Appendix 1):

- White-striped Free-tailed Bat *Austronomus australis*
- South-western Free-tailed Bat *Ozimops kitcheneri*
- Gould's Wattled Bat *Chalinolobus gouldii*
- Chocolate Wattled Bat *Chalinolobus morio*
- Lesser Long-eared Bat *Nyctophilus geoffroyi*
- Southern Forest Bat *Vespadelus regulus.*

None of the species recorded are conservation significant; however, White-striped Free-tailed Bat is known to be the most impacted bat species by wind farms in Australia as it forages with fast, non-manoeuvrable flight within the RSA of most turbines (Phoenix 2025b). There are growing concerns about the cumulative impact of wind farms on this species across Australia.

5 CONCLUSION

To date, we have recorded 7 conservation significant species across the study area. Of these, Carnaby's Cockatoo are by far the most frequently recorded. A total of 1,333 Carnaby's Cockatoo individuals have been recorded across all 7 Phases completed to date. The majority of the records of these species were of birds flying at low heights (<20 m), though a few records were at or above 50 m which may intersect the RSA height. More information on habitat utilisation across the study area by Carnaby's Cockatoo can be found in the Phoenix report titled *Targeted Black Cockatoo survey for the Marri Wind Farm Project* (Phoenix in prep.).

Aside from the Carnaby's Cockatoos, a far smaller population of Forrest Red-tailed Black Cockatoos were observed using the study area between Autumn and Spring in 2025. Low numbers of migratory shorebirds and one priority duck species have also been recorded in the BBIA, though notably none have been observed inside the study area. These species are strongly associated with wetlands, of which there are several to the west of the study area.

Regarding bats, no conservation significant bat species have been recorded as part of the BBUS to date. However, the White-striped Free-tailed Bat is present in the area. This species is known to be heavily impacted by windfarms, as it makes up a large portion of the carcass search records for many operational windfarms across Australia.

The final BBUS phase is scheduled for Spring 2026, following the completion of the last phase, the remainder of the data for the BBUS will be analysed and a technical report will be prepared.

Yours Sincerely,

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Appendix 1 Field survey bird and bat species records

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Accipitriformes	Accipitridae	*Aquila audax*	Wedge-tailed Eagle			*	*				*	*
Accipitriformes	Accipitridae	*Circus approximans*	Swamp Harrier			*	*				*	*
Accipitriformes	Accipitridae	*Circus assimilis*	Spotted Harrier			*	*					
Accipitriformes	Accipitridae	*Elanus axillaris*	Black-shouldered Kite			*	*				*	*
Accipitriformes	Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-eagle			*					*	
Accipitriformes	Accipitridae	*Haliastur sphenurus*	Whistling Kite			*	*					*
Accipitriformes	Accipitridae	*Hieraaetus morphnoides*	Little Eagle			*	*		*			*
Accipitriformes	Accipitridae	*Lophoictinia isura*	Square-tailed Kite			*						*
Accipitriformes	Accipitridae	*Milvus migrans*	Black Kite			*						
Accipitriformes	Accipitridae	*Tachyspiza cirrocephala*	Collared Sparrowhawk			*	*					
Accipitriformes	Accipitridae	*Tachyspiza fasciata*	Brown Goshawk			*	*				*	*
Accipitriformes	Pandionidae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)		*		*				
Anseriformes	Anatidae	*Anas castanea*	Chestnut Teal			*	*					*
Anseriformes	Anatidae	*Anas gracilis*	Grey Teal			*	*				*	*
Anseriformes	Anatidae	*Anas platyrhynchos*	Mallard			*						
Anseriformes	Anatidae	*Anas superciliosa*	Pacific Black Duck			*	*				*	*
Anseriformes	Anatidae	*Aythya australis*	Hardhead			*	*				*	*
Anseriformes	Anatidae	*Biziura lobata*	Musk Duck			*	*				*	*
Anseriformes	Anatidae	*Chenonetta jubata*	Australian Wood Duck			*	*				*	*
Anseriformes	Anatidae	*Cygnus atratus*	Black Swan			*	*				*	*
Anseriformes	Anatidae	*Malacorhynchus membranaceus*	Pink-eared Duck			*	*				*	*
Anseriformes	Anatidae	*Oxyura australis*	Blue-billed Duck	P4 (DBCA list)		*				*	*	*

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Anseriformes	Anatidae	*Spatula rhynchotis*	Australasian Shoveler			*	*				*	*
Anseriformes	Anatidae	*Stictonetta naevosa*	Freckled Duck			*	*				*	
Anseriformes	Anatidae	*Tadorna tadornoides*	Australian Shelduck			*	*				*	*
Apodiformes	Apodidae	*Apus pacificus*	Fork-tailed Swift	Mig. (EPBC & BC Acts)				*				
Caprimulgiformes	Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar			*	*					
Caprimulgiformes	Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar				*					
Caprimulgiformes	Podargidae	*Podargus strigoides*	Tawny Frogmouth			*	*					
Charadriiformes	Charadriidae	*Anarhynchus bicinctus*	Double-banded Plover	Mig. (EPBC & BC Acts)							*	
Charadriiformes	Charadriidae	*Anarhynchus leschenaultii*	Greater Sand Plover	VU/Mig. (EPBC Act); VU (BC Act)		*		*				
Charadriiformes	Charadriidae	*Anarhynchus ruficapillus*	Red-capped Plover			*	*				*	*
Charadriiformes	Charadriidae	*Charadrius cucullatus*	Hooded Plover/Dotterel	P4 (DBCA list)		*				*		
Charadriiformes	Charadriidae	*Charadrius melanops*	Black-fronted Dotterel			*	*					*
Charadriiformes	Charadriidae	*Erythrogonys cinctus*	Red-kneed Dotterel			*	*				*	*
Charadriiformes	Charadriidae	*Peltohyas australis*	Inland Dotterel				*					
Charadriiformes	Charadriidae	*Pluvialis fulva*	Pacific Golden Plover	Mig. (EPBC & BC Acts)		*				*	*	
Charadriiformes	Charadriidae	*Pluvialis squatarola*	Grey Plover	VU/Mig. (EPBC Act); Mig. (BC Act)		*				*	*	
Charadriiformes	Charadriidae	*Vanellus tricolor*	Banded Lapwing			*	*					
Charadriiformes	Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher			*						
Charadriiformes	Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher			*	*					
Charadriiformes	Laridae	*Anous stolidus*	Common Noddy	Mig. (EPBC & BC Acts)		*		*		*		
Charadriiformes	Laridae	*Anous tenuirostris melanops*	Australian Lesser Noddy	VU (EPBC Act); EN (BC Act)				*				

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Charadriiformes	Laridae	*Chlidonias hybrida*	Whiskered Tern				*				*	
Charadriiformes	Laridae	*Chlidonias leucopterus*	White-winged Black Tern	Mig. (EPBC & BC Acts)						*		
Charadriiformes	Laridae	*Chroicocephalus novaehollandiae*	Silver Gull			*	*				*	*
Charadriiformes	Laridae	*Hydroprogne caspia*	Caspian Tern	Mig. (EPBC & BC Acts)		*		*		*		
Charadriiformes	Laridae	*Larus pacificus*	Pacific Gull			*	*					
Charadriiformes	Laridae	*Onychoprion anaethetus*	Bridled Tern	Mig. (EPBC & BC Acts)		*		*		*		
Charadriiformes	Laridae	*Onychoprion fuscatus*	Sooty Tern			*	*					
Charadriiformes	Laridae	*Sterna dougallii*	Roseate Tern	Mig. (EPBC & BC Acts)		*		*		*		
Charadriiformes	Laridae	*Sternula albifrons*	Little Tern	VU/Mig. (EPBC Act); Mig. (BC Act)				*				
Charadriiformes	Laridae	*Sternula nereis nereis*	Fairy Tern	VU (EPBC & BC Acts)		*	*	*				
Charadriiformes	Laridae	*Thalasseus bergii*	Greater Crested Tern	Mig. (EPBC & BC Acts)		*		*		*		
Charadriiformes	Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt			*	*				*	*
Charadriiformes	Recurvirostridae	*Himantopus leucocephalus*	Pied Stilt			*	*				*	*
Charadriiformes	Recurvirostridae	*Recurvirostra novaehollandiae*	Red-necked Avocet			*	*				*	*
Charadriiformes	Rostratulidae	*Rostratula australis*	Australian Painted Snipe	EN (EPBC & BC Acts)				*				
Charadriiformes	Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Mig. (EPBC & BC Acts)		*		*		*	*	
Charadriiformes	Scolopacidae	*Arenaria interpres*	Ruddy Turnstone	VU/Mig. (EPBC Act); Mig. (BC Act)		*				*		
Charadriiformes	Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	VU/Mig. (EPBC Act); Mig. (BC Act)		*		*		*	*	*
Charadriiformes	Scolopacidae	*Calidris alba*	Sanderling	Mig. (EPBC & BC Acts)		*				*		
Charadriiformes	Scolopacidae	*Calidris canutus*	Red Knot	VU/Mig. (EPBC Act); EN (BC Act)				*				

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Charadriiformes	Scolopacidae	*Calidris falcinellus*	Broad-billed Sandpiper	Mig. (EPBC & BC Acts)							*	
Charadriiformes	Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CR/Mig. (EPBC Act); CR (BC Act)		*		*		*	*	
Charadriiformes	Scolopacidae	*Calidris melanotos*	Pectoral Sandpiper	Mig. (EPBC & BC Acts)		*		*		*	*	
Charadriiformes	Scolopacidae	*Calidris pugnax*	Ruff	Mig. (EPBC & BC Acts)		*				*	*	
Charadriiformes	Scolopacidae	*Calidris ruficollis*	Red-necked Stint	Mig. (EPBC & BC Acts)		*				*	*	*
Charadriiformes	Scolopacidae	*Calidris subminuta*	Long-toed Stint	Mig. (EPBC & BC Acts)		*				*	*	
Charadriiformes	Scolopacidae	*Calidris tenuirostris*	Great Knot	CR/Mig. (EPBC Act); CR (BC Act)							*	
Charadriiformes	Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit	Mig. (EPBC & BC Acts)		*		*		*	*	
Charadriiformes	Scolopacidae	*Limosa lapponica subsp. menzbieri*	Bar-tailed Godwit (northern Siberian)	EN (EPBC Act); CR (BC Act)				*				
Charadriiformes	Scolopacidae	*Limosa limosa*	Black-tailed Godwit	EN/Mig. (EPBC Act); Mig. (BC Act)		*					*	
Charadriiformes	Scolopacidae	*Numenius madagascariensis*	Eastern Curlew	CR/Mig. (EPBC Act); CR (BC Act)				*				
Charadriiformes	Scolopacidae	*Numenius minutus*	Little Curlew	Mig. (EPBC & BC Acts)		*				*		
Charadriiformes	Scolopacidae	*Tringa brevipes*	Grey-tailed Tattler	Mig. (EPBC & BC Acts); P4 (DBCA list)		*						
Charadriiformes	Scolopacidae	*Tringa glareola*	Wood Sandpiper	Mig. (EPBC & BC Acts)						*		*
Charadriiformes	Scolopacidae	*Tringa nebularia*	Common Greenshank	EN/Mig. (EPBC Act); Mig. (BC Act)		*		*		*	*	*
Charadriiformes	Scolopacidae	*Tringa stagnatilis*	Marsh Sandpiper	Mig. (EPBC & BC Acts)							*	
Ciconiiformes	Ardeidae	*Ardea alba*	Great Egret (Eastern Great Egret)			*	*				*	
Ciconiiformes	Ardeidae	*Ardea coromanda*	Eastern Cattle Egret									*

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Ciconiiformes	Ardeidae	*Ardea pacifica*	White-necked Heron			*	*				*	*
Ciconiiformes	Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	EN (EPBC & BC Acts)				*		*		
Ciconiiformes	Ardeidae	*Egretta garzetta*	Little Egret									*
Ciconiiformes	Ardeidae	*Egretta novaehollandiae*	White-faced Heron			*	*				*	*
Ciconiiformes	Ardeidae	*Egretta sacra*	Eastern Reef Egret			*						
Ciconiiformes	Ardeidae	*Ixobrychus dubius*	Australian Little Bittern	P4 (DBCA list)		*						
Ciconiiformes	Ardeidae	*Nycticorax caledonicus*	Rufous Night Heron			*	*					
Ciconiiformes	Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill			*	*				*	*
Ciconiiformes	Threskiornithidae	*Platalea regia*	Royal Spoonbill			*						
Ciconiiformes	Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	Mig. (EPBC & BC Acts)		*				*		
Ciconiiformes	Threskiornithidae	*Threskiornis molucca*	Australian White Ibis			*	*				*	*
Ciconiiformes	Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis			*	*		*		*	*
Columbiformes	Columbidae	*Columba livia*	Rock Dove		*	*						
Columbiformes	Columbidae	*Ocyphaps lophotes*	Crested Pigeon			*	*		*		*	*
Columbiformes	Columbidae	*Phaps chalcoptera*	Common Bronzewing			*	*					*
Columbiformes	Columbidae	*Phaps elegans*	Brush Bronzewing			*	*					
Columbiformes	Columbidae	*Streptopelia chinensis*	Spotted Dove		*	*						
Columbiformes	Columbidae	*Streptopelia senegalensis*	Laughing Dove		*	*	*		*			
Coraciiformes	Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		*	*	*		*			*
Coraciiformes	Halcyonidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher				*					
Coraciiformes	Halcyonidae	*Todiramphus sanctus*	Sacred Kingfisher			*	*					*
Coraciiformes	Meropidae	*Merops ornatus*	Rainbow Bee-eater			*	*		*			*
Cuculiformes	Cuculidae	*Cacomantis flabelliformis*	Fan-tailed Cuckoo			*	*		*			*
Cuculiformes	Cuculidae	*Chalcites basalis*	Horsfield's Bronze Cuckoo			*	*		*		*	*

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Cuculiformes	Cuculidae	*Chalcites lucidus*	Shining Bronze Cuckoo			*	*					*
Cuculiformes	Cuculidae	*Chalcites osculans*	Black-eared Cuckoo			*	*					
Cuculiformes	Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo			*			*			*
Falconiformes	Falconidae	*Falco berigora*	Brown Falcon			*	*					*
Falconiformes	Falconidae	*Falco cenchroides*	Australian Kestrel			*	*		*		*	*
Falconiformes	Falconidae	*Falco hypoleucos*	Grey Falcon	VU (EPBC & BC Acts)				*				
Falconiformes	Falconidae	*Falco longipennis*	Australian Hobby			*	*					*
Falconiformes	Falconidae	*Falco peregrinus*	Peregrine Falcon	OS (BC Act)		*				*	*	
Galliformes	Megapodiidae	*Leipoa ocellata*	Malleefowl	VU (EPBC & BC Acts)		*		*		*		
Galliformes	Phasianidae	*Coturnix pectoralis*	Stubble Quail			*	*					*
Galliformes	Phasianidae	*Synoicus ypsilophorus*	Brown Quail			*	*					*
Gruiformes	Rallidae	*Fulica atra*	Eurasian Coot			*	*				*	*
Gruiformes	Rallidae	*Gallinula tenebrosa*	Dusky Moorhen			*	*					*
Gruiformes	Rallidae	*Hypotaenidia philippensis*	Buff-banded Rail			*						
Gruiformes	Rallidae	*Porphyrio melanotus*	Australasian Swamphen			*	*					*
Gruiformes	Rallidae	*Porzana fluminea*	Australian Spotted Crake				*					
Gruiformes	Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen			*	*					
Gruiformes	Rallidae	*Zapornia pusilla*	Baillon's Crake				*					
Gruiformes	Rallidae	*Zapornia tabuensis*	Spotless Crake			*	*					
Otidiformes	Otididae	*Ardeotis australis*	Australian Bustard			*						
Passeriformes	Acanthizidae	*Acanthiza apicalis*	Inland Thornbill			*	*					*
Passeriformes	Acanthizidae	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill			*	*				*	*
Passeriformes	Acanthizidae	*Acanthiza inornata*	Western Thornbill			*	*				*	*
Passeriformes	Acanthizidae	*Acanthiza uropygialis*	Chestnut-rumped Thornbill			*	*					*

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Passeriformes	Acanthizidae	*Aphelocephala leucopsis*	Southern Whiteface	VU (EPBC & BC Acts)				*				
Passeriformes	Acanthizidae	*Calamanthus campestris*	Rufous Fieldwren			*	*				*	*
Passeriformes	Acanthizidae	*Calamanthus cautus*	Shy Groundwren (Shy Heathwren)			*						*
Passeriformes	Acanthizidae	*Gerygone fusca*	Western Gerygone			*	*		*		*	*
Passeriformes	Acanthizidae	*Pyrrholaemus brunneus*	Redthroat				*					
Passeriformes	Acanthizidae	*Sericornis maculatus*	Spotted Scrubwren			*	*				*	*
Passeriformes	Acanthizidae	*Smicrornis brevirostris*	Weebill			*	*		*			*
Passeriformes	Artamidae	*Artamus cinereus*	Black-faced Woodswallow			*	*		*		*	*
Passeriformes	Artamidae	*Artamus cyanopterus*	Dusky Woodswallow			*					*	
Passeriformes	Artamidae	*Artamus personatus*	Masked Woodswallow			*	*					
Passeriformes	Artamidae	*Cracticus nigrogularis*	Pied Butcherbird			*	*		*			*
Passeriformes	Artamidae	*Cracticus torquatus*	Grey Butcherbird			*	*					*
Passeriformes	Artamidae	*Gymnorhina tibicen*	Australian Magpie			*	*		*		*	*
Passeriformes	Artamidae	*Strepera versicolor*	Grey Currawong			*	*					
Passeriformes	Campephagidae	*Coracina maxima*	Ground Cuckoo-shrike				*					
Passeriformes	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike			*	*		*		*	*
Passeriformes	Campephagidae	*Lalage tricolor*	White-winged Triller			*	*				*	
Passeriformes	Climacteridae	*Climacteris rufus*	Rufous Treecreeper			*	*					*
Passeriformes	Corvidae	*Corvus bennetti*	Little Crow			*	*					
Passeriformes	Corvidae	*Corvus coronoides*	Australian Raven			*	*		*			*
Passeriformes	Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird			*	*					*
Passeriformes	Dicruridae	*Grallina cyanoleuca*	Magpie-lark			*	*		*			*
Passeriformes	Dicruridae	*Myiagra inquieta*	Restless Flycatcher			*						

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Passeriformes	Dicruridae	*Rhipidura albiscapa*	Grey Fantail			*	*		*			*
Passeriformes	Dicruridae	*Rhipidura leucophrys*	Willie Wagtail			*	*		*		*	*
Passeriformes	Estrildidae	*Taeniopygia castanotis*	Zebra Finch				*					
Passeriformes	Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow			*	*					
Passeriformes	Hirundinidae	*Hirundo neoxena*	Welcome Swallow			*	*					*
Passeriformes	Hirundinidae	*Petrochelidon ariel*	Fairy Martin			*	*					*
Passeriformes	Hirundinidae	*Petrochelidon nigricans*	Tree Martin			*	*				*	*
Passeriformes	Locustellidae	*Cincloramphus cruralis*	Brown Songlark			*	*					*
Passeriformes	Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark			*	*		*		*	*
Passeriformes	Locustellidae	*Poodytes gramineus*	Little Grassbird			*	*					
Passeriformes	Maluridae	*Malurus assimilis*	Purple-backed Fairy-wren			*	*				*	*
Passeriformes	Maluridae	*Malurus elegans*	Red-winged Fairy-wren			*						
Passeriformes	Maluridae	*Malurus leucopterus*	White-winged Fairy-wren			*	*		*		*	*
Passeriformes	Maluridae	*Malurus pulcherrimus*	Blue-breasted Fairy-wren			*	*					
Passeriformes	Maluridae	*Malurus splendens*	Splendid Fairy-wren			*	*		*		*	*
Passeriformes	Maluridae	*Stipiturus malachurus*	Southern Emu-wren			*	*				*	
Passeriformes	Maluridae	*Stipiturus ruficeps*	Rufous-crowned Emu-wren				*					
Passeriformes	Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater			*	*					*
Passeriformes	Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill			*	*					*
Passeriformes	Meliphagidae	*Anthochaera carunculata*	Red Wattlebird			*	*		*		*	*
Passeriformes	Meliphagidae	*Anthochaera lunulata*	Western Little Wattlebird			*	*				*	*
Passeriformes	Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater			*						
Passeriformes	Meliphagidae	*Epthianura albifrons*	White-fronted Chat			*	*					*
Passeriformes	Meliphagidae	*Epthianura tricolor*	Crimson Chat			*	*					

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Passeriformes	Meliphagidae	*Gavicalis virescens*	Singing Honeyeater			*	*		*			*
Passeriformes	Meliphagidae	*Gliciphila melanops*	Tawny-crowned honeyeater			*	*				*	*
Passeriformes	Meliphagidae	*Lichmera indistincta*	Brown Honeyeater			*	*		*		*	*
Passeriformes	Meliphagidae	*Manorina flavigula*	Yellow-throated Miner			*	*					*
Passeriformes	Meliphagidae	*Melithreptus brevirostris*	Brown-headed Honeyeater			*	*					*
Passeriformes	Meliphagidae	*Melithreptus chloropsis*	Western White-naped Honeyeater			*						
Passeriformes	Meliphagidae	*Nesoptilotis leucotis*	White-eared Honeyeater			*	*					
Passeriformes	Meliphagidae	*Phylidonyris niger*	White-cheeked Honeyeater			*	*				*	*
Passeriformes	Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater			*	*		*			*
Passeriformes	Meliphagidae	*Ptilotula keartlandi*	Grey-headed Honeyeater				*					
Passeriformes	Meliphagidae	*Ptilotula ornata*	Yellow-plumed Honeyeater			*	*					*
Passeriformes	Meliphagidae	*Ptilotula plumula*	Grey-fronted Honeyeater				*					
Passeriformes	Meliphagidae	*Purnella albifrons*	White-fronted Honeyeater			*					*	
Passeriformes	Meliphagidae	*Sugomel nigrum*	Black Honeyeater			*						
Passeriformes	Motacillidae	*Anthus australis*	Australian Pipit			*	*		*			*
Passeriformes	Motacillidae	*Motacilla cinerea*	Grey Wagtail	Mig. (EPBC & BC Acts)				*				
Passeriformes	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella			*	*				*	*
Passeriformes	Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush			*	*		*			*
Passeriformes	Pachycephalidae	*Oreoica gutturalis*	Crested Bellbird			*	*				*	
Passeriformes	Pachycephalidae	*Pachycephala fuliginosa*	Western Whistler			*	*					*
Passeriformes	Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler			*	*		*		*	*
Passeriformes	Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote			*	*					*
Passeriformes	Pardalotidae	*Pardalotus striatus*	Striated Pardalote			*	*				*	*

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Passeriformes	Petroicidae	*Eopsaltria griseogularis*	Western Yellow Robin			*						
Passeriformes	Petroicidae	*Melanodryas cucullata*	Hooded Robin			*	*					
Passeriformes	Petroicidae	*Microeca fascinans*	Jacky Winter			*	*					
Passeriformes	Petroicidae	*Petroica boodang*	Scarlet Robin			*	*					*
Passeriformes	Petroicidae	*Petroica goodenovii*	Red-capped Robin			*	*					*
Passeriformes	Petroicidae	*Quoyornis georgianus*	White-breasted Robin			*						*
Passeriformes	Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler			*	*					
Passeriformes	Sylviidae	*Acrocephalus australis*	Australian Reed Warbler			*	*					*
Passeriformes	Zosteropidae	*Zosterops lateralis*	Silvereye			*	*				*	*
Pelecaniformes	Anhingidae	*Anhinga novaehollandiae*	Australasian Darter			*	*				*	*
Pelecaniformes	Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican			*	*				*	*
Pelecaniformes	Phaethontidae	*Phaethon rubricauda westralis*	Indian Ocean Red-tailed Tropicbird	EN/Mig. (EPBC Act; BC Act); P4 DBCA list				*				
Pelecaniformes	Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant			*	*				*	*
Pelecaniformes	Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant			*	*				*	*
Pelecaniformes	Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant			*	*				*	*
Pelecaniformes	Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant			*	*					
Pelecaniformes	Sulidae	*Morus serrator*	Australasian Gannet			*						
Podicipediformes	Podicipedidae	*Podiceps cristatus*	Great Crested Grebe			*	*				*	*
Podicipediformes	Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe			*	*				*	*
Podicipediformes	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe			*	*					*

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Procellariiformes	Diomedeidae	*Diomedea amsterdamensis*	Amsterdam Albatross	EN/Mig. (EPBC Act); CR/Mig. (BC Act)				*				
Procellariiformes	Diomedeidae	*Diomedea epomophora*	Southern Royal Albatross	VU/Mig. (EPBC & BC Acts)				*				
Procellariiformes	Diomedeidae	*Diomedea exulans*	Wandering Albatross	VU/Mig. (EPBC & BC Acts)				*				
Procellariiformes	Diomedeidae	*Phoebetria fusca*	Sooty Albatross	VU/Mig. (EPBC Act); EN/Mig. (BC Act)				*				
Procellariiformes	Diomedeidae	*Thalassarche carteri*	Indian Yellow-nosed Albatross	VU/Mig. (EPBC Act); EN/Mig. (BC Act)				*				
Procellariiformes	Diomedeidae	*Thalassarche cauta subsp. cauta*	Shy Albatross	EN/Mig. (BC Act)				*				
Procellariiformes	Diomedeidae	*Thalassarche cauta subsp. steadi*	White-capped Albatross	VU/Mig. (BC Act)				*				
Procellariiformes	Diomedeidae	*Thalassarche impavida*	Campbell Albatross	VU/Mig. (EPBC & BC Acts)				*				
Procellariiformes	Diomedeidae	*Thalassarche melanophris*	Black-browed Albatross	VU/Mig. (EPBC Act); EN/Mig. (BC Act)				*				
Procellariiformes	Oceanitidae	*Pelagodroma marina*	White-faced Storm Petrel				*					
Procellariiformes	Procellariidae	*Ardenna carneipes*	Flesh-footed Shearwater	VU/Mig. (BC Act)		*		*				
Procellariiformes	Procellariidae	*Ardenna pacifica*	Wedge-tailed Shearwater	Mig. (BC Act)		*		*				
Procellariiformes	Procellariidae	*Halobaena caerulea*	Blue Petrel	VU (EPBC Act)				*				
Procellariiformes	Procellariidae	*Macronectes giganteus*	Southern Giant Petrel	EN/Mig. (EPBC Act); Mig. (BC Act)				*		*		
Procellariiformes	Procellariidae	*Macronectes halli*	Northern Giant Petrel	VU/Mig. (EPBC Act); Mig. (BC Act)				*				

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Procellariiformes	Procellariidae	*Pachyptila turtur subantarctica*	Fairy Prion (southern)	VU (EPBC Act)				*				
Procellariiformes	Procellariidae	*Pterodroma mollis*	Soft-plumaged Petrel	VU (EPBC Act)				*				
Psittaciformes	Cacatuidae	*Cacatua pastinator*	Western Long-billed Corella			*	*					*
Psittaciformes	Cacatuidae	*Cacatua sanguinea*	Little Corella			*	*		*		*	*
Psittaciformes	Cacatuidae	*Cacatua tenuirostris*	Eastern Long-billed Corella		*	*						
Psittaciformes	Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo/Karrak	VU (EPBC & BC Acts)		*		*		*	*	*
Psittaciformes	Cacatuidae	*Eolophus roseicapilla*	Galah			*	*		*		*	*
Psittaciformes	Cacatuidae	*Zanda baudinii*	Baudin's Cockatoo	EN (EPBC & BC Acts)		*						
Psittaciformes	Cacatuidae	*Zanda latirostris*	Carnaby's Cockatoo	EN (EPBC & BC Acts)		*		*	*	*		*
Psittaciformes	Cacatuidae	*Zanda sp.*	white-tailed black cockatoo species	EN (EPBC & BC Acts)		*				*	*	
Psittaciformes	Psittaculidae	*Barnardius zonarius*	Australian Ringneck			*	*		*		*	*
Psittaciformes	Psittaculidae	*Melopsittacus undulatus*	Budgerigar			*	*					
Psittaciformes	Psittaculidae	*Neophema elegans*	Elegant Parrot			*					*	*
Psittaciformes	Psittaculidae	*Neophema petrophila*	Rock Parrot			*	*					
Psittaciformes	Psittaculidae	*Parvipsitta porphyrocephala*	Purple-crowned Lorikeet			*	*					
Psittaciformes	Psittaculidae	*Platycercus icterotis*	Western Rosella			*	*					
Psittaciformes	Psittaculidae	*Platycercus icterotis subsp. xanthogenys*	Western Rosella (inland)	P4 (DBCA list)						*		
Psittaciformes	Psittaculidae	*Polytelis anthopeplus*	Regent Parrot			*	*					*
Psittaciformes	Psittaculidae	*Psephotellus varius*	Mulga Parrot				*					
Psittaciformes	Psittaculidae	*Purpureicephalus spurius*	Red-capped Parrot			*	*				*	*
Psittaciformes	Psittaculidae	*Trichoglossus moluccanus*	Rainbow Lorikeet		*	*						

Order	Family	Species	Common name	Status	Introduced	BirdLife	Dandjoo	PM[1]	PESDB[2]	TFA[3]	UR[4]	This survey
Strigiformes	Strigidae	*Ninox boobook*	Boobook Owl			*	*					*
Strigiformes	Strigidae	*Ninox connivens subsp. connivens*	Barking Owl (southwest subpop.)	P3 (DBCA list)		*						
Strigiformes	Tytonidae	*Tyto javanica*	Eastern barn owl			*	*					*
Struthioniformes	Dromaiidae	*Dromaius novaehollandiae*	Emu			*	*				*	*
Turniciformes	Turnicidae	*Turnix varius*	Painted Button-quail			*	*					
Turniciformes	Turnicidae	*Turnix velox*	Little Button-quail			*	*					
Chiroptera	Megadermatidae	*Macroderma gigas*	Ghost Bat	VU (EPBC & BC Acts)				*				
Chiroptera	Molossidae	*Austronomus australis*	White-striped Free-tailed Bat									*
Chiroptera	Molossidae	*Ozimops kitcheneri*	South-western Free-tailed Bat									*
Chiroptera	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat				*					*
Chiroptera	Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat									*
Chiroptera	Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat				*					*
Chiroptera	Vespertilionidae	*Nyctophilus holtorum*	Holt's Long-eared Bat				*					
Chiroptera	Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat				*					*

[1] Protected Matters Database.

[2] Phoenix Environmental Sciences Database.

[3] Threatened and Priority Fauna Database.

[4] Unpublished Reports.

Appendix 2 Direct sightings of Carnaby's Cockatoo

Site name	Date collected	Sample method	Species	Evidence	Number of individuals	Height AGL (m)
Opp02	05-Aug-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	100	
Opp01	05-Aug-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	7	
Opp05	07-Aug-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	56	
Opp03	08-Aug-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	8	
Site17	26-Aug-24	wind farm point count	*Zanda latirostris*	Direct sighting	2	
Site21	27-Aug-24	wind farm point count	*Zanda latirostris*	Direct sighting	1	40
Site18	28-Aug-24	wind farm point count	*Zanda latirostris*	Direct sighting	2	15
Site17	28-Aug-24	wind farm point count	*Zanda latirostris*	Direct sighting	3	30
Site19	29-Aug-24	wind farm point count	*Zanda latirostris*	Direct sighting	4	15
Site17	29-Aug-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	30	30
PESRoost01	09-Dec-24	Roost monitoring	*Zanda latirostris*	Direct sighting	100	
Opp11	09-Dec-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	100	
Opp12	10-Dec-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	6	6
Site06	10-Dec-24	wind farm point count	*Zanda latirostris*	Direct sighting	4	10
Site07	10-Dec-24	wind farm point count	*Zanda latirostris*	Direct sighting	5	25
Opp13	11-Dec-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	2	
Site10	12-Dec-24	wind farm point count	*Zanda latirostris*	Direct sighting	4	10
Opp17	13-Dec-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	1	10
Opp17	16-Dec-24	Opportunistic sighting	*Zanda latirostris*	Direct sighting	6	
PESRoost01	02-Feb-25	Roost monitoring	*Zanda latirostris*	Direct sighting	46	25
Opp18	03-Feb-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	40	
Opp20	04-Feb-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	25	5
Opp23	07-May-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	10	
Opp23	07-May-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	28	
Site10	07-May-25	wind farm point count	*Zanda latirostris*	Direct sighting	2	60

Site name	Date collected	Sample method	Species	Evidence	Number of individuals	Height AGL (m)
Site07	09-May-25	wind farm point count	*Zanda latirostris*	Direct sighting	4	15
Opp24	09-May-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	4	
Site07	09-May-25	wind farm point count	*Zanda latirostris*	Direct sighting	2	
Opp25	24-Jul-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	110	
Opp25	25-Jul-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	10	
Opp20	29-Jul-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	6	
Opp20	29-Jul-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	2	
Opp25	29-Jul-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	10	
Opp26	29-Jul-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	6	
Site06	05-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	2	10
PESRoost02	05-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	30	
Opp23	05-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	20	
Opp25	05-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	100	
Opp18	06-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	4	
Opp29	06-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	50	10
Opp28	06-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	100	15
Opp23	07-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	8	
Opp10	15-Aug-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	4	
PESRoost01	10-Nov-25	Roost monitoring	*Zanda latirostris*	Direct sighting	60	40
Opp31	10-Nov-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	70	
Site06	11-Nov-25	wind farm point count	*Zanda latirostris*	Direct sighting	1	10
Site06	11-Nov-25	wind farm point count	*Zanda latirostris*	Direct sighting	1	15
Site06	11-Nov-25	wind farm point count	*Zanda latirostris*	Direct sighting	1	20
Site06	11-Nov-25	wind farm point count	*Zanda latirostris*	Direct sighting	1	30
Opp31	12-Nov-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	45	12
Opp31	13-Nov-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	30	10
Opp31	13-Nov-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	2	20

Site name	Date collected	Sample method	Species	Evidence	Number of individuals	Height AGL (m)
Site06	13-Nov-25	wind farm point count	*Zanda latirostris*	Direct sighting	1	25
Site24	13-Nov-25	Opportunistic sighting	*Zanda latirostris*	Direct sighting	2	45
Site07	13-Nov-25	wind farm point count	*Zanda latirostris*	Direct sighting	1	100
PESRoost01	12-Jan-26	Roost monitoring	*Zanda latirostris*	Direct sighting	15	
Opp23	12-Jan-26	Opportunistic sighting	*Zanda latirostris*	Direct sighting	5	
Opp17	14-Jan-26	Opportunistic sighting	*Zanda latirostris*	Direct sighting	7	8
Site06	15-Jan-26	wind farm point count	*Zanda latirostris*	Direct sighting	4	10
Site31	16-Jan-26	wind farm point count	*Zanda latirostris*	Direct sighting	2	20
Site06	16-Jan-26	Opportunistic sighting	*Zanda latirostris*	Direct sighting	2	

Appendix 3 Direct sightings of Forest Red-tailed Black Cockatoo

Site name	Date collected	Sample method	Species	Evidence	Number of individuals	Height AGL (m)
Site11	06-May-25	wind farm point count	*Calyptorhynchus banksii naso*	Direct sighting	3	
Opp27	06-Aug-25	Opportunistic sighting	*Calyptorhynchus banksii naso*	Direct sighting	3	
Site06	06-Aug-25	wind farm point count	*Calyptorhynchus banksii naso*	Direct sighting	18	10
Site30	06-Aug-25	wind farm point count	*Calyptorhynchus banksii naso*	Direct sighting	2	10
Site06	13-Nov-25	wind farm point count	*Calyptorhynchus banksii naso*	Direct sighting	1	10
Opp31	14-Nov-25	Opportunistic sighting	*Calyptorhynchus banksii naso*	Direct sighting	1	
CBC05	14-Nov-25	Opportunistic sighting	*Calyptorhynchus banksii naso*	Direct sighting	3	60
CBC01	15-Nov-25	Opportunistic sighting	*Calyptorhynchus banksii naso*	Direct sighting	1	5
Opp17	15-Nov-25	Opportunistic sighting	*Calyptorhynchus banksii naso*	Direct sighting	5	60

Appendix B. Preliminary Bird and bat risk assessment for windfarms in the northern Swan Coastal Plain (with focus on Marri Development Envelope).

Information presented here is based upon familiarity with species particularly in the south-west, and drawing from the literature such as the HANZAB volumes and WA Museum handbooks. Approach has been to assign each species a status in the Development Envelope (as described below), a note on its likely abundance and frequency of occurrence, a note on its likely flight height (>50m and >100m), and a conclusion about risk. Risk combines the likelihood of mortality which is a combination of status, abundance, frequency and flight height. Risk can then be interpreted in terms of significance of mortality, which considers the consequences of the risk level. Significance thus factors in the conservation significance of a species; a common species at high risk may have a low significance (e.g. Galah; a widespread and over-abundant native species), while a species of very high conservation significance may a low risk of mortality, but the significance of any mortality would be high. Significance of mortality also takes into account population characteristics such as dispersal patterns and reproductive potential. Such factors affect the resilience of a population to a new form of mortality (note that Lumsden et al. (2019) consider this in detail). Significance of mortality is roughly scored as per table 3 below. Risk and significance are assigned conservatively so that they are more likely to be over-estimated than under-estimated.

Status categories have been developed by BCE and are outlined below.

Species lists generated from the review of sources of information are generous as they include records drawn from a large region and possibly from environments not represented in the Development Envelope. Therefore, some species that were returned by one or more of the database and literature searches have been excluded because their ecology, or the environment within the Development Envelope, determined that it is highly unlikely that these species will be present. Such species can include, for example, seabirds that might occur as extremely rare vagrants at a terrestrial, inland site, but for which the site is of no importance. Species returned from the databases and not excluded on the basis of ecology or environment are therefore considered potentially present or expected to be present in the Development Envelope at least occasionally, whether or not they were recorded during field surveys, and whether or not the Development Envelope is likely to be important for them. This list of expected species is therefore subject to interpretation by assigning each a predicted status, the expected occurrence, in the Development Envelope. The status categories used are:

- **Resident:** species with a population permanently present in the Development Envelope.
- **Regular visitor:** species that occur within the Development Envelope regularly in at least moderate numbers, such as part of an annual cycle (thus includes migrants).
- **Irregular Visitor:** species that occur within the Development Envelope irregularly such as nomadic and irruptive species. The length of time between visitations could be decades but when the species is present, it uses the Development Envelope in at least moderate numbers and for some time.
- **Vagrant:** species that occur within the Development Envelope unpredictably, in small numbers and/or for very brief periods. Therefore, the Development Envelope is unlikely to be of importance for the species.

- **Locally extinct:** species that would have been present but has not been recently recorded in the local area and therefore is almost certainly no longer present in the Development Envelope.

These status categories make it possible to distinguish between vagrant species, which may be recorded at any time but for which the Development Envelope is not important in a conservation sense, and species which use the Development Envelope in other ways but for which the site is important at least occasionally. This is particularly useful for birds that may naturally be migratory or nomadic, and for some mammals that can also be mobile or irruptive, and further recognises that even the most detailed field survey can fail to record species which will be present at times. The status categories are assigned conservatively based on the precautionary principle. For example, a lizard known from the general area is assumed to be a resident unless there is very good evidence the Development Envelope will not support it, and even then, it may be classed as a vagrant rather than assumed to be absent if the site might support dispersing individuals. It must be stressed that these status categories are predictions only and that often very intensive sampling would be required to confirm a species' status. It should be noted that the aim of the desktop assessment and field investigations is not to confirm the presence or absence of species in the Development Envelope. By using a precautionary approach, the expected species assemblage represents a conservative estimate of the species assemblage that may use the Development Envelope, with errors of inclusion rather than exclusion.

BCE also has guidelines for assessing significance of impacts and notes that the significance of impacts is contextual. See Table B1 below. These categories have been used in Appendix A (under 'significance of risk'). Note that these impact categories were developed to assess local impacts within a radius of 15 km of a proposed action; this value of 15 km comes from the EPA (2016), which suggests that the availability of fauna habitats within a radius of 15 km can be used as a basis to predict low, moderate or high impacts. In this case, a high impact is where the impacted environment and its component fauna are rare (less than 5% of the landscape within a 15 km radius or within the Bioregion), whereas a low impact is where the environment is widespread (e.g. >10% of the local landscape). Under the Ramsar Convention, a wetland that regularly supports 1% of a population of a waterbird species is considered to be significant. These percentage values and the concept of a 15 km radius or Bioregion were used to develop the impact criteria presented in Table B.1.

Table B.1. Assessment criteria of consequences of impacts upon fauna.

Impact Category	Observed Impact
Negligible	Effectively no population decline; at most few individuals impacted and any decline in population size within the normal range of annual variability.
Minor	Population decline temporary (recovery after end of project such as through rehabilitation) or permanent, but <1% within the immediate area[1]. No change in viability or conservation status of taxon.
Moderate	Permanent population decline 1-10% within the immediate area. No change in viability or conservation status of taxon.
Major	Permanent population decline >10% within the immediate area. No change in viability or conservation status of taxon
Critical	Taxon extinction within the immediate area and/or change in viability or conservation status of taxon.

Table B2. Bird and bat risk assessment for windfarms in the northern Swan Coastal Plain (with focus on Marri Development Envelope)

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
BIRDS							
Order: Accipitriformes; Family: Accipitridae							
Haliaeetus leucogaster White-bellied Sea-Eagle		Marine	Coastal habitats and terrestrial wetlands in tropical and temperate regions of mainland Australia and offshore islands. Characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Recorded in (or flying over) a variety of terrestrial habitats. Recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. Also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and urban areas.	**Irregular visitor** in very small numbers for short periods of time, such as an individual flying through the area once every few years. Individuals are likely to be dispersing juveniles. Known to occur regularly at nearby Lake Guraga.	Will regularly fly >50m and occasionally >100m	Low risk of very occasional deaths, possibly of juveniles.	Negligible

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
Order: Anseriformes; Family: Anatidae							
Oxyura australis (Blue-billed Duck)	Priority 4		Completely aquatic. Deep water in large permanent wetlands and swamps with dense aquatic vegetation.	**Regular visitor** to wetlands in sometimes moderate numbers. Was recorded at Lake Guraga in BBUS. Probably present annually. AOI is on the northern margin of the distribution of the species (Marchant & Higgins, 1990).	Uncertain. Rarely flies in daylight but will travel long distances at night; flight height possibly within RSA.	Uncertain due to uncertainty of flight height at night. May therefore be a moderate risk. Birds in this group are generally considered at higher risk (NGH Environmental, 2016).	Minor or possibly moderate. Population of species in the south-west is uncertain but smaller than the Eastern states (Marchant & Higgins, 1990), so a small number of deaths could be a concern.
Order: Apodiformes; Family: Apodidae							
Apus pacificus (Fork-tailed (Pacific) Swift)	Migratory	Migratory	Mostly inland plains but sometimes above foothills or in coastal areas. Cliffs, beaches and islands. Also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-	Irr**egular visitor or Vagrant.** Rarely recorded in the south-west (M. Bamford personal records of two sightings over 50 years of bird-watching in the region, both sightings of <10 birds).	Almost completely aerial. Flies between 1 – 300 m in height (Department of the Environment, 2024b). Both MB sighting of birds at c. 100 m. Other sightings by MB (Murchison, Kimberley, Northern Territory) of birds <10 m.	Moderate risk due to flight height but infrequency of occurrence	Negligible due to infrequency of occurrence and low numbers; the species is also listed as Migratory and is thus not threatened.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			dunes. Occasionally above rainforests, wet sclerophyll forest or open forest or plantations of pines.				
Order: Charadriiformes; Family: Charadriidae							
Pluvialis squatarola (Grey Plover)	Migratory	Migratory	Coastal areas including sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally rocky coasts with wave-cut platforms or reef-flats, or reefs within muddy lagoons. Also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. Very occasionally recorded further inland around wetlands or salt-lakes.	**Irregular visitor or Vagrant**. A species largely of marine tidal shorelines; therefore little suitable habitat. Despite this, occasional individuals may visit suitable open wetlands (i.e. wetlands with sandy or muddy shorelines) in the general vicinity. Note that migrating birds may overfly the Development Envelope.	Moderate. Grey Plovers fly low (<50 m) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (Department of Environment, Science and Innovation, Queensland (DESI Qld, 2023).	Low risk due to low flight height and infrequency of occurrence	Negligible due to very low numbers and infrequency of occurrence. The species is migratory but not threatened.
Thinornis rubricollis (Hooded Plover)	Priority 4		Inland saline wetlands, littoral zone of beaches and sandy estuaries.	**Irregular visitor to vagrant (but regular visitor in moderate numbers to salt lakes near Jurien).** A species of saline lakes and sandy beaches, therefore	Moderate. Hooded Plovers fly low (<10m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA	Low risk due to low flight height and infrequency of occurrence. However, abundance in region and flight height when	Low; some uncertainty as abundance is uncertain, Population may be small and therefore a small number of deaths could be a concern.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
				little suitable habitat but some salt lake systems nearby. Birds may therefore pass through the AOI and could occasionally settle on suitable open wetlands (i.e. wetlands with sandy or muddy shorelines).	when travelling long distances.	travelling long distances uncertain.	
Order: Charadriiformes; Family: Scolopacidae							
Actitus hypoleucos (Common Sandpiper)	Migratory	Migratory	Coastal wetlands and some inland wetlands, with varying levels of salinity. Mostly found around muddy margins or rocky shores and rarely on mudflats.	**Irregular visitor.** A species that will visit a wide range of freshwater and saline wetlands, but always in small numbers (one or two birds at a time). Note that migrating birds may overfly the Development Envelope.	Moderate. Fly low (<10m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	Low risk due to low numbers and probably low flight height.	Negligible. Low numbers of encounters expected, and the species is not Threatened.
Arenaria interpres (Ruddy Turnstone)	Migratory	Migratory	Coastal regions with exposed rock coast lines or coral reefs or near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches.	**Vagrant away from rocky coastlines.** A shorebird more or less confined to rocky (occasionally sandy with weed wrack) marine coastlines.	Moderate. Fly low (<10m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling	Low risk due to infrequency of occurrence.	Negligible. Very low numbers of encounters expected, and the species is not Threatened.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			Occasionally found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral and in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In south-west Australia, it may occur on pebble-strewn shores of saltlakes near the coast. Occasionally live away from coastal areas in habitats such river beds, and on inland lakes and adjacent farmland. Forage between supralittoral and lower littoral foreshore zones often in banks of seaweed or other tide-wrack.	Therefore no suitable habitat. Note that migrating birds may overfly the Development Envelope.	long distances such as when travelling between foraging and roosting sites. Migrating birds are probably at heights above RSA (DESI Qld, 2023).		
Calidris acuminata (Sharp-tailed Sandpiper)		Migratory, Vulnerable	Muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation including lagoons,	**Regular to Irregular visitor.** Recorded on Lake Guraga during BBUS. A species that will visit a wide range of freshwater and saline wetlands,	Moderate. Fly low (<10m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling	Moderate risk. Most movements will be below RSA, but there may be occasional and possibly even regular movements	Low. Exposure of birds to risk will be infrequent (possibly every year for small numbers, but infrequently for large numbers). Worth targeting suitable wetlands in broader region to get an idea of

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			swamps, lakes pools near the coast, dams, waterholes, soaks, bore drains, bore swamps, saltpans and hypersaline saltlakes inland. Also occur in saltworks and sewage farms. Utilise flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Use coastal mudflats after ephemeral terrestrial wetlands have dried out. Occasionally occur on rocky shores and rarely on exposed reefs.	usually away from the coast. Tends to favour wetlands with emergent sedges and chenopods. Therefore suitable wetlands in the broader region and at least small numbers could be present every year (September to April) with occasional influxes of larger numbers. May occur in large flocks (100s and rarely 1000s of birds). Note that migrating birds may overfly the Development Envelope.	long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	of at least moderate numbers of birds through the AOI at RSA.	actual abundance and frequency of occurrence.
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered	Migratory, Critically Endangered	Intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. Less often,	**Regular to Irregular visitor.** A species that will visit a wide range of freshwater and saline wetlands, and marine tidal coastlines. Therefore suitable wetlands in the broader region	Moderate. Fly low (<10 m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances.	Moderate risk. Most movements will be below RSA, but there may be occasional movements of birds through the AOI at RSA.	Exposure of birds to risk will be infrequent (possibly every year in small numbers), but the population decline means that even small numbers of birds are significant. Worth targeting suitable wetlands in broader region to get an idea of actual

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Fresh and brackish water. Occasionally recorded around floodwaters.	and small numbers could be present every year (September to April). Larger numbers may formerly have been present but the species has declined and is now very rarely seen in the south-west except in very small numbers (such as groups of two or three birds), at locations where hundreds were seen in the 1980s (M. Bamford pers. obs.). Note that migrating birds may overfly the Development Envelope.	Migrating birds are probably at heights above RSA (DESI Qld, 2023).		abundance and frequency of occurrence.
Calidris ruficollis (Red-necked Stint)	Migratory	Migratory	Coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and occasionally protected sandy or coralline shores. Have been recorded on exposed or ocean beaches, stony or	**Regular to Irregular visitor.** Recorded on nearby Lake Guraga in BBUS. A species that will visit a wide range of freshwater and saline wetlands, and marine tidal coastlines. Favours shorelines with little or no vegetation such	Moderate. Fly low (<10m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. They have been observed flying at 50-100m when	Moderate risk. Most movements will be below RSA, but there may be occasional movements of birds through the AOI at RSA, such as when travelling between regional wetlands.	Low. Exposure of birds to risk will be infrequent (possibly every year for small numbers, but infrequently for large numbers). The species is not Threatened. Worth targeting suitable wetlands in broader region to get an idea of actual abundance and frequency of occurrence.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			rocky shores, reefs or shoals. Also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. Sometimes use flooded paddocks or damp grasslands. Occasionally recorded on dry gibber plains, with little or no perennial vegetation.	as bare sand or mud. Therefore suitable wetlands in the broader region and at least small numbers could be present every year (September to April) with occasional influxes of larger numbers. May occur in large flocks (100s and rarely 1000s of birds). Note that migrating birds may overfly the Development Envelope.	crossing from the Swan River to Rottnest Island (M. Bamford pers. obs.). Migrating birds are probably at heights above RSA (DESI Qld, 2023).		
Calidris melanotos (Pectoral Sandpiper)	Migratory	Migratory	Coastal or near coastal habitat but occasionally found further inland. Prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. Also recorded in swamp overgrown with lignum.	**Vagrant.** A species that will visit a wide range of freshwater and saline wetlands, usually away from the coast. Tends to favour wetlands with emergent sedges and chenopods. Therefore suitable wetlands in the broader region, but it is a species recorded only in very small numbers (most	Moderate. Fly low (<10m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	Moderate risk. Most movements will be below RSA, but there may be occasional movements of birds through the AOI at RSA.	Negligible due to low abundance in region.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
				years) in the south-west. and at least small numbers could be present every year (September. Note that migrating birds may overfly the Development Envelope.			
Calidris subminuta (Long-toed Stint)	Migratory	Migratory	Found mainly along the coast with a few scattered inland records. Shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. Also areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire. Also observed at open, less vegetated shores of larger lakes and ponds and on muddy fridges of drying ephemeral lakes and swamps. Permanent wetlands such as	**Vagrant.** A species that will visit a wide range of freshwater and saline wetlands, usually away from the coast. Tends to favour wetlands with emergent sedges and chenopods. Therefore suitable wetlands in the broader region, but it is a species recorded only in very small numbers (most years) in the south-west. and at least small numbers could be present every year (September. Note that migrating birds may overfly the Development Envelope.	Moderate. Fly low (<10 m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	Moderate risk. Most movements will be below RSA, but there may be occasional movements of birds through the AOI at RSA.	Negligible due to low abundance in region.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			reservoirs and artificial lakes. They are uncommon, but occasionally known from tidal estuaries, saline lakes, saltponds and bore swamps.				
Calidris tenuirostris (Great Knot)	Critically Endangered	Migratory, Critically Endangered	Sheltered coastal habitats, with large intertidal mudflats or sandflats including inlets, bays, harbours, estuaries and lagoons. Occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons.	**Vagrant away from coast**. A species largely of marine tidal shorelines; therefore little suitable habitat. Despite this, occasional individuals may visit suitable open wetlands (i.e. wetlands with sandy or muddy shorelines) in the general vicinity. Note that migrating birds may overfly the Development Envelope.	Moderate. Great Knots fly low (<50 m) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	Low risk due to infrequency of occurrence.	Negligible due to very small numbers of birds likely to be impacted.
Phalaropus lobatus (Red-necked Phalarope)	Migratory	Migratory	Non breeding season: mainly at sea. Breeding Season: Inland and coastal lakes/swamps, including highly saline waters and artificial	**Vagrant.** A largely marine species that feeds on open water; also visits large lakes (notably Rottnest lakes being one of the few locations	Moderate. May fly in RSA when travelling long distances. Migrating birds are probably at heights	Moderate risk. Most movements will be below RSA, but there may be occasional movements of birds	Negligible due to low abundance in region

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			wetlands notably saltfields.	where the species is regularly encountered (some years; small numbers) in the south-west). and at least small numbers could be present every year (September. Note that migrating birds may overfly the Development Envelope.	above RSA (DESI Qld, 2023).	through the AOI at RSA.	
Tringa glareola (Wood Sandpiper)	Migratory	Migratory	Well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. Typically associated with emergent, aquatic plants or grass, dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees. Inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops.	**Regular to Irregular visitor.** Observed at nearby Lakes during BBUS. A species that will visit a wide range of freshwater and brackish wetlands. Therefore suitable wetlands in the broader region and at least small numbers could be present every year (September to April). Tends not to form large flocks. Note that migrating birds may overfly the	Moderate. Fly low (<10 m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	Moderate risk. Most movements will be below RSA, but there may be occasional and possibly even regular movements of at least small numbers of birds through the AOI at RSA.	Low. Exposure of birds to risk will be infrequent (possibly every year for small numbers). The species is Migratory but not Threatened. Worth targeting suitable wetlands in broader region to get an idea of actual abundance and frequency of occurrence.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			Small wetlands only when they are drying. Rarely found at brackish wetlands, or dry stunted saltmarsh. Occasionally stony wetlands. Artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains.	Development Envelope.			
Tringa nebularia (Common Greenshank)	Migratory	Migratory	Coastal and inland environments, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	**Regular to Irregular visitor.** Recorded at nearby Lakes during BBUS. A species that will visit a wide range of freshwater and brackish wetlands; also tidal marine coasts. Therefore suitable wetlands in the broader region and at least small numbers could be present every year (September to April). Tends not to form large flocks. Note that migrating birds may overfly the Development Envelope.	Moderate. Fly low (<10 m; M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	Moderate risk. Most movements will be below RSA, but there may be occasional and possibly even regular movements of at least small numbers of birds through the AOI at RSA.	Low. Exposure of birds to risk will be infrequent (possibly every year for small numbers). The species is Migratory but not Threatened. Worth targeting suitable wetlands in broader region to get an idea of actual abundance and frequency of occurrence.
Tringa stagnatilis	Migratory	Migratory	Permanent or ephemeral wetlands of	**Regular to Irregular visitor.** A species	Moderate. Fly low (<10 m;	Moderate risk. Most movements	Low. Exposure of birds to risk will be infrequent (possibly every year

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
(Marsh Sandpiper)			varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. Occasionally at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	that will visit a wide range of freshwater and brackish wetlands; also tidal marine coasts. Therefore suitable wetlands in the broader region and at least small numbers could be present every year (September to April). Tends not to form large flocks. Note that migrating birds may overfly the Development Envelope.	M. Bamford pers. obs.) when moving around within a wetland, but may fly in RSA when travelling long distances. Migrating birds are probably at heights above RSA (DESI Qld, 2023).	will be below RSA, but there may be occasional and possibly even regular movements of at least small numbers of birds through the AOI at RSA.	for small numbers). The species is Migratory but not Threatened. Worth targeting suitable wetlands in broader region to get an idea of actual abundance and frequency of occurrence.
Order: Coraciiformes; Family: Meropidae							
Merops ornatus (Rainbow Bee-eater)		Marine	Open forests and woodlands often dominated by eucalypts, shrublands, including mallee and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. Usually in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to permanent	**Regular visitor**. Recorded during BBUS. A breeding visitor Likely to occur annually (October to February). Most likely to occur in parkland cleared areas and margins of woodland and forest.	Moderate to high. Flight height of foraging birds determined by perch height, so commonly in range of 5-20 m. Birds feed aerially by sallying from a perch on dead branchlets. On migration, however, birds travel in loose	Moderate risk. The species will be present every year and at least on migration (start and end of season) at least some birds may be in the lower end of the RSA.	Negligible to Low. Exposure of some birds to risk may be frequent but the species is not Threatened. Advice from the commonwealth agency is that Marine listings under the EPBC Act are of conservation interest only in commonwealth waters.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			water. Also occurs in inland and coastal sand dune systems, mangroves in northern Australia, heathland, sedgeland, vine forest and vine thicket, and on beaches. On migration, may also fly over non-preferred habitats such as rainforest or treeless plains		flocks around 50 m or possibly higher (M. Bamford pers. obs.). Migrating birds therefore at least occasionally in RSA.		
Order: Falconiformes; Family: Falconidae							
Falco peregrinus (Peregrine Falcon)	Other Specially Protected		Found in most habitat types. Requires abundant prey (small - medium birds, small diurnal mammals). Nests on coastal and inland cliffs, open woodlands near water, high artificial structures.	**Irregular visitor**. None recorded in the BBUS but an adult was observed flying within the Development Envelope adjacent Dandaragan Rd on 13 Apr 2026.	Likely High. The species flies at a range of heights and regularly within RSA.	Low to moderate risk. Not expected to be present continuously but may move into the area for a season. Flies at RSA regularly.	Low. While not resident in the immediate area, the risk is low. However, if a pair sets up a territory on or around the Development Envelope, this risk will increase to moderate and has implications for local persistence of the species. Ability to avoid turbines is likely high so collision risk more likely to involve juvenile birds. The species is widespread at low densities so recolonisation potential is high.
Order: Galliformes; Family: Megapodiidae							
Leipoa ocellata (Malleefowl)	Vulnerable	Vulnerable	Semi-arid to arid zones in shrubland and woodland dominated by mallee and wattle species and occasionally Wandoo,	**Regular to irregular visitor**. The species would formerly have been resident, but habitat loss and fragmentation may	Low. The species can fly strongly but appears to only ever fly low, often just above the ground or just	Negligible. The species may not be present or present only infrequently, and rarely if ever flies at RSA.	Negligible. Risk is negligible and it is unlikely a breeding population is present. If field investigations did find the species to be present, the risk and significance might be increased, but mostly from

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			Marri and Mallet woodlands.	have led to local decline; possibly even local extinction. Individuals may still occasionally be present in parts of the region.	above the canopy (M. Bamford has witness two flights, and has also spoken with landholders who have witnessed flights).		clearing and roadkill rather than from flying in the RSA.
Order: Pelecaniformes; Family: Ardeidae							
Bubulcus ibis (Cattle Egret)		Marine	Tropical and temperate grasslands, wooded lands and terrestrial wetlands. Very rare occurrences in arid and semi-arid regions. High numbers have been observed in moist, low-lying poorly drained pastures with an abundance of high grass. Avoids low grass pastures. Recorded on earthen dam walls and ploughed fields. Uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. Sometimes observed in swamps	**Vagrant**. The Cattle Egret occurs only in very small numbers in the south-west region, with one or two birds reported by birdwatchers annually. Occasional birds may therefore occur in the AOI and the surrounding region, in wetlands, flooded paddocks and on pasture. Such events may occur less than annually.	Low to possibly moderate. No specific observations on Cattle Egret, but other egrets and herons have been seen to fly >50 m occasionally (more often <50 m).	Low risk. The species probably only occasionally flies at RSA. will be present infrequently and only in very small numbers.	Negligible. Low abundance, only occasionally at RSA and the species is not Threatened. Advice from the commonwealth agency is that Marine listings under the EPBC Act are of conservation interest only in commonwealth waters.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			with tall emergent vegetation.				
Order: Passeriformes; Family: Motacillidae							
Motacilla cinerea Grey Wagtail		Migratory and Marine	Strong association with water (usually fast-flowing), particularly rocky substrates along water courses but also lakes and marshes.	**Vagrant**. The Cattle Egret occurs only in very small numbers in the south-west region, with reports from birdwatchers less than annual. Elsewhere in its range, and on the rare occasions when it is seen in the south-west, it usually occurs on the margins of wetlands. Therefore, a slight possibility exists of individuals very occasionally being present in the AOI.	Low to possibly moderate. Movements are usually close to the ground (<5 m) but birds dispersing and migrating may be at greater height.	Low risk. The species probably only occasionally flies at RSA. will be present infrequently and only in very small numbers.	Negligible. Very low abundance, only occasionally at RSA and the species abundant overseas. It is not Threatened.
Order: Psittaciformes; Family: Cacatuidae							
Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo)	Vulnerable	Vulnerable	Dense Eucalypt forests receiving >600 mm rainfall especially of *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri). May forage in pasture on weeds	**Regular visitor**. Recorded during spring and summer on the BBUS. The Development Envelope is on the border of the taxon's range so birds may not be present at all times, but are likely	Low to moderate. While typically low-flying, birds may occasionally or even regularly fly in RSA, although this may be when flying across valleys so low height likely over high ground	Low. The bird may be present regularly in at least moderate numbers in parts of the region, but seldom flies in RSA. More information is needed on flight height as this may vary with season,	Low or possibly moderate. This is a long-lived sub-species of low fecundity, and already under pressure from other threatening processes. Therefore, any additional mortality may be a concern, especially on the periphery of its range.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
				to be present regularly, in moderate numbers, where Marri is a major component of the vegetation. Possibly breeding.	(where turbines most likely located).	activity and location.	
Zanda baudinii (Baudin's Black-Cockatoo)	Endangered	Endangered	Eucalypt forests, especially Jarrah, Marri and Karri forest. Forages in pasture on seeds of weeds; sometimes recorded in pasture in large numbers feeding on *Erodium*.	**Vagrant in south**. The region is outside the range of the species but individuals may occasionally venture into the far southern edge.	Moderate to high. While typically low-flying, birds may occasionally or even regularly fly in RSA, although this may be when flying across valleys so low height likely over high ground (where turbines most likely located). Limited information on this species.	Low. The bird is unlikely to be present except in extremely small numbers, very occasionally, in the south of the region. Seldom observed flying at heights consistent with RSA.	Negligible. This is a long-lived species of low fecundity, and already under pressure from other threatening processes. Therefore, any additional mortality may be a concern, especially on the periphery of its range.
Zanda latirostris (Carnaby's Black-Cockatoo)	Endangered	Endangered	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	**Resident**. One of commonest birds recorded on site during BBUS and recorded at estimated 100 m height. The region is within the core of the species' range, with birds probably present all year	Moderate to high. While typically low-flying, birds may occasionally or even regularly fly in RSA, although this may be when flying across valleys so low height likely over high ground (where turbines	Low. The bird is resident and almost certainly breeding, but will fly in RSA only occasionally. More information is needed on flight height as this may vary with season, activity and location. Possible	Moderate to High. This is a long-lived species of low fecundity, and already under pressure from other threatening processes. Therefore, any additional mortality may be a concern. Information gathered recently suggests it very rarely flies in the RSA and generally only in small numbers.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
			patches of native vegetation on land otherwise cleared for agriculture. Forages extensively in pasture on weeds, and will also forage on Canola.	round, some birds moving away for part of the year, and with breeding taking place.	most likely located).	losses of breeding and foraging habitat.	Reduced availability of hollow-bearing nesting trees and foraging habitat around nest and roost sites, also poses concerns.
MAMMALS							
Falsistrellus mackenziei (Western False Pipistrelle)	Priority 4	Endangered	Old growth forest with suitable tree hollows or abandoned buildings. Jarrah-Karri forest and occasionally Tuart forest and Banksia woodland.	**Vagrant.** The region may be out of range but the species could occasionally occur in the far south	Moderate to high. A moderately high-flying species that typically forages within or just above the canopy of eucalypt forest. May therefore occasionally enter RSA.	Low to moderate. Risk is uncertain as flight height of the species is poorly-known. More information is needed on status in the AOI and on flight height	Negligible due to the species probably not being present.
Unlisted species considered at risk							
Aquila audax (Wedge-tailed Eagle)			Most areas, occasionally in urban places (ALA, n.d.)	**Resident**. Recorded on site during BBUS. Widespread as a breeding resident in the region; also dispersing birds (probably juveniles	High. The species flies at a range of heights and regularly within RSA.	Moderate to high risk. The species will be present more or less continuously at any location and does fly at RSA regularly. Wedge-tailed Eagles have the second highest recorded mortality from wind farms in Australia (Moloney *et al.,* 2019).	Moderate to high. Some mortality is inevitable and while these may often be juvenile birds, there exists the possibility of members of breeding pairs being killed, although there is some evidence that breeding pairs habituate rapidly to the presence of turbines. This has implications for local persistence of the species. However, the species is widespread at low densities so recolonisation potential is high.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
Falco cenchroides (Nankeen Kestrel)			Open grasslands, croplands and urban areas (ALA, n.d.)	**Resident**. Recorded on site during BBUS. Widespread as a breeding resident in the region; also dispersing birds (probably juveniles.	High. The species flies at a range of heights and regularly within RSA.	Moderate to high risk. The species will be present more or less continuously and does fly at RSA regularly. This species is regularly recorded in mortality reports for wind farms in Victoria, Australia (NGH Environmental, 2016, Moloney *et al.,* 2019).	Moderate. 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.
Falco berigora (Brown Falcon)			Open grasslands, pastures and farmland (ALA, n.d.)	**Resident** Recorded on site during BBUS. Widespread as a breeding resident in the region; also dispersing birds (probably juveniles	High. The species flies at a range of heights and regularly within RSA.	Moderate to high risk. The species will be present more or less continuously and does fly at RSA regularly. This species is regularly recorded in mortality This species is regularly recorded in mortality reports for wind farms in Victoria, Australia (Moloney *et al.,* 2019).	Moderate. 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. Note that the species is widespread at low to moderate densities so recolonisation potential is high.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
Hieraaetus morphnoides (Little Eagle)			Open forest, woodlands and croplands (ALA, n.d.)	**Resident**. Recorded on site during BBUS. Widespread as a breeding resident in the region; also dispersing birds (probably juveniles	High. The species flies at a range of heights and regularly within RSA.	Moderate to high risk. The species will be present more or less continuously and does fly at RSA regularly.	Moderate. 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 low densities so recolonisation potential is high.
Tyto novaehollandiae (Masked Owl) and *Ninox connivens* (Barking Owl)			Masked Owl: Caves, woodlands and timbered waterways, in mature trees with suitable nesting hollows close to foraging areas. Barking Owl: Forest and woodland (ALA, n.d.)	**Probably locally extinct. Resident or regular visitor**. Both these species were almost certainly formerly resident, Barking Owl extremely rarely recorded in the overall south-west region (Davis *et al.*, 2022).	Moderate. Flight heights of these owls is not well-understood and may be determined by the height of the tallest trees.	Moderate. In the absence of presence and flight height data, assume there is at least a moderate level of risk. Site-specific data for these species is required.	None to negligible due to the species probably not being present. Moderate. If the species is present.
Waterfowl (ducks and swans), herons and allies, terns			Wetlands and waterways	A rich assemblage with species ranging from **resident, many regular to irregular visitors. Some vagrants**. Abundance highly variable but a few species occasionally in large numbers. Highly seasonal and	Moderate to high. Flight heights of waterfowl variable but will often travel within RSA. Some species, such as ibis, will use thermals to gain altitude during the day. Many ducks and swans travel	Moderate to high. Often abundant and often at RSA.	Low. Despite high risk, low significance as most species are extremely numerous and not of conservation significance. Largest numbers (and thus highest risk) most likely during periods of irruption when numbers peak, so mortality very unlikely to have effects on populations.

SPECIES (Common Name)	WA STATUS	EPBC STATUS	HABITAT	STATUS IN AOI	LIKELIHOOD TO OCCUR WITHIN RSA	RISK	SIGNIFICANCE OF RISK
				with great a annual variation.	long distances mostly at night and are probably within RSA for at least part of this time.		
Austronomus australis (White-striped Freetail Bat)			Woodland and urban areas (ALA, n.d.)	Probably **resident** but may have seasonal variations in abundance.	Moderate to high. A high-flying species.	Moderate to high. Often abundant and often at RSA. Most commonly reported bat species in mortality reports from wind farms in Victoria (Moloney *et al.,* 2019).	Low to moderate. If mortality rates are high, the vast extent of windfarms could result in regional population declines. If breeding colonies exist in the Development Envelope and surrounds the loss of juveniles may have implications for persistence.
Chalnilobus gouldii (Gould's Wattled Bat			Woodland and forest.	Probably resident	Moderate; possibly high.	Moderate. Recorded as a mortality at the second highest rate of all bat species in Ecological Australia records (unpubl.), suggesting it regularly flies at height.	Low. Possibly moderate. A common species but uncertainty regarding actual population size means consequences of mortality are uncertain especially if significant breeding occurs in the Development Envelope or surrounds.

Appendix C. Tables of Management Objectives and Environmental Outcomes

The following outcomes will be finalised based on the final BBUS findings and consultation with regulatory agencies.

Table C.1. Environmental Outcomes for Carcass Monitoring

Factor: Conservation significant bird and bat species **Objective:** Listed and locally significant bird and bat populations will remain stable within and around the Development Envelope **Outcome:** No unsustainable losses from populations of conservation significant species **Key Species:** Carnaby's and Forest Red-tailed Black-Cockatoos; Wedge-tailed Eagle; Nankeen Kestrel; White-striped Freetail Bat; Gould's Wattled Bat; migrant waders; Blue-billed Ducks **Key impacts:** Injury and death of individuals from collision with turbine blades and towers.				
Conditions Clause Number: TBC				
Indicators:	Response Actions	Monitoring	Timing/frequency of monitoring	Reporting
Trigger criterion 1 Retrieve carcasses of target species Threshold criterion 1 Fatalities or injuries of a target species exceed threshold for sustainable losses	Trigger criteria action: If carcasses of target species found, annual loss estimates to be calculated. Age, sex and reproductive status to be included in data. Threshold criteria action: If predicted annual losses exceed annual threshold levels for any age and sex category, an adaptive management review will be undertaken.	Implement carcass monitoring programme weighted towards peak presence of target species. Carcass searches from within defined area under 20% turbines. Use sniffer dogs or other efficient means to locate bird and bat carcasses Use data from other carcass monitoring programmes in the region to define search area, detectability and scavenging, to predict annual losses (in concert with feral predator controls) Remains to be identified by relevant experts for species confirmation and life stage/reproductive activity. Annual losses to be estimated based on numbers accumulated from all campaigns using established modelling methods.	To begin on commencement of power generation. Frequency to be quarterly with two additional campaigns during peak presence of black-cockatoos and migrant waders	Compliance with programme and results of carcass searches to be included in annual reports. Exceedances of actual or predicted fatalities to be reported to EPA within one week. On exceedance, review conditions leading to events and investigate adaptive measures. Pre-emptive measures to be implemented immediately with ongoing measures reported to EPA for inclusion in and approval of the final BBAMP.
Trigger criterion 2	Trigger criteria action Search for nests on site and within	Adaptive monitoring should adult birds be found struck by turbine blades. Nest sites to be monitored	To begin on discovery of adult bird during carcass retrieval.	To be included in annual reporting.

Breeding age adult Black-cockatoo, Peregrine Falcon or Wedge-tailed Eagle struck by turbines in peak nesting period. Threshold criterion 2 Breeding unsuccessful due to parent bird struck by turbine.	10 km of boundary, and monitor nesting activity for those found. Threshold criteria action: Consideration of technological monitoring and turbine curtailment of shut-down during the breeding season.	weekly to assess breeding success until fledged young leave nest.		

Table C.2. Environmental Outcomes for Bird and Bat Monitoring

Factor: Conservation significant bird and bat species **Objective:** Listed and locally significant bird and bat populations will remain stable within and around the Development Envelope **Outcome:** No unsustainable reductions in local populations of conservation and locally significant bird and bat species **Key Species:** Listed species, locally significant and general bird and bat assemblages **Key impacts:** Injury and death of individuals from collision, habitat loss and displacement from disturbance.				
Conditions Clause Number: TBC				
Indicators:	Response Actions	Monitoring	Timing/frequency of monitoring	Reporting
Trigger criterion 1 Abundance and activities of target species drop below baseline and reference sites. Threshold criterion 1 Biennial reduction in abundance of target species within the array compared with baseline and regional levels.	Trigger criteria action: If monitoring identifies a drop in abundance of a species below collective baseline and reference site levels (adjusted for season if necessary), regional monitoring programme to be called upon. Threshold criteria action: Regional monitoring data to be examined every two years to address whether target species are in decline or displaced from wind farms.	Abundance, presence and activities of target species to be monitored through implementation of a vantage point and bird census monitoring programme for birds and an acoustic monitoring programme for birds and bats. Programme to record presence and flights of target species through turbine array and at reference sites. From a cumulative perspective, a regional monitoring programme is required to address whether abundance and diversity of birds is	To begin on commencement of power generation. Frequency to be quarterly with two additional campaigns during peak presence of black-cockatoos and migrant waders	Compliance with programme and results of carcass searches to be included in annual reports. Exceedances of actual or predicted fatalities to be reported to EPA within one week. On exceedance, review conditions leading to events and investigate adaptive measures. Pre-emptive measures to be implemented immediately with ongoing measures reported to EPA for inclusion in and approval of the .

		being maintained at the regional level.		
Trigger criterion 2 Confirmation of nesting activity in Development Envelope. Threshold criterion 2 Abandonment of nest or loss of parent bird leading to nest failure.	Trigger criteria action Weekly monitoring of nesting trees invoked. Threshold criteria action Review cause of abandonment or loss of parent and if concluded to be caused by wind farm activity review measures to reduce disturbance and/or fatalities.	Hollow-bearing nesting trees within the Development Envelope to be monitored at the start of the breeding season for use by Carnaby's. Trees confirmed in use to be monitored weekly throughout nesting season to assess nesting success.	On completion of turbine installation within 1.1 km of hollow-bearing tree.	Compliance with programme and results of nesting monitoring to be included in annual reports. Abandonment of nest or loss of parent bird to be reported to regulators within 24 hours. If concluded to be caused by wind farm, adaptive measures to be reviewed and proposed.
Trigger criterion 3 Statistically significant reduction in relative abundance (detections per night) compared with Control Sites and BBUS baseline of White-striped Freetail Bat or Gould's Wattled Bat over the course of two full campaigns. Threshold criterion 3 Statistically significant reduction in annual abundance of target species within the array compared with baseline and regional levels.	Trigger criteria action: Trawl of regional and other wind farm datasets in preparation should decline persist or accelerate over annual cycle. Threshold criteria action: Regional monitoring data to be examined every two years to address whether target species are in decline or displaced from wind farms. Assess potential for habitat restoration.	Ultrasonic acoustic programme compares bat activity including the installation of recorders at RSA height.	Ultrasonic monitoring programme to commence immediately metmast(s) are installed to acquire a baseline dataset. Monitoring on metmasts and ground level to continue through construction. Ultrasonic monitoring at height to be continued from at least two turbines on installation of first turbine and for two years following operation of full wind farm.	Compliance with programme and results of ultrasonic monitoring to be included in annual reports. On exceedance of threshold criteria, review conditions leading to events and investigate adaptive measures. Pre-emptive measures to be implemented immediately with ongoing measures reported to EPA for inclusion in and approval of the BBAMP.
Trigger criterion 4 Statistically significant increase in activity of locally significant bat species inside RSA as detected on acoustic recorder on metmast or turbines compared with baseline or construction levels. Threshold criterion 4	Trigger criteria action: Review species flying at height with those expected. Compare carcass records under turbines and identify whether high-flying bats are more at risk than predicted. Review carcass search protocols if bats are not being found. Threshold criteria action:	Ultrasonic acoustic programme compares bat activity including the installation of recorders at RSA height.		Compliance with programme and results of flight height analysis to be included in annual reports. On exceedance of threshold criteria, review conditions leading to events and investigate adaptive measures. Pre-emptive measures to be implemented immediately with ongoing measures reported to

Statistically significant annual reductions in relative abundance of locally significant species compared to control sites and baseline.	Regional monitoring data to be acquired and compared. Adaptive measures to reduce bat fatalities to be considered if fatalities exceed threshold levels for target taxa.			EPA for inclusion in and approval of the BBAMP.

Table C.3. Environmental Outcomes for Bird and Bat Monitoring

Factor: General bird and bat assemblages **Objective:** Maintain local bird and bat diversity and abundance within the Development Envelope **Outcome:** No losses from populations of species identified as resident and regular visitor **Key Species:** All birds and bats encountered in baseline BBUS **Key impacts:** Loss of or displacement from the Development Envelope due to habitat loss and disturbance.				
Conditions Clause Number: TBC				
Indicators:	Response Actions	Monitoring	Timing/frequency of monitoring	Reporting
Trigger criterion 1 Statistically significant decline in bird numbers or relative abundance of bats (detections per night sampling) for a single campaign. Data to be adjusted for seasonal differences if required. Threshold criterion 1 Biannual reduction of bird numbers or loss of a species from monitoring.	Trigger criteria action: Compare with background levels and available long-term datasets to assess whether background or on Development Envelope only. Threshold criteria action: Review availability of native vegetation in Development Envelope and outlook for using adaptive options of habitat restoration.	Monitor bird and bat assemblages and compare with background levels. Bird census and/or acoustic sampling to provide comparative dataset of diversity and relative abundance with baseline levels. Ultrasonic acoustic programme compares bat activity levels with baseline. Installation of recorders at RSA height.	Surveys are to be commenced at beginning of construction (unless delayed in which case baseline may need to recommence) and continue through first two years of operations. Campaigns to be conducted quarterly with consideration given to seasonal peaks e.g. peak breeding seasons.	Compliance to be included in annual reports. Reduction in species diversity or significant relative abundance is to be reported in annual reports. Biennial datasets are to be used to detect longer-term trends and triggering of review.

Table C.4. Environmental Outcomes for Black-cockatoo Habitat Monitoring

Factor: Black-cockatoos
Objective: Maintain key and critical habitat features
Outcome: No unsustainable losses from populations of conservation significant species

Key Species: Carnaby's Black-Cockatoo; Forest Red-tailed Black-Cockatoo. **Key impacts:** Loss of key and critical habitat features from within the Development Envelope.				
Conditions Clause Number: TBC				
Indicators:	Response Actions	Monitoring	Timing/frequency of monitoring	Reporting
Trigger criterion 1 Damage to native vegetation, hollow-bearing and roosting trees caused by wind farm activities in excess of that permitted. Threshold criterion 1 Loss of one hollow-bearing tree, one hectare of native foraging habitat or stand of trees known as routinely used roost site.	Trigger criteria action: Report causes to proponent and review implications for black-cockatoos. Review buffer zones and protection measures to avoid repeat damage. Threshold criteria action: Review habitat restoration and provision of artificial nest tubes to replace lost habitat.	Annual monitoring of key habitat features within the Development Envelope to include nesting trees, root sites and native vegetation.	Throughout construction and two years following completion of wind farm installation.	Compliance to be included in annual reports and breaches reported in accordance with approval conditions. Propose restoration measures and implement following approval with authorities.

Table C.4. Management Objectives

Factor: Birds and Bats **Objective:** Prevent loss of habitat and avoid disturbance to critical habitat **Key Species:** Bird and bat species identified as resident or regular visitors (further listings are given against each Management Target). **Key impacts:** Habitat loss and disturbance.				
Conditions Clause Number				
Management targets	**Management actions**	**Monitoring**	**Timing / frequency of actions**	**Reporting**
Management target 1 **Key Species:** Black-cockatoos listed as either Vulnerable or Endangered under EPBC Act. Form a 500 m/1 km exclusion zone around nest trees and significant roosts of Black-Cockatoos	Turbine array and infrastructure layout ensures no turbines or infrastructure, or temporary works encroach within the exclusion zones Establish exclusion zones for construction activities prior to construction commencing. Exclusion zones will be communicated to all site personnel in inductions and demarcated to prevent construction or operational	No construction or operational activities to encroach on exclusion zones Maintenance of demarcation and adherence to exclusion zones to be monitored during site inspections.	Monthly during construction, quarterly during operations.	Compliance to be included in annual reports. Breaches of exclusion zone to be treated as an incident and reported accordingly. Review cause of breach and identify corrective actions.

	traffic from entering. Restrictions are limited to one month either side of peak breeding season for Carnaby's Black-Cockatoo.			
Management target 2 **Key Species:** Black-cockatoos listed as either Vulnerable or Endangered under EPBC Act. Maintain all nesting trees and roost sites for black-cockatoos within the Development Envelope. OR Remove no more than XX trees identified as being potential nesting or roosting trees (Note: hydrological changes may cause loss of trees and monitoring groundwater needs to be included in Broader EMP)	Fauna specialist to record and mark all trees of significance for black-cockatoos to form spatial database. Area around dripline of retained trees to be demarcated as an exclusion zone for all activities. Nesting and roosting trees lost will be offset by restoring an area of Marri/Jarrah woodland on the periphery of the wind farm. Temporary poles with "cocky tubes" to be erected in wooded as temporary nesting opportunity while offsets mature.	Fauna specialist to inspect retained tree database annually to establish survival. Maintenance of demarcation and adherence to exclusion zones to be monitored during site inspections.	Tree inspection to be conducted annually. Demarcation integrity inspected during monthly construction site inspections.	Compliance to be included in annual reports. Breaches of exclusion zone to be treated as an incident and reported accordingly. Review cause of breach and identify corrective actions (e.g. increase size of offset area/number of cocky-tube installations).
Management target 3 **Key Species:** Black-cockatoos listed as either Vulnerable or Endangered under EPBC Act. Limit loss of foraging habitat (including live pine trees) to XX Ha within 6 km of all nesting and 12 km of all roosting sites for black-cockatoos.	Land surveyor to demarcate around foraging habitat to be cleared so that no more than approved area is cleared. If hydrological assessment identifies potential secondary impacts on native vegetation (e.g. degradation from drought), changes in hydrological processes identified through monitoring will trigger additional vegetation inspections. Offsets for lost foraging habitat will be restoration of native vegetation. Short-term foraging can be considered as sacrificial pines or crops on which black-cockatoos are known to forage (e.g. canola).	Botanist to inspect retained foraging habitat (as defined by ecologist) to ensure zero creep. Maintenance of demarcation and adherence to exclusion zones to be monitored during site inspections.	Foraging habitat inspected biannually during construction period. Changes in hydrological regime will trigger increase in habitat inspection to quarterly.	Compliance to be included in annual reports. Breaches of exclusion zone to be treated as an incident and reported accordingly. Review cause of breach and identify corrective actions (e.g. increase size of offset area/number of cocky-tube installations).

Management target 4 **Key Species:** Black-cockatoos listed as either Vulnerable or Endangered under EPBC Act. Maintain availability of standing water within 1.5 km of nest or roost trees	All sources of standing water and their availability throughout the year are to be mapped (including livestock troughs) in a spatial database. Loss of water sources are to be replaced with similar suited to black-cockatoos and located within 1.5 km of roosting and nesting trees and by drawing bird movements away from turbines.	Fauna specialist to inspect standing water sources to establish upkeep and use. Loss or lack of use to be recorded.		Compliance to be included in annual reports. Breaches of exclusion zone to be treated as an incident and reported accordingly. Review cause of breach and identify corrective actions (e.g. increase size of offset area/number of cocky-tube installations).
Management target 5 **Key Species:** All birds and bats Implement a control programme for feral predators on site.	In conjunction with the DBCA and feral predator control experts, devise and implement an effective control programme to eradicate feral predators from the Development Envelope. Working with other wind farm operators and landowners, the programme can be substantially more effective (and cost effective) if implemented at the regional scale.	Implement a feral predator monitoring programme (e.g. camera trapping) within the Development Envelope to establish relative densities of cats and foxes. Camera traps that automatically identify cats and foxes can be used and linked via network to send notifications for collating data. Carcasses of birds or	Monitoring programme to be implemented with immediate effect and continue through first two years of operation. Occurrences of feral predators through control programme can be compared with baseline to address effectiveness.	Compliance to be included in annual reports. Breaches of exclusion zone to be treated as an incident and reported accordingly. Review cause of breach and identify corrective actions (e.g. increase size of offset area/number of cocky-tube installations).
Management target 6 **Key Species:** All birds and bats Limit loss of native vegetation to XX Ha throughout all activities associated with the wind farm.	Land surveyor to demarcate around native vegetation to be cleared so that no more than approved area is cleared. If hydrological assessment identifies potential secondary impacts on native vegetation (e.g. degradation from drought), changes in hydrological processes identified through monitoring will trigger additional vegetation inspections.	Botanist to inspect retained foraging habitat (as defined by ecologist) to ensure zero creep. Maintenance of demarcation and adherence to exclusion zones to be monitored during site inspections.	Foraging habitat inspected biannually during construction period. Changes in hydrological regime will trigger increase in habitat inspection to quarterly.	Compliance to be included in annual reports. Clearance of area greater than permitted to be reported to EPA within one (1) week of occurrence. Review root cause of breach and identify corrective actions (e.g. increase size of offset area).

Appendix D. Provisional assessment of trigger and threshold criteria for key bird and bat species

Trigger and Threshold criteria for management impacts on conservation significant taxa are generally derived from a population viability analysis (PVA) for a given species following predictions of specific losses of key habitat features, breeding potential or individuals from the population. Pending formal impact and collision risk assessment, and PVA, the following is offered on which to base the trigger and threshold criteria for each of the bird and bat taxa potentially at significant risk from the wind farm development.

Mortality triggers need to consider the age of birds killed, as loss of juveniles from a population is 'normal' and can be sustainable, whereas loss of breeding adults may be more critical. For example, Carnaby's Black-Cockatoos are regularly killed along the Brand Highway that forms the western boundary of the Proposal Development Envelope, and through the overall greater windfarm area in general. This level of mortality is not quantified, but a dead adult male was found on the highway near Cataby (35 km north of the proposal) in July 2025 (M. Bamford), and a second dead bird (not sexed or aged) was found at Regan's Ford on 12th September (M. Bamford). That is two road-kills along 40 km of road in two months. Two further deaths were reported along the same stretch of road in October/November (S. Broomfield, pers. comm.). Therefore, along a roughly 40 km section of the Brand Highway, that is one death/40 km/month or 0.025 deaths/km/month. Since the Brand Highway passes through 200 km of similar foraging habitat, then that is potentially around 60 deaths per year along the Brand Highway. Mortality along the Brand Highway may already be affecting the species in the area. There are other anecdotal accounts of mortality along this and other major roads, often in much larger numbers.

The impact criteria presented in Table B1 of Appendix B can be used to develop trigger thresholds for the Proposal. These impact criteria are based around proportional impacts within a 15 km radius or within a Bioregion, and use guidance regarding management of migratory species for example that proposes 1% represents a significant proportion of a species' population (Ramsar Convention). This has been re-interpreted for migratory species when in Australia as 0.1% (e.g. DoE, (2015) referral guidelines for migratory species). These percentages were developed to be used at the population level, but at that level such proportions are highly unlikely to be met by individual actions except for a very few and usually critically endangered species; therefore a species-wide trigger is unlikely to be useful in identifying local impacts. It is therefore proposed that a >1% impact (decline) in the local population (within radius of 15 km) provides the best trigger definition for a project. This is especially important where there are multiple similar projects nearby, and a local impact trigger is a better way of managing cumulative impacts than a population-wide trigger. Importantly, using the same local impact level for nearby project allows for the management of cumulative impacts.

This trigger approach does need a reasonable, regional population estimate, but for the species of most concern for the Proposal, such information is not currently available. The population estimates below are drawn largely from personal experience in the region (Bamford Consulting Ecologists team). Discussion around juveniles versus adult is included, as the loss of juvenile birds is much less significant than of adults.

D.1 Carnaby's Black-Cockatoo

Carnaby's is potentially at risk of mortality from blades strike, disturbance at hollow-bearing trees resulting in reduced breeding potential and displacement from within the turbine array leading to loss of foraging opportunities (including agricultural seed crops).

The expectation of Carnaby's being struck by turbine blades is extremely low due to their predominantly low flight profile and, their apparent situational awareness and ability to avoid obstacles. Furthermore, none have been reported in carcass monitoring studies for two wind farms to the north of the proposed Marri Wind Farm reported in Shepherd and Bamford (2025). Carnaby's has been observed flying uncharacteristically at 60 m and 100 m during the BBUS and therefore potentially within the RSA at least several times per year, and in very low numbers. Despite these sightings being outside of the Development Envelope, this behaviour could also be inside. It is therefore concluded that losses from blade strike will be less than one individual per year. Since Carnaby's breed and roost throughout the year in the Development Envelope, this could be from any age group, but is considered more likely to be juveniles.

Local population of Carnaby's can be estimated at 1,000 birds peak in the autumn winter, which would include adults and juveniles (based on personal experience in the area and the size of known roosts from the Great Cocky Count). It is potentially larger. A 1% annual mortality would therefore be 10 birds. The actual number of breeding adults in the region will be much lower; perhaps in the order of 50 pairs (i.e. 50 pairs may breed within about 15 km of the Proposal). This is based upon personal experience in the area but with some information on known breeding sites from DBCA threatened fauna database. The loss of a single breeding adult would therefore be a threshold.

Similarly, hollow bearing trees are increasingly limited throughout their range which is exacerbated through ongoing vegetation clearance and the lack of woodland regeneration. The loss of suitable nesting trees or deterring their use through disturbance or loss of supporting habitat, may reduce breeding potential. Loss of a single nesting tree or its use (compared with baseline levels) are considered a threshold trigger and unintentional damage to nesting trees or loss of 10% of supporting foraging habitat are defined as trigger criteria.

A response to such losses might be to provide breeding habitat (i.e. artificial hollows) to enhance breeding opportunities. The high risk associated with the loss of breeding adults emphasizes the need to identify breeding locations, to monitor roost and breeding sites to detect any change, and to study movement patterns of birds, particularly nesting birds.

D.2 Migratory and other listed waterbirds.

Waterbirds in general are expected infrequently and in low numbers within the Development Envelope, so risk is very low. Straw-necked Ibis is expected to be present in large numbers within the agricultural paddocks taking advantage of irruptions of invertebrates especially during the spring and early summer. However, mortality data from south-eastern Australia suggest ibis species rarely suffer collisions (T.Kelly, pers. comm.). Australian Shelducks and Australian Wood Ducks graze in paddocks occasionally so may also be regular visitors but in low numbers and are unlisted. Otherwise, the Development Envelope offers little of interest to most waterbirds with the exception of transiting between water bodies. Blue-billed Duck often disperse at night between water bodies and may

therefore be at risk when in transit. Opportunistic sightings and records from carcass searches will be important to ascertain how vulnerable these species are.

Losses of relatively abundant waterbird and wader species can be relatively large before significant levels are met. Blue-billed Ducks (Priority 4) are the most common conservation significant species throughout the year in the region and may number one to two hundred within 15 km based on counts at local lakes. This is a significant proportion of the total Western Australian population currently estimated at 5,000 individuals (BirdLife Datazone, accessed 23rd April 2026). Trigger criteria for this species would be the confirmed presence within the operational wind farm array. Threshold criteria for this species would be 1% of its regional population (c. 200 individuals) which is estimated to be two (2) individuals.

Numbers of migrant waders are very difficult to define but counts at local lakes seldom exceed ten or so of the regular visitors such as Red-necked Stint (Least Concern) or Common Greenshank (Vulnerable). These are regular visitors during the spring, through to autumn, with occasional individuals remaining through the winter. Other species such as Curlew Sandpiper (Critically Endangered), Sharp-tailed Sandpiper or Wood Sandpiper are encountered less frequently and may not be present every year. The loss of even one or two Curlew Sandpiper would be a significant consequence on the entire population. However, these wader species are very seldom encountered on the nearby lakes and the risk is considered low. Loss of a non-threatened migrant wader or the presence of a threatened migrant wader in the airspace of the wind farm is deemed a Trigger threshold. Threshold Triggers for each species of migrant that may transit through the Development Envelope however infrequently are defined in Table D1.

Table D1. Threshold criteria for migrant wader and listed waterbird species previously recorded in the BBUS or area or expected. To be completed on finalisation of BBUS reporting.

Species	Regional Population and Ref	Trigger Crit.	Threshold Crit.
Blue-billed Duck (P4)	200	Presence in array	2 carcasses/yr
Hooded Plover (P4)			
Sharp-tailed Sandpiper			
Curlew Sandpiper (CrEn)		Presence in array	1 carcass/yr
Red-necked Stint			
Wood Sandpiper			
Common Greenshank (Vu)			
Marsh Sandpiper			

D.3 Peregrine Falcon.

The Proposal is probably within the home range of at least one pair for the species, and breeding may take place. While it was not recorded during the BBUS, an adult was observed flying adjacent to Dandaragan Rd in Apr 2026. During similar studies in the broader region, BCE has recorded the species only infrequently, but a pair has been fairly regularly encountered near Lancelin. Population density is uncertain but broadly across Australia, densities are typically within a pair per 500 – 1,500 km^2

(Marchant and Higgins 1993). The density is likely to be very low in the region and furthermore, the species appears to be a rare mortality at windfarms (T.Kelly, pers. comm.). Surveys are required to determine if the species is present, and particularly if there is a nest in the area. If a breeding pair is found to be resident, it would be the trigger criteria and needs to be monitored in order to detect any possible impact. The threshold criteria would be if an adult is found during carcass searches.

D.4 Unlisted Species within the Development Envelope

White-striped Freetail-Bat and Gould's Wattled-Bat. The White-striped Freetail-Bat has been detected during the BBUS and is present for only part of the year (yet to be determined) as the species is internally migrant in Australia and retreats to the lower south-west over summer. Substantial numbers of deaths for this species are reported in south-eastern Australia (T. Kelly pers.comm.) although on wind farms with generally lower RSAs. In the absence of any population estimate it is not possible to propose a sustainable mortality rate for the Proposal. Phoenix is currently conducting surveys that may provide abundance information but during similar sampling regimes, this species has low rates of detection compared with most other species (B.Shepherd, pers. comm.) despite having louder calls and a larger detection range. Further research is needed to address the risk in Western Australia. There are no density estimates for this species and call abundance is often lower by an order of magnitude compared with other more common species (B.Shepherd, pers. obs.). Pending further information and in compliance with the precautionary principle, it is assumed that there are 500 bats within 15 km. Due to their least concern status, a trigger level of 1% (5 individuals) and a threshold criterion of 2% (10 individuals) per annum is set.

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. There are no density estimates for Gould's Wattled Bat and so an analogue with density estimates is the Southern Forest Bat with densities of around 0.08 individuals per ha in preferred habitat (Lumsden and Bennett, 2005). That equates to around 6,000 bats within 15 km of the Development Envelope. This is likely an overestimation in a mixed landscape and in compliance with the precautionary principle, it is assumed that there are around half that at 3,000 bats. Due to their least concern status and being very abundant, a trigger criterion of 1% (30 individuals) and a threshold criterion of 2% (60 individuals) per annum is set.

Carcass searching may provide information on peak periods of mortality, and the species may benefit from low wind-speed shutdown. If peak abundance periods can be identified then this shut-down approach could be used at those times. Information on local population size is also lacking for other bat species, and Gould's Wattled-Bat is a known at-risk species in south-eastern Australia (Ecological Australia unpubl. Records). Regular monitoring of bat activity with ARUs deployed within and around the Development Envelope may detect changes in abundance but it will be difficult to separate this from natural variation and/or from variation due to other causes. Monitoring can at least confirm ongoing presence and can detect local changes in abundance if, for example, bats are displaced by (or attracted to) a single turbine.

Wedge-tailed Eagle. The Proposal probably encompasses at least part of the home range of two pairs of the species. Studies in south-eastern Australia have found high rates of mortality of this species at windfarms, but with almost all dead birds being juveniles (<4 years old; T. Kelly pers. comm.). It may be possible to estimate the number of juvenile Wedge-tailed Eagles that pass through the proposal annually; but it is probably <100 birds. The underlying mortality rate of juveniles (i.e.. the proportion of juveniles that fail to survive their first year) is probably very high. Marchant and Higgins (1993) report on breeding success and juvenile survival and give one report of 0.9 chicks fledged per pair per year, and 0.6 chicks surviving to their first year. There appears to be no precedent for assigning a sustainable juvenile mortality rate for Wedge-tailed Eagles at windfarms; it clearly needs to be <30% of juveniles that pass through the windfarm. It also needs to be recognized that at least some of the juveniles that pass through the Proposal Development Envelope will pass through other windfarms located throughout the region from Perth to Geraldton. An annual mortality of juvenile Wedge-tailed Eagles of no more than three birds/year at any one windfarm (i.e. ca. 10% of the natural annual mortality rate of 100 juvenile birds) in the broader region should be sustainable, particularly as the mortality rate of the species when it was classed as vermin and was regularly shot was very high, but apparently had little effect on the population. Serventy and Whittell (1976) report an annual rate of 3,591 bounties being paid between 1928 and 1968 in Western Australia. Most of these were probably in the wheatbelt region. While loss of juvenile Wedge-tailed Eagles may be sustainable, loss of breeding adults is more of a concern. Monitoring of pairs of the species should take place to follow their breeding success (to ensure there is not a disproportionate loss of local juveniles), and to follow what happens if a member of a pair is killed. Replacement should happen rapidly. It should be possible to demonstrate whether or not there is a decline in the local breeding population or breeding success, or not. Note that the Wedge-tailed Eagle can be protected through the use of Identiflight (refer Section 7.1.1) if mortality rates and local impacts are a concern.

APPENDIX E. Consideration of management measures and justification for inclusion/exclusion (measures taken from DCCEEW, 2026)

Ref	Measure	Proposed	Justification
1	Site Selection	N	Land availability and access to SWIS connection limits alternate sites
2	Turbine Configuration	Y	Turbine layout adjusted round Carnaby's nesting sites
3	Turbine design	Y	Turbine selection and height configuration based on avoiding 99% of black-cockatoo flights
4	Feathering blades below cut-in speeds	Y	Can be considered following trigger levels of bat mortality numbers
5	Feathering and curtailment	Y	Can be considered following threshold numbers of bat mortality and on most impactful turbines
6	Informed curtailment	Y	To be considered if White-striped Freetail Bat is impacted beyond threshold numbers during seasonal presence. Increased numbers of detections being criteria
7	Manual curtailment	Y	To be considered for certain threatening turbines during nesting season if breeding Carnaby's are found beyond threshold levels in carcass searches
8	Automated curtailment – optical	Y	Can be considered for activity around turbines threatening nesting Carnaby's, nesting Peregrines or day-flying migrant waders are found during carcass searches and exceed threshold criteria
9	Automated curtailment – radar	Y	Can be considered if night-flying migrant waders, listed ducks or [unexpected listed] owls are found during carcass searches in numbers beyond threshold criteria
10	Deterrents	N	Not yet trialled in Australia, can cause stress to birds and bats, aims to displace species and can cause response reactions (e.g. vortexing) in black-cockatoos and may prompt them to fly to RSA
11	Turbine visibility	N	Not yet trialled for Australian species.
12	Marking overhead transmission lines	Y	Can be considered if new overhead lines lead to mortalities beyond threshold levels.
13	Modifying aviation lighting	N	Limited options for changes to aviation lighting and not shown to be effective for

			taxa of concern in the Development Envelope.
14	Habitat management	Y	Measures suggested include maintaining and improving habitat for black-cockatoos, installing nest tubes in locations that reduce risk to nesting birds and consideration of agricultural cropping regime to reduce bird mortality if Carnaby's foraging on crops are concluded to be at greater risk of blade strike resulting in mortality. Carrion removal and predator control can also be placed in this category.

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