Appendix D

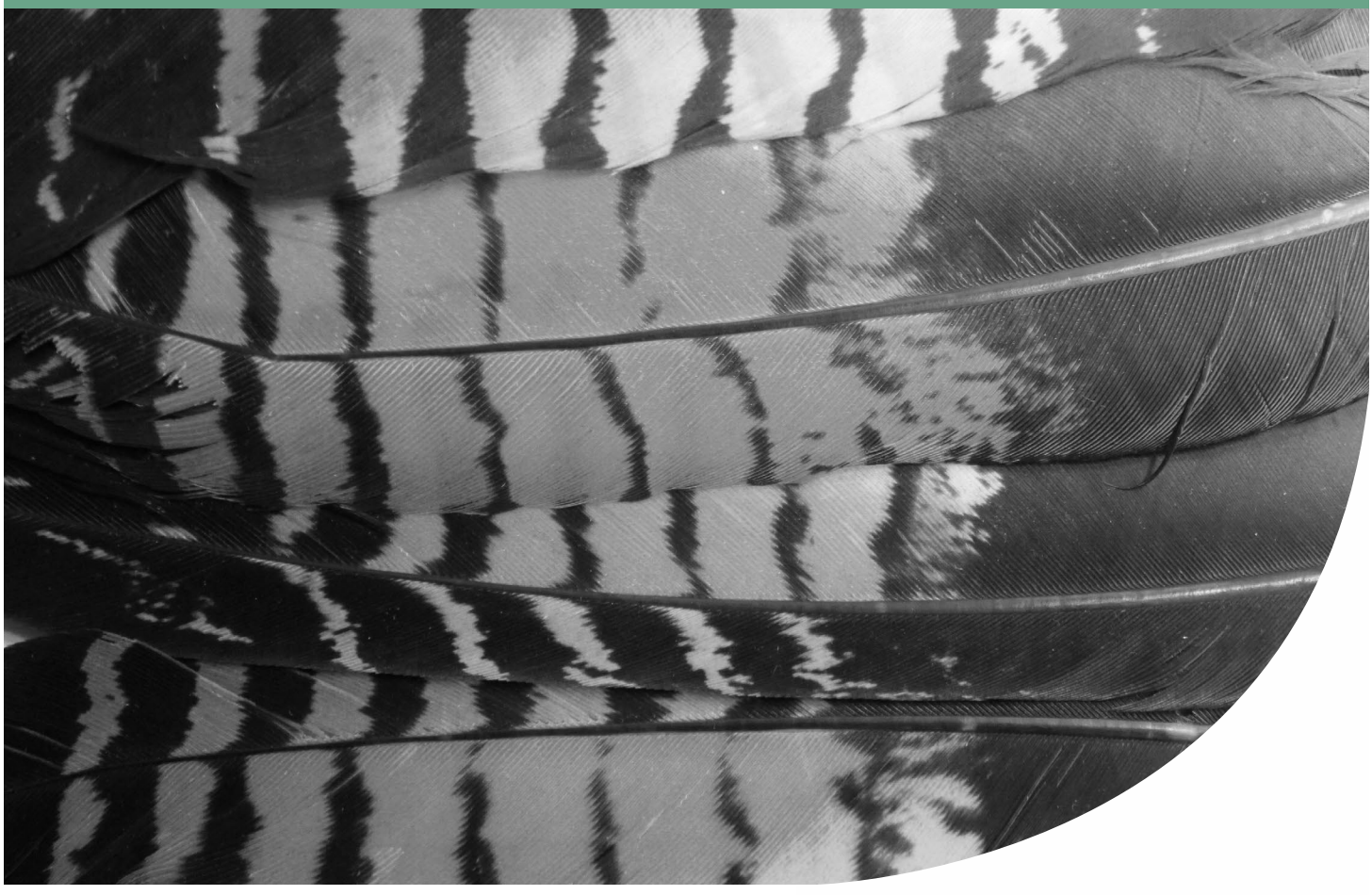
Basic Fauna and Targeted Bird and Bat Assessment

Basic Fauna and Targeted Bird and Bat Assessment

Parron Wind Farm Development Support

Project No: EP23-085(02)

Prepared for Zephyr Energy Pty Ltd
November 2024



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Executive Summary

Zephyr Energy Pty Ltd engaged Emerge Associates to conduct a basic fauna and a targeted bird and bat assessment for the proposed Parron Wind Farm and associated road reserves in Badgingarra (referred to herein as the 'site').

As part of the assessment a desktop review of relevant background information was completed and a field survey was undertaken on 18 to 22 September 2023. Additionally, the portion of the site associated with the intersection of Cowalla Road and Brand Highway was surveyed on 25 September 2024. During the field survey opportunistic sightings of fauna were recorded and an assessment was made on the fauna habitat within the site and its suitability to provide habitat for threatened, specially protected and priority fauna. A targeted bird and bat survey was also undertaken as these groups are typically most susceptible to the operational impacts of wind farms.

Outcomes of the basic fauna assessment include the following:

- The site consists of 10 broad habitat types:
  - **Agricultural vegetation** (738.07 hectares (ha)): planted rows o*f Chamaecytisus palmensis*.
  - **Bare ground and pasture** (7247.94 ha): pastureland, paddocks, firebreaks and roads.
  - **Dams and water features** (2.31 ha): agricultural dams and drainage lines.
  - **Eucalyptus woodland** (19.58 ha): native canopy woodland with sparse understory.
  - **Laterite hills and breakaways** (71.76 ha): shrubby/heathy vegetation on rocky ridges and breakaways.
  - **Open forest** (120.68 ha): forest of mostly non-native trees with some native trees over cleared areas and non-native grassland.
  - **Plateau** (58.75 ha): native shrubland on a rocky laterite plateau.
  - **Riparian and wetland vegetation** (22.89 ha): riparian vegetation in areas with seasonal or permanent inundation.
  - **Sandplain** (192.07 ha): open *Eucalyptus* and *Proteaceae* woodland on sandy soils.
  - **Scattered trees and shrubs** (55.73 ha): scattered native and non-native trees with little to no understory.
- A total of 56 native fauna species were recorded within the site.
- One threatened species was recorded during the survey: Carnaby's black cockatoo (endangered (EN) under the *Environment Protection and Biodiversity Conservation Act* and *Biodiversity Conservation Act*).
- Despite not being recording during the survey, the following species were considered to have a high or moderate likelihood of occurring within the site:
  - Pacific swift (migratory)
  - peregrine falcon (other specially protected)
  - woollybush bee (priority 3)
  - Mt Lesueur shield-backed trapdoor spider (priority 2)
  - western brush wallaby (priority 4 (P4))
  - black-striped snake (P4).

Outcomes of the targeted black cockatoo survey include the following:

- Foraging evidence attributed to Carnaby's black cockatoo was recorded in the site.

- The site occurs within the modelled distribution of Carnaby's black cockatoo but outside of the modelled distribution of forest red-tailed black cockatoo and Baudin's black cockatoo.
- The site contains 185.86 ha of breeding and roosting habitat for Carnaby's black cockatoo.
- No black cockatoo roosts occur in close proximity to the site (Peck *et al.* 2019). No roosts or evidence of roosting by any species of black cockatoo was recorded within the site during the field survey. Tall native and non-native trees within the site represent suitable roosting habitat Carnaby's black cockatoo.
- A total of 471.08 ha of foraging habitat for Carnaby's black cockatoo was mapped within the site of which 279.65 ha (59.36%) comprises primary native plants, 6.37 ha (1.35%) comprises primary non-native plants, 47.55 ha (10.09%) provides secondary native plants and 137.51 ha (29.19%) provides secondary non-native plants.
- Additional areas of foraging habitat of similar or higher value occur adjacent to the site and in the wider local area.

Outcomes of the targeted bird survey include the following:

- A total of 51 bird species were observed across the site.
  - 11 species were observed from height category 1 (predominantly above canopy).
  - 12 species were observed from height category 2 (predominantly at canopy).
  - 29 species were observed from height category 3 (predominantly below canopy).

Outcomes of the targeted bat survey include the following:

- Three bat taxa were recorded within the site:
  - *Chalinolobus gouldii* - Gould's wattled bat
  - *Nyctophilus* spp. - Long-eared bats
  - *Vespadelus regulus* - Southern forest bat.

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ALA	Atlas of Living Australia
BoM	Bureau of Meteorology
EPA	Environmental Protection Authority
DAWE	Department of Agriculture, Water and the Environment (now DCCEEW)
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DoEE	Department of the Environment and Energy
DoW	Department of Water (now DWER)
DPaW	Department of Parks and Wildlife (now DBCA)
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
WAM	Western Australian Museum
WALIA	Western Australian Land Information Authority

Table A2: Abbreviations – Conservation codes

Conservation codes	
CD	Conservation dependent
CR	Critically endangered
EN	Endangered
MI	Migratory
P1	Priority 1
P2	Priority 2
P3	Priority 3
P4	Priority 4
OS	Other specially protected
VU	Vulnerable

Table A3: Abbreviations –Legislation

Legislation	
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
CALM	*Conservation and Land Management Act 1984*
EBPC Act	*Environment Protection and Biodiversity Conservation Act 1999*
LA Act	*Land Administration Act 1997*
SCRM Act	*Swan and Canning Rivers Management Act 2006*

Table A4: Abbreviations – Units of measurement

Units of measurement	
DBH	Diameter at breast height
cm	Centimetre
ha	Hectare
km	Kilometre
m	Metre
m AHD	m in relation to the Australian height datum
mm	Millimetre

Table A5: Abbreviations - General

General terms	
AFD	Australian Faunal Directory
DP (C3)	Category 3 Declared Pest
HC1	Height Category 1
HC2	Height Category 2
HC3	Height Category 3
IBRA	Interim Biogeographic Regionalisation for Australia
MNES	Matters of National Environmental Significance
UFI	Unique Feature Identifier

1 Introduction

1.1 Purpose

Emerge Associates (Emerge) were engaged by Zephyr Energy Pty Ltd to conduct a basic fauna and targeted bird and bat assessment within the proposed Parron Wind Farm and associated road reserves in Badgingarra as shown **Figure 1** (referred to herein as the 'site').

Fauna assessments are required to characterise fauna values and, in particular, confirm the presence or absence of values relevant to environmental approvals process, such as 'fauna habitat', 'threatened' fauna, 'specially protected' fauna and 'priority' fauna.

1.2 Legislation and policy

Fauna may be listed as threatened, extinct or specially protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the State *Biodiversity Conservation Act 2016* (BC Act). Threatened fauna are classified as either 'critically endangered' (CR), 'endangered' (EN) or 'vulnerable' (VU). Extinct species are classified as 'extinct' (EX) or 'extinct in the wild' (EW)[1]. Specially protected species are classified as 'migratory species' (MI), 'species of special conservation interest' (CD) or 'other specially protected' (OS). Commonwealth and/or State ministerial approval is required to impact threatened and specially protected fauna.

Native fauna that are not listed as threatened or specially protected, but are otherwise rare, under threat or poorly known, may be added to a Department of Biodiversity Conservation and Attractions (DBCA) priority list. Priority fauna are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority 4' (P4). Priority listing does not afford direct statutory protection. However, the classification of priority species is taken into account during State and Local government approval processes.

Introduced fauna that are regarded as having negative environmental or economic impacts may be listed as a 'declared pest' pursuant to the *State Biosecurity and Agriculture Management Act 2007* (BAM Act). Management of declared pests may be required during government approval processes.

Further information on legislation and policy relevant to fauna assessments is provided in **Appendix A**.

1.3 Scope of work

The scope of work was specifically to undertake a terrestrial vertebrate fauna assessment to the standard required of a 'basic' fauna survey and a 'targeted' bird and bat survey with reference to the Environmental Protection Authority's (EPA's) technical guidance (EPA 2020).

As part of this scope of work, the following tasks were undertaken:

[1] Currently there are no threatened species listed as extinct in the wild in Western Australia.

- Desktop study to provide contextual information and determine the likelihood of occurrence of threatened, specially protected and priority fauna.
- Field survey to record fauna and fauna habitats with a particular focus on habitat for threatened and priority fauna species.
- Analysis and mapping of contextual information, fauna habitat and black cockatoo breeding, roosting and foraging (if present).
- Bird surveys at fixed points within the site.
- Deployment of ultrasonic bat detector devices within the site.
- Documentation of the desktop study, methods, results, discussion and conclusions.

2 Desktop Study

2.1 Site context

2.1.1 Location and extent

The site is located in the Shire of Dandaragan in the Geraldton Sandplains region of Western Australia and extends over 8529.8 hectares (ha) as shown in **Figure 1**. The site is bounded by a mix of agricultural land and remnant native vegetation to the north and east, Badgingarra National Park and Cadda Road to the south and Yerramullah Road to the west. The site includes road reserves, namely Cowalla road (both sides), Yerramullah Road (eastern side only), Cadda Road (northern side only) and the Cowalla Road and Brand Highway intersection.

2.1.2 Climate

The South West region of Western Australia experiences a Mediterranean climate of hot dry summers and cool wet winters (BoM 2023). Recent rainfall at the closest weather station to the site has been inconsistent with long term averages **Plate 1** (BoM 2023). Targeted surveys should be undertaken during the season that is most suitable for detection and identification of the targeted species (EPA 2020).

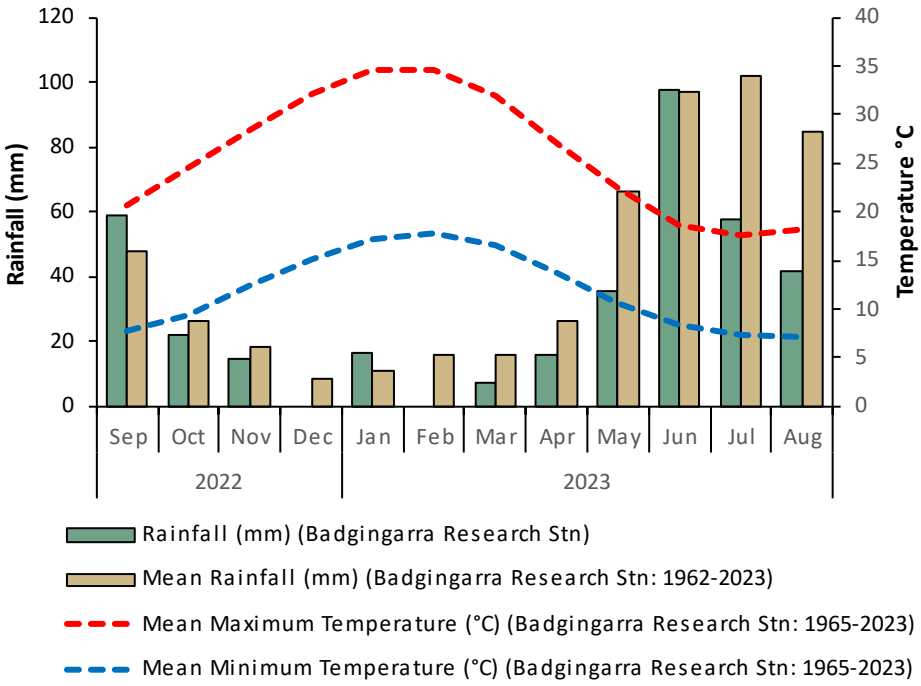

Plate 1: Recent rainfall and long-term mean temperature and rainfall

2.1.3 Geomorphology and soils

Landform and soils influence fauna habitat and species at regional and local scales. The site occurs on the Geraldton Sandplains in the Lesueur Sandplain subregion, which is the geomorphic unit that

characterises the region spanning from Dongara in the north to Greenhead in the south and spanning inland to Badgingarra (CALM 2003). This region is characterised by an undulating lateritic sandplain mantling Permian to Cretaceous strata with areas of coastal aeolian sands and limestone. Alluvial outwash plains exist in areas of valleys and hills (Purdie *et al.* 2004).

Soil landscape mapping from the Department of Primary Industries and Regional Development (DPIRD) is summarised below in **Table 1** and shown in **Figure 2** (DPIRD 2019).

Table 1: Soil landscape mapping within the site.

Soil landscape mapping unit	Description
Yerramullah 1 Subsystem	Laterite plateau residual; shallow gravel, shallow sand over duricrust, sandy gravels
Yerramullah 2 Subsystem	Plateau residuals, very gently to gently inclined hillcrest and hillslopes; pale sandy gravels, shallow gravel over duricrust, gravelly pale deep sand, pale and yellow deep sands
Yerramullah 3 Subsystem	Colluvial slopes and some plateau remnants, very gently to gently inclined hillslopes and sand filled minor valleys; pale and yellow deep sands, pale sandy gravels, shallow gravel over duricrust, some sandy duplexes and sandy earths
Yerramullah 4 Subsystem	Plateau residuals, complex of Ye2 and Ye3; pale sandy gravels, gravelly pale deep sand, shallow gravel over duricrust, pale deep sand, some sandy duplexes, yellow deep sand
Yerramullah 6 Subsystem	Colluvial slopes, very gently to gently inclined mid to lower hillslopes and sand filled minor valleys; pale deep sand, some sandy duplexes and shallow sand over pan or bog iron
Yerramullah 9 Subsystem	Narrow alluvial flats of minor creeks; pale to brown deep sands, sandy and loamy duplexes, shallow sand over pans
Mintaja Hills System	Rises and low hills on sedimentary rocks north and south of the Mount Lesueur area. Variable soils including red/brown non-cracking clays, brown loamy earths, and grey/brown shallow loamy duplexes. Woodlands.
Nylagarda 1 Subsystem	Drainage line and adjacent very gently inclined footslopes; mainly sandy duplexes, brown deep sand and brown sandy earth

The site is not known to contain any restricted landforms or unique geological features.

2.1.4 Topography

The elevation of the site ranges from 94 m in relation to the Australian height datum (mAHD) in the north-western corner to 278 mAHD in the centre (DoW 2008) (**Figure 2**).

2.1.5 Hydrology and wetlands

Wetlands are areas of seasonally, intermittently or permanently waterlogged land such as poorly drained soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries (Wetlands Advisory Committee 1977). Many wetlands provide important fauna habitat and support high levels of fauna biodiversity and endemism.

Wetlands of national or international significance may be afforded special protection under Commonwealth or international agreements. Review of the *Ramsar List of Wetlands of International Importance* (DBCA 2017) and *A Directory of Important Wetlands in Australia – Western Australia* (DBCA 2018) indicates that no Ramsar or listed 'important wetlands' are located within or near the site.

Examination of the Department of Water and Environmental Regulation (DWER) hydrography linear dataset (DWER 2018) shows the following 43 wetland or water related features occur within the site:

- 16 earth dams
- 18 watercourses - minor, non-perennial
- 9 unnamed hydrological features

The *Geomorphic Wetlands of Cervantes Eneabba* dataset maps geomorphic wetland features and classifies them based on their landform shape and water permanence (DBCA 2023a). Each wetland feature is classified according to their host landform and hydroperiod.

A review of the *Geomorphic Wetlands, Cervantes Eneabba* dataset indicated that one dampland wetland feature (Unique Feature Identifier (UFI) 581) occurs within the central northern side part of the site and one non-classified wetland feature (UFI 258) occurs in the south-western part of the site (DBCA 2023a).

The location of the hydrological features and geomorphic wetland mapped in the site are shown in **Figure 2.**

2.1.6 Regional vegetation

Vegetation types and resulting fauna habitats strongly influence the diversity and composition of fauna taxa present within an area. Native vegetation is described and mapped at different scales in order to illustrate patterns in its distribution. At a continental scale the *Interim Biogeographic Regionalisation of Australia* (IBRA) separates the Geraldton Sandplains into three floristic regions (Environment Australia 2000).

The site is contained within the 'GES02' or Lesueur Sandplain subregion, which is characterised as mainly containing *Acacia-Casuarina* thickets further inlands and *Eucalyptus loxophleba* on hard-setting loams (Beard 1990).

Variations in native vegetation can be further classified based on regional vegetation mapping. Beard *et al.* (2013) mapping shows the site as comprises vegetation association 'Lesueur 1034' which is described as 'medium woodland; marri and wandoo' and 'Lesueur 1031' which is described as 'mosaic: shrublands; hakea scrub-heath/shrublands; dryandra heath'.

2.1.7 Historic land use

Review of historical images available from 2000 onwards shows that the majority of the site was cleared of native vegetation prior to 2000, mostly for grazing and cropping as well as some residential uses (WALIA 2023)

2.1.8 DBCA managed or legislated land

DBCA has tenure of or interests in numerous areas of land across the state for a range of purposes. Tenure categories include national parks, nature reserves, conservation parks, marine parks, marine nature reserves, marine management areas, section 5(1)(g) reserves, state forest and timber reserves. These areas are mapped within the *Legislated Lands and Waters* (DBCA 2021b) and *Lands of Interest* (DBCA 2021a) datasets. The *Legislated Lands and Waters* (DBCA 2021b) dataset includes

lands subject to the following legislation; the *Conservation and Land Management Act 1984* (CALM Act 1984), *Swan and Canning Rivers Management Act 2006* (SCRM Act) and lands identified under the *Land Administration Act 1997* (LA Act). The *Lands of Interest* (DBCA 2021a) dataset includes all other lands of which DBCA is recognised as the manager but is not vested under any act. These lands comprise of crown land and freehold land which DBCA has been acknowledged by the Department of Lands as the responsible agency.

Two areas of DBCA managed or legislated lands or lands of interest occur adjacent to the site (DBCA 2021b). Badgingarra National Park lies adjacent to the southern border of the site and extends to the south and east. Hill River Nature Reserve lies adjacent to the north-eastern corner of the site and extends along Hill River. These features are shown in **Figure 3**.

2.1.9 Threatened, specially protected and priority fauna

The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) has compiled various datasets relating to 'matters of national environmental significance' (MNES) (DCCEEW 2023b). The *Protected Matters Search Tool* provides general guidance on threatened and specially protected fauna listed under the EPBC Act that may occur within a location based on validated records and less reliable unvalidated habitat distribution modelling (DCCEEW 2023b).

DBCA's *Threatened and Priority Fauna* database and *NatureMap* database, as well as the spatial portal of the Atlas of Living Australia (ALA) contain records of threatened specially protected and priority fauna in Western Australia (ALA 2023; DBCA 2023c, b). Searches of these databases provide point data for threatened, specially protected and priority fauna within a location, comprising validated and historical unvalidated records.

A search was initially conducted for fauna species that have been recorded within a 20 km radius of the site using the *Protected Matters Search Tool* (DCCEEW 2023b), *NatureMap* (DBCA 2023b), DBCA's conservation significant fauna database (reference no. FAUNA7936), Atlas of Living Australia (ALA 2023) and literature references.

A total of 932 fauna species were identified from database searches as occurring or potentially occurring within 50 km of the site[2] as listed in **Appendix B.**

2.1.10 Pest fauna

The term 'pest fauna' can refer to any animal that requires some form of action to reduce its effect on the economy, the environment, human health and amenity. Pest fauna species are generally not native but some Australian or Western Australian fauna may also be considered pests.

A particularly invasive or detrimental pest species may be listed as a 'declared pest' pursuant to Western Australia's *Biosecurity and Agriculture Management Act 2007* (BAM Act), indicating that it warrants special management to limit its spread. Current pest status and control categories for Western Australia are provided in the *Western Australian Organism List* (DPIRD 2022). Further information on categories of declared pests is provided in **Appendix A**.

[2] Includes native and non-native species

2.1.11 Previous surveys

Brett Lane & Associates Pty Ltd. previously conducted a fauna assessment and targeted bird and bat survey of the site and wider Badgingarra area for the now developed Badgingarra wind farm (Brett Lane & Associates Pty Ltd 2008). The survey found that the site comprised mostly of cleared pasture land with little to no value to fauna as well as some planted eucalyptus, heathland and woodland habitats which supported a variety of native wildlife. Carnaby's black cockatoo were recorded during the survey in all habitats but showed preference for heathland areas. No threatened species of mammals, reptiles or frogs were recorded within the site, and all bats found were common and widespread species.

Astron Environmental Services conducted a 'level 1' (now referred to as a 'basic') fauna survey within the site and areas to the south and east in 2015 (Astron environmental Services 2016). The survey recorded one threatened species (Carnaby's black cockatoo (EN)), one previously specially protected species (rainbow bee-eater (MI), now marine) and one priority species (western brush wallaby (P4)). Astron environmental Services (2016) stated that large areas of vegetation in the local area provided high value foraging resources for Carnaby's black cockatoo.

Ecoscape conducted Carnaby's black cockatoo and bird monitoring at the established Badgingarra wind farm in February-April and July 2019 (Ecoscape 2019). Bird utilisation and abundance surveys found a statistically significant difference in both general bird and Carnaby's black cockatoo count data in both wind farm and reference sites, with presence of all bird species higher in reference sites by up to 90%. In total, 83 Carnaby's black cockatoos and 559 other birds were observed in sites with turbines and 840 Carnaby's cockatoos and 7,026 other birds were recorded in the reference sites.

2.2 Likelihood of occurrence

The distribution and habitat preferences of the threatened and priority fauna species listed in **Appendix B** was reviewed against site context information described in **Section 2.1**. Likelihood of occurrence of threatened, specially protected and priority fauna species within the site was classified as 'high', 'moderate', 'low', 'negligible' or 'nil' as outlined in **Table 2**.

Table 2: Likelihood of occurrence assessment categories and definitions

		Reliable record[1]		Unreliable record[2]
		Access to site not impeded	Access to site impeded	
Habitat	Suitable	High	Low	Nil
	Potentially suitable	Moderate		
	Unsuitable	Negligible		

[1]Reliable record defined as DBCA or validated ALA record from the last ~20 years, [2]Unreliable record defined as record >20 years old or PMST prediction.

One threatened, two specially protected and four priority species were classified as having a 'high' or 'moderate' likelihood of occurrence. The legislative or policy status and habitat preferences of these species are shown in **Table 3**.

The remainder of the conservation significant fauna species identified in the desktop assessment (32 species) were considered as having a 'low', 'negligible' or 'nil' likelihood of occurrence. Refer to **Table 3** and **Appendix C** for detail on individual species likelihood of occurrence.

Table 3: Summary of conservation significant fauna species with potential to occur in the site

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Birds				
Apus pacificus	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities
Falco peregrinus	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of *Pinus* spp. Attracted to seeding *Banksia* spp., *Dryandra* spp., *Hakea* spp., *Eucalyptus* spp., *Corymbia calophylla*, *Grevillea* spp., and *Allocasuarina* spp.
Invertebrates				
Hylaeus globuliferus	Woollybush bee	P3	-	Males are territorial and may be found perched on the growing tips of *Adenanthos* sp., *Banksia* sp. or *Jacksonia* sp. Has also been recorded visiting the flowers of *Grevillea* sp.
Idiosoma gardneri	Mt Lesueur shield-backed trapdoor spider	P2	-	Only one recorded specimen. Found in Lesueur National Park, likely has similar biology to *Idiosoma sigillatum*.
Mammals				
Notamacropus irma	Western brush wallaby	P4	-	Dry sclerophyll forest, *Banksia* spp. woodlands and shrublands, typically favouring dense low vegetation that provides dense cover.
Reptiles				
Neelaps calonotos	Black-striped snake	P3	-	Coastal and near-coastal dunes, sandplains supporting heathlands and *Banksia* spp. woodlands.

2.3 Black cockatoos

Three threatened species of black cockatoo occur in the south-west of WA (referred to herein collectively as 'black cockatoos'):

- *Zanda*[3] *latirostris* (Carnaby's black cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Zanda*[3] *baudinii* (Baudin's black cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) which is listed as 'vulnerable' under the EPBC Act and the BC Act.

[3] Previously *Calyptorhynchus*

Black cockatoo habitat is conventionally separated into breeding, roosting and foraging categories. **Breeding habitat** refers to 'habitat trees' which consist of native trees of a suitable species that either contain nesting hollows or have a large enough diameter at breast height[4] (DBH) to develop a nesting hollow over time (DAWE 2022). Black cockatoos typically utilise breeding habitat within their defined breeding season: August to March for Baudin's black cockatoo, July to December for Carnaby's black cockatoo and throughout the year for forest red-tailed black cockatoo, with peaks in April – June and August – October (DAWE 2022). **Roosting habitat** consists of a stand of tall trees (>8 m) within 6 km of water and food resources and 12 km of additional foraging resources where black cockatoos rest overnight (Shah 2006; Glossop *et al.* 2011; Le Roux 2017; DAWE 2022). **Foraging habitat** is vegetation that black cockatoos are known to feed on, which varies between black cockatoo species (Groom 2011; Johnstone *et al.* 2011; DAWE 2022). A full range of foraging plants and their foraging category assigned by Emerge Associates is available in **Appendix D**.

A review of black cockatoo datasets was undertaken as outlined in **Table 4** and shown in **Figure 4**. Further information on black cockatoo habitat is available in **Appendix A**. Counts for all known black cockatoo roosts within 12 km are available in **Appendix E**.

Table 4: Summary of black cockatoo background review

Category	Black cockatoo site context			Source
	Carnaby's	Baudin's	Forest red-tailed	
Site located within species distribution	Yes	No	No	(DAWE 2022)
Site in known breeding distribution	Yes	N/A	N/A	(DAWE 2022)
Site is located within 12km of a confirmed or possible breeding site	No	N/A	N/A	(Glossop *et al.* 2011)
Site located in important bird area	No	N/A	N/A	(DPaW 2013; BirdLife International 2022)
Known roosts occur within site^	N/A		N/A	(Peck *et al.* 2019)
Known roosts occur within 12 km of site^	6		N/A	
Potential foraging habitat within site	Yes	N/A	N/A	(Forest Products Commission 2020; Emerge Associates 2021)
Potential foraging habitat in local area (including pine plantations)	Yes	N/A	N/A	

^'White-tailed black cockatoo roosts can be Carnaby's black cockatoo and/or Baudin's black cockatoo.

[4] ≥50 cm or ≥30 cm for wandoo or salmon gum

3 Methods

3.1 Field survey

Two zoologists from Emerge visited the site from 18 September 2023 to 22 September 2023 to conduct the basic fauna survey and a targeted bird and bat survey field survey. Additionally, the portion of the site associated with the intersection of Cowalla Road and Brand Highway was surveyed on 25 September 2024.

3.1.1 Active and opportunistic searches

Transects were traversed across the site during the day to evaluate the fauna habitat and record the presence of fauna species. Fauna habitat was assessed based on vegetation condition, the overall disturbances to the area and the microhabitat characteristics such as soil type and leaf litter density as well as the presence of logs, rocks, leaf litter and water. An opportunistic fauna list was compiled which included evidence of species presence such as tracks, scats, skeletal remains, foraging evidence and calls.

3.1.2 Cameras

Five non-baited motion-sensor cameras (Acorn Ltl-5310) were placed across the site for between 2-4 nights/3-5 days. Cameras were located within habitat types likely to support ground dwelling fauna that may not have been observed during active and opportunistic searches.

The dates and coordinates of each camera is provided in **Appendix F**. The location of each fauna camera sampling site is shown in **Figure 5**.

3.1.3 Black cockatoos

The site was traversed and the presence of potential black cockatoo breeding, night roosting and foraging habitat was recorded. If observed, the presence of black cockatoos within or near the site was noted. Active searches for evidence of breeding, roosting and foraging activity such as chew marks, branch clippings, droppings, moulted feathers and chewed marri or banksia fruit were conducted.

3.1.3.1 Breeding habitat

Breeding habitat was identified as vegetation with native eucalypts that met the required DBH (≥50 cm for suitable species or ≥30 cm for wandoo or salmon gum). Individual habitat trees within each patch of vegetation were not recorded.

3.1.3.2 Roosting habitat

Roosting habitat was identified as groups of tall native and non-native trees. The presence of active or historical roosts in these trees was determined through evidence of roosting activity, such as branch clippings, droppings or moulted feathers.

Tall groups of native and non-native trees in the site within 1,000 m of an existing large roost (>150 individuals) or 500 m of an existing small roost (<150 individuals) were assumed to be associated with that roost (Glossop *et al.* 2011).

3.1.3.3 Foraging habitat

Foraging habitat was identified by assessing vegetation in the site for plant species known to provide food for black cockatoos (Davies 1966; Saunders 1980; Johnstone and Storr 1998; Johnstone and Kirkby 1999; Groom 2011; Johnstone *et al.* 2011; DAWE 2022).

Foraging habitat was classified as either 'native' or 'non-native' based on the predominant vegetation's naturalised status. It was also classified as either 'primary' or 'secondary' based on black cockatoo foraging preferences. Primary food plants were defined as those with historical and contemporary records of regular consumption by a black cockatoo species. Secondary food plants were defined as plants that black cockatoo species have been recorded consuming occasionally or that, based on their limited extent or agricultural origin, should not be considered a sustaining resource. A list of plant species classified as primary or secondary food plants is provided as **Appendix D**.

Each patch of foraging habitat was assigned a foraging value for each species of black cockatoo likely to occur within the site. As it is not always possible to separate out food plants from non-food plants, mapped foraging habitat may also include vegetation comprising non-food plants. The proportion of non-food plants in mapped foraging habitat was minimised as far as practicable.

Evidence of black cockatoo foraging, such as chewed fruits, was searched for within the site and allocated to a black cockatoo species where possible.

3.1.1 Birds

Bird utilization surveys were undertaken using six fixed-point samples. Survey locations were selected based on areas where wind turbines were most likely to be situated and areas with the highest elevation. Locations aligned with the pre-development bird surveys for the Badgingarra wind farm (Brett Lane & Associates Pty Ltd 2008).

Each survey was 15 minutes in duration and consisted of a count of all birds identified within positive identification range (approximately 200-300 m radius) from the sample location. Birds were identified to species level by sight or call. Each site was sampled for four consecutive days and sampled at a different time of the day to account for variation in movements of species over the course of the day. Each bird species recorded was classified into one of the following three broad height categories according to the height at which the species was frequently observed:

- Height Category 1 (HC1) – Predominantly observed flying above canopy height.
- Height Category 2 (HC2) – Predominantly observed flying at canopy height.
- Height Category 3 (HC3) – Predominantly observed flying below canopy (in shrubs or crop/grasses)

Notes on the weather and survey time were also taken for each site.

The locations of bird utilisation survey sampling sites are shown in **Figure 5**.

3.1.2 Bats

Bat echolocation calls were recorded using two bioacoustics recorders (Wildlife Acoustics Song Meter SM4BAT FS). The devices were placed in locations where bats were considered most likely to occur, mostly in remnant intact vegetation and woodland habitats which contained suitable bat foraging species.

Each device was programmed to record ultrasonic sound from 30 minutes pre-dusk to 30 minutes post-dawn. Each device was placed at two locations for one night each.

The dates and coordinates of each bat detector survey is provided in **Appendix G**. The locations of sampling sites are shown in **Figure 5**.

3.2 Data analysis

3.2.1 Fauna identification

Fauna observed during the survey were identified in the field where possible. Photographs and/or noted observations were recorded on unknown species and they were later identified through the use of taxonomic keys and field guides.

3.2.1.1 Nomenclature and sources of information

Taxonomy and nomenclature of scientific and common names for mammals, reptiles and amphibians follow *the Western Australian Museum* (WAM) *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* (WAM 2022). For birds taxonomy and nomenclature of scientific and common names follows the Australian Faunal Directory (AFD) (DCCEEW 2023a). Where common names were not provided by the WAM or the AFD, these have been derived from other sources as noted.

Literature listed in **Appendix A** represent the main publications used to identify fauna species and habitats within the site.

3.2.2 Fauna habitat

Fauna habitats were described according to the dominant flora species and vegetation type present, as determined from observations made during the field survey and information provided in the '*Detailed Flora and Vegetation Assessment*' (Emerge Associates 2024). Significant microhabitat features present in each habitat were also described.

The identified fauna habitats were mapped on aerial photography with the boundaries interpreted from aerial photography, Emerge Associates (2024) plant communities and notes taken in the field.

3.2.3 Black cockatoo habitat

3.2.3.1 Breeding and roosting habitat

Breeding and roosting habitat was mapped using notes taken in the field.

3.2.3.2 Foraging habitat value

Foraging habitat was described according to the dominant flora species or vegetation type present and mapped using boundaries interpreted from aerial photography and notes taken in the field. The foraging value of each patch of foraging habitat was attributed separately for each species of black cockatoo likely to occur in the site. Foraging value was assigned as outlined in **3.1.1.3**.

3.2.4 Birds

Total bird counts from across all fixed-point bird survey sites were tallied according to site number. The height category of each species observed during fixed-point and opportunistic surveys was refined to reflect their maximum flight height according known biology from literature sources and survey observations.

3.2.5 Bats

Recordings were analysed by experienced zoologist Brenden Metcalf by comparing calls recorded in the site to established bat call libraries using Kaleidoscope Pro Analysis Software (Wildlife Acoustics 2023).

3.3 Survey limitations

It is important to note the specific constraints imposed on surveys and the degree to which these may have limited survey outcomes. An evaluation of the survey methodology against standard constraints outlined in the EPA's document *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) is provided in **Table 5**.

Table 5: Evaluation of survey methodology against standard constraints outlined in the EPA's Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)

Constraint	Degree of limitation	Details
Level of survey	No limitation	A basic survey (desktop study and field survey) in combination with a targeted bird and bat survey was undertaken. The level of survey and survey effort are considered adequate to assess the fauna habitat values within the site, in addition to providing baseline bird and bat data.
Scope	No limitation	The survey focused on vertebrate fauna and habitat values, with particular focus on conservation significant taxa with potential to occur within the site.
Proportion of fauna identified, recorded and/or collected.	No limitation	All observed vertebrate fauna were identified.
Sources of information e.g. previously available information (whether historic or recent) as distinct from new data.	No limitation	Adequate information was available from database searches, previous surveys and literature references.

Table 5: Evaluation of survey methodology against standard constraints outlined in the EPA's Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020) (continued)

Constraint	Degree of limitation	Details
The proportion of the task achieved and further work which might be needed.	Minor limitation	The task was achieved in its entirety. The targeted bat and bird survey data is preliminary and likely to require multi season/year surveys.
Experience level of personnel	No limitation	This fauna and black cockatoo assessment was undertaken by qualified zoologists with over four and two years of zoological experience in Western Australia. Technical review was undertaken by a senior environmental consultant with over 15 years' experience in environmental science in Western Australia.
Suitability of timing, weather and season	No limitation	Survey timing is not considered to be of great importance for basic fauna assessments but the weather conditions during the survey were ideal for detecting fauna species. Carnaby's black cockatoos migrate south from the Badgingarra region to the northern Swan Coastal Plain in the summer months. The survey was therefore undertaken outside any periods of migration for black cockatoos (Johnstone *et al.* 2008). No night surveys were undertaken to observe nocturnal bird species.
Completeness	No limitation	The desktop assessment, field survey and targeted black cockatoo components of the survey were completed comprehensively.
Spatial coverage and access	No limitation	Site coverage was comprehensive (track logged).
	No limitation	All parts of the site could be accessed as required.
Survey intensity	Minor limitation	The intensity of the survey was adequate given the size of the site and the relatively low habitat value present. Due to errors in each bat audio detector only one night of sampling was achieved at each location.
Influence of disturbance	No limitation	The site is highly modified due to historical disturbance.
Adequacy of resources	No limitation	All resources required to perform the survey were available. No federal or state guidelines for wind farm surveys exist at the survey. The guidance currently available from Commonwealth and State agencies on the assessment of black cockatoo habitat is limited and relies heavily on technical experts preparing their own methodology. This assessment applies an internally developed methodology that is considered to provide a systematic and balanced characterisation of black cockatoo habitat.
Compliance with EPA (2020) guidance	Minor limitation	The EPA guidance requires that a full list of all fauna species with potential to occur within the site is compiled. As part of this assessment a comprehensive list of fauna species of conservation significance was compiled. Non-conservation taxa with potential to occur within the site were not compiled into a list but are provided as raw data in **Appendix B**. Given that all species with potential to occur within the site are still identified within the relevant appendices this is not considered to affect the outcomes of this assessment.

4 Results

4.1 Fauna

4.1.1 Species inventory

A total of 58 native and eight introduced fauna species, were directly or indirectly (from foraging evidence) recorded during the field survey. This includes three species recorded from camera capture events which are shown in **Plate 2** to **Plate 4**: *Dromaius novaehollandiae* (emu), *Macropus fuliginosus* (western grey kangaroo) and *Tarsipes rostratus* (honey possum).

Plate 2: Capture event of emu at camera site 3

Plate 3: Capture event of western grey kangaroo at camera site 4

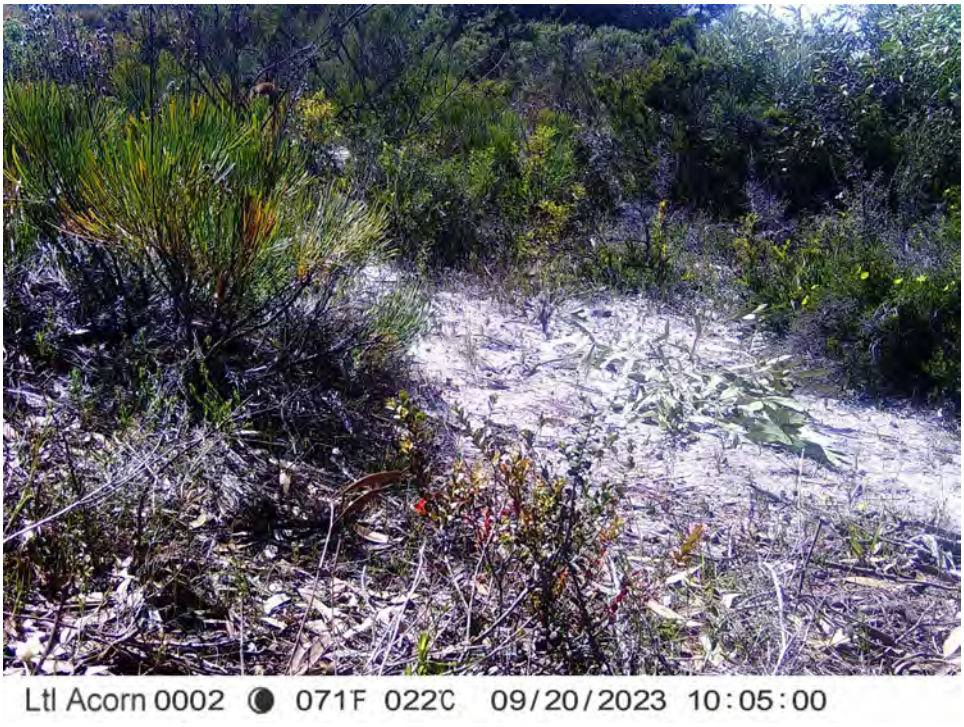

Plate 4: Capture event of honey possum at camera site 4

A complete species list is provided in **Appendix H**.

4.1.2 Threatened, specially protected and priority fauna

One threatened species was recorded within the site during the field survey: *Zanda latirostris* (Carnaby's black cockatoo (EN)).

4.1.3 Declared pests

Three species listed as a declared pest (C3) pursuant to the BAM Act, *Oryctolagus cuniculus* (rabbit) and *Vulpes vulpes* (fox) and *Sus scrofa* (pig), were identified from scats and diggings within the site.

4.2 Fauna habitat

10 broad fauna habitats were identified within the site, as listed in in **Table 7**.

A description, the size of the area and a representative photograph of each habitat is provided in **Table 7**. The location of each habitat is shown on **Figure 6**.

Table 6: Fauna habitats within the site

Fauna habitat	Description	Total area (ha)	Proportion of site (%)	Representative photograph
Agricultural vegetation	Planted **Chamaecytisus palmensis*. Value of habitat varies across the site with some locations densely vegetated, others planted more recently in rows and with an open structure and some locations intermixed with broken woody debris and dead vegetation. • Value to fauna varies dependent on vegetation cover and structure. • Low microhabitat complexity. • Areas with more dense vegetation may provide habitat for larger mammals as well as common and widespread avifauna	738.07	8.65	
Bare ground and pasture	Mostly cleared or low non-native (weed) grassland paddocks used for sheep grazing. Includes farm laneways, firebreaks and cleared areas around infrastructure (houses, sheds etc.). • Provides little to no value for most fauna • Low microhabitat complexity • May be utilised by raptor species hunting for lambs, mice and rats in the paddocks • Used by livestock • Some avifauna may traverse across this habitat to move to more intact native vegetation	7247.94	84.97	

Table 6: Fauna habitats within the site (continued)

Fauna habitat	Description	Total area (ha)	Proportion of site (%)	Representative photograph
Dams	Permanent or semi-permanent water features. Mostly agricultural dams built adjacent to wetland areas to service livestock. • Most likely used by widespread and common avifauna, amphibia and introduced mammals and livestock. • Higher quantity of invertebrate species including *Cherax destructor*.	2.31	0.03	
Eucalypt woodland	Dense woodland of native *Eucalyptus* spp. trees over mixed native shrub and understory species. • Moderate microhabitat complexity (woody debris, burrows, runnels, fallen logs, leaf litter). • Canopy and dense shrub layer likely supports an array of common and rarer avifauna. • Denser understory areas combined with soft soils are likely to support ground dwelling fauna and reptiles. • Connectivity with intact roadside vegetation outside of the site.	19.58	0.23	

Table 6: Fauna habitats within the site (continued)

Fauna habitat	Description	Total area (ha)	Proportion of site (%)	Representative photograph
Laterite hills and breakaways	Native shrubland vegetation on laterite breakaways and hills. Includes some smaller hills in paddocks which are mostly grazed and have lower cover of shrubs. • Moderate microhabitat complexity for most areas (details) • Low microhabitat complexity in smaller hills in paddocks. • Provides habitat for smaller shrub-dwelling birds and some raptor species as well as small reptiles. Larger mammals may traverse through these sites. • Used by livestock.	71.76	0.85	
Open forest	Open Eucalyptus spp. forest of mostly non-native, planted trees interspersed with some native species. Heavy disturbance from vehicle tracks and livestock grazing. • Low microhabitat complexity. Some fallen woody debris and sandy patches with reptile burrows. • Utilised by common and widespread avifauna and livestock.	120.68	1.41	

Table 6: Fauna habitats within the site (continued)

Fauna habitat	Description	Total area (ha)	Proportion of site (%)	Representative photograph
Plateau	Native shrubland located on a rocky laterite plateau. • High microhabitat complexity (woody debris, rocky outcroppings, small caves, dense shrubs, burrows). • Likely utilised by a broad fauna assemblage including most avifauna not requiring canopy, mammals and reptiles. • Fenced with few livestock incursions. • Connectivity with sandplain woodland habitat as well as high value vegetation outside the site.	58.75	0.69	
Riparian and wetland vegetation	Riparian vegetation surrounding water features or growing in seasonally inundated drainage lines. • Moderate microhabitat complexity. Some woody debris, dense understory vegetation, water features (puddles, drainage line, muddy terrain). • Species are likely to move between this habitat and dams and water features. • Use mostly by widespread and common avifauna, amphibia and likely introduced mammals and livestock. • Where not fenced, areas are frequented by livestock for shade.	22.89	0.27	

Table 6: Fauna habitats within the site (continued)

Fauna habitat	Description	Total area (ha)	Proportion of site (%)	Representative photograph
Sandplain	Open *Eucalyptus* spp. and *Proteaceae* woodland over native shrubs on sandy soils. • High microhabitat complexity (woody debris, burrows, runnels, fallen logs, leaf litter) • Denser areas may provide habitat for larger mammals and a wide assemblage of common and rarer avifauna as well as reptiles. • Largest areas of habitat fenced from livestock.	192.07	2.25	
Scattered trees and shrubs	Scattered native and non-native trees and shrubs over non-native grasses. Mostly associated with *Eucalyptus gomphocephala* in paddocks or along firebreak/laneway edges and remnant **Chamaecytisus palmensis* in paddocks. • Low microhabitat complexity • Utilised mostly by livestock for shade. Some common avifauna may use sparingly. • Poor connectivity with surrounding areas of vegetation. • Some *Pinus spp.* on the western edge of the site provide primary food resources for Carnaby's black cockatoo.	55.73	0.65	

4.3 Black cockatoo habitat

4.3.1.1 Breeding

A total of 185.86 ha of potential breeding habitat for Carnaby's black cockatoos was recorded within the site as shown in **Figure 7**.

Breeding habitat within the site comprised mostly of tuart, jarrah, marri, *Eucalyptus rudis* (flooded gum) and stag (dead) trees.

4.3.1.2 Roosting

A total of 185.86 ha of roosting habitat for Carnaby's black cockatoos was recorded within the site as shown in **Figure 7.**

No roosts or evidence of roosting were observed within the site during the survey.

4.3.1.3 Foraging

A total of 471.08 ha of foraging habitat for Carnaby's black cockatoo was recorded in the site as shown in **Figure 7**.

The extent of foraging habitat by value category is detailed in **Table 7**.

Table 7: Foraging habitat recorded within the site

Foraging habitat	Foraging habitat for Carnaby's black cockatoos (ha)
Primary native	279.65
Primary non-native	6.37
Secondary native	47.55
Secondary non-native	137.51
Total	471.08

4.4 Birds

A total of 32 bird species were observed across the six sample sites. A further 19 bird species were observed during the survey within the site but outside of the fixed-point bird survey sites.

Eleven species were observed from HC1, 12 species in HC2 and 29 species in HC3.

A summary count of the bird species observed across all fixed-point sites as well as all recorded opportunistic observations are shown in **Table 8** and a record of the average species abundance and richness across each site each day is show in **Appendix I** and **Plate 5.** Species richness across all sites is shown in **Plate 6.**

Table 8: Total number of bird species observed at each site across the total duration of the survey sorted according to most observed height category

Species name	Common name	Site and number of individuals observed						Opportunistic observations	Total
		1	2	3	4	5	6		
Height category 1									
Anas gracilis	Grey teal	0	0	0	0	0	0	X	N/A
Anas superciliosa	Pacific black duck	0	0	0	0	0	0	X	N/A
Aquila audax	Wedge-tailed eagle	0	0	0	0	1	0	X	1
Cacatua sp.	Corella sp.	0	0	0	0	0	25		25
Circus approximans	Swamp harrier	0	0	0	0	0	0	X	N/A
Chenonetta jubata	Australian wood duck	0	0	0	0	0	0	X	N/A
Egretta novaehollandiae	White-faced heron	0	0	0	0	0	0	X	N/A
Elanus axillaris	Black-shouldered kite	0	1	0	0	0	0	X	1
Falco cenchroides	Nankeen kestrel	0	3	2	1	2	2	X	10
Lophoictinia isura	Square-tailed kite	2	0	0	0	0	0	X	2
Threskiornis spinicollis	Straw-necked ibis	0	0	0	7	0	54	X	61
Height Category 2									
Artamus cinereus	Black-faced woodswallow	0	0	0	0	0	0	X	N/A
Barnardius zonarius	Australian ringneck	0	0	2	1	0	2	X	5
Cincloramphus cruralis	Brown songlark	18	26*	23*	15*	27*	17*	X	126*
Coracina novaehollandiae	Black-faced cuckoo shrike	2	0	0	0	1	2		5
Corvus bennetti	Little crow	0	0	0	1	0	0		1

Table 8: Total number of bird species observed at each site across the total duration of the survey sorted according to most observed height category (continued)

Species name	Common name	Site and number of individuals observed						Opportunistic observations	Total
		1	2	3	4	5	6		
Corvus coronoides	Australian raven	6	2	8	14	20	29	X	79
Cracticus nigrogularis	Pied butcherbird	1	1	1	4	2	0	X	9
Cracticus tibicen	Australian magpie	11	8	8	14	8	6	X	55
Eolophus roseicapilla	Galah	0	0	0	5	0	0	X	5
Grallina cyanoleuca	Magpie-lark	10	1	7	8	6	4	X	36
Hirundo neoxena	Welcome swallow	14	0	0	0	0	0	X	14
Manorina flavigula	Yellow-throated miner	0	0	6	12*	0	0		18*
Height Category 3									
Acanthiza chrysorrhoa	Yellow-rumped thornbill	0	0	0	0	0	0	X	N/A
Anthochaera carunculata	Red wattlebird	0	0	0	2	0	0	X	2
Anthus novaeseelandiae	Australian pipit	16*	3	2	10	7	5	X	43*
Chrysococcyx basalis	Horsfield's bronze-cuckoo	2	0	1	0	0	0	X	3
Cacomantis flabelliformis	Fan-tailed cuckoo	1	0	3	0	0	0	X	4
Cincloramphus mathewsi	Rufous songlark	3	0	6	0	0	0	X	9
Colluricincla harmonica	Grey shrikethrush	0	0	0	0	0	0	X	N/A
Coturnix pectoralis	Stubble quail	13*	22*	13	9*	1	4	X	62*
Dromaius novaehollandiae	Emu	0	9	0	1	0	0	X	10

Table 8: Total number of bird species observed at each site across the total duration of the survey sorted according to most observed height category (continued)

Species name	Common name	Site and number of individuals observed						Opportunistic observations	Total
		1	2	3	4	5	6		
Epthianura albifrons	White-fronted chat	0	0	0	0	0	0	X	N/A
Gerygone fusca	Western gerygone	0	0	0	1	0	0	X	1
Gliciphila melanops	Tawny-crowned honeyeater	0	0	1	0	0	0	X	1
Lichmera indistincta	Brown honeyeater	3	0	9	5	0	0	X	17
Malurus assimilis	Purple-backed fairywren	0	0	0	0	0	0	X	N/A
Malurus leucopterus	White-winged fairywren	0	12	2	0	0	0	X	14
Malurus spendens	Splendid fairywren	0	0	0	0	0	0	X	N/A
Melithreptus brevirostris	Brown-headed honeyeater	0	0	0	0	0	0	X	N/A
Neophema elegans	Elegant parrot	0	0	0	0	0	0	X	N/A
Ocyphaps lophotes	Crested pigeon	0	0	1	0	0	0	X	1
Pachycephala rufiventris	Rufous whistler	0	0	1	0	0	0	X	1
Phaps chalcoptera	Common bronzewing	0	0	0	0	0	0	X	N/A
Phylidonyris niger	White-cheeked honeyeater	0	0	0	0	0	0	X	N/A
Rhipidura albiscrapa	Grey fantail	0	0	0	0	0	0	X	N/A
Rhipidura leucophrys	Willy wagtail	3	0	4	0	0	0	X	7
Sericornis maculatus	Spotted scrubwren	0	0	0	0	0	0	X	N/A

Table 8: Total number of bird species observed at each site across the total duration of the survey sorted according to most observed height category (continued)

Species name	Common name	Site and number of individuals observed						Opportunistic observations	Total
		1	2	3	4	5	6		
Smicrornis brevirostris	Weebill	0	0	0	0	0	0	X	N/A
Tachybaptus novaehollandiae	Australasian grebe	0	0	0	0	0	0	X	N/A
Vanellus tricolor	Banded lapwing	0	0	0	0	0	0	X	N/A
Zosterops lateralis	Silvereye	0	0	2	0	0	0		2

*Counts that were approximate for at least one of the bird survey days. Totals only counted for species observed during fixed-point bird surveys.

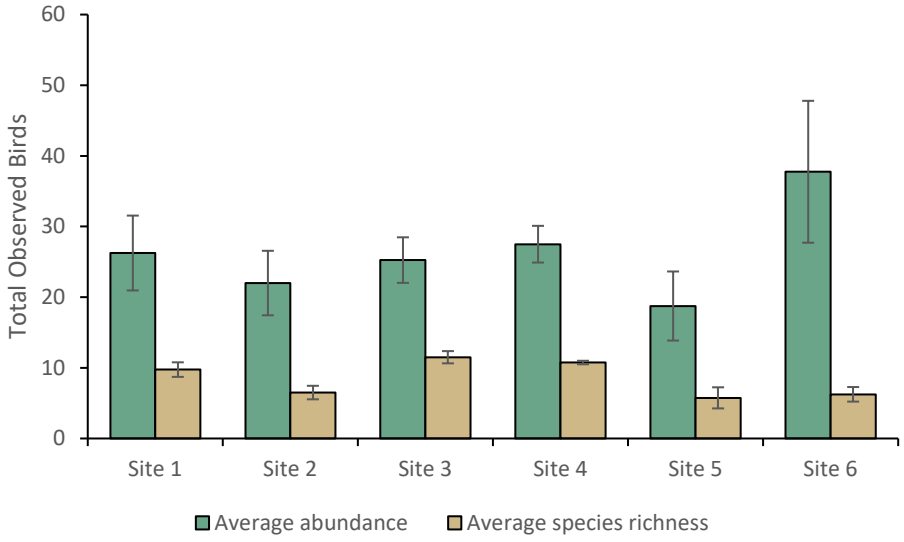

Plate 5: Average abundance and species richness across each site

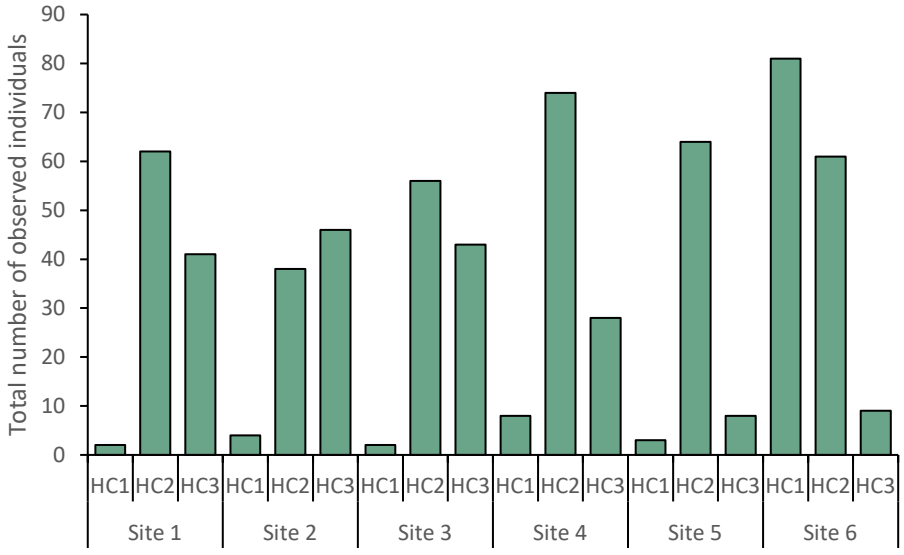

Plate 6: Total abundance across each height category in each site

4.5 Bats

Three bat taxa were recorded from three sample locations within the site. Site C did not record any bats.

The number of each species is shown in **Table 9**. A summary of the analysed data across all the recorders is provided in **Appendix G**.

Table 9: Bat species and relative abundance.

Species		Site and relative abundance			
Scientific name	Common name	A	B	C	D
Chalinolobus gouldii	Gould's wattled bat	22	1	-	132
*Nyctophilus spp.^*	Long-eared bats	22	4	-	-
Vespadelus regulus	Southern forest bat	9	10	-	5

^The *Nyctophilus* spp. calls were unable to be separated to species level but regional restrictions on the genus suggest it is likely *Nyctophilus geoffroyi*, lesser long-eared bat.

5 Discussion

5.1 Fauna

The 58 native fauna species recorded during the survey are mostly common in the region and were typically observed in areas of more intact vegetation with higher connectivity to nearby vegetation. The low number of amphibians and reptiles observed is a consequence of the low intensity nature of basic fauna surveys.

Two of the six introduced species are livestock farmed in the site. The three declared pests, European red fox, pig and rabbit, are widespread in farming regions of WA and therefore not unexpected. It is common practice by locals across WA farming regions to place *Cherax destructor* (common yabby) into dams and so presence of this species was also not unexpected.

5.1.1 Threatened, specially protected and priority fauna

Evidence of Carnaby's black cockatoo was recorded within the site and this species is discussed in **Section 5.3**.

Two specially protected and four priority species were considered to have a moderate likelihood of occurring in the site, as described below.

- The Pacific swift (MI) and peregrine falcon (OS) are highly mobile species that may opportunistically fly over or forage in the site for short periods of time as part of a much larger home range but are unlikely to perch. Neither of these species would breed within the site. Any occurrence of pacific swift or peregrine falcon in the site would likely be in the air space and largely independent from terrestrial habitat.
- The woollybush bee (P3) is a territorial native bee species which has two records approximately 14 km west of the site. The species has been recorded on *Adenanthos* sp., *Banksia* sp., *Jacksonia* sp. and *Grevillea* sp. These plant species were recorded in the site during the flora assessment (Emerge Associates 2024) and therefore the woollybush bee may occur in the sandplain and plateau habitats.
- Mt Lesueur shield-backed trapdoor spider (P2) is only known from one specimen in Lesueur National Park approximately 20 km north west of the site and is categorized as a data deficient species (Rix *et al.* 2018). Therefore, it is not possible to assess whether the species would occur in the site due to lack of information on its' ecology or record distribution. However, given trap door spiders of the *Idiosoma* genus are known to occur in banksia woodland and heathland soils, the sandplain habitat in the site may represent suitable habitat for the species.
- Records of the western brush wallaby (P4) occur within 20 km of the site and the species occupies dry sclerophyll forests, banksia woodlands and heath or shrubland vegetation (Christensen and Strahan 1984). The sandplain, plateau and fenced areas of the laterite hills and breakaways habitats represent suitable habitat for the species within the site and have some connectivity to surrounding vegetation of similar type and quality. The species may therefore be present, although only in the eastern or southern areas of the site with more intact native vegetation.

- Several records exist for the black-striped snake (P4) approximately 20 km south of the site in Wongonderrah Nature Reserve. The species is known to occur in sandplains and heathland vegetation. The sandplain, plateau and fenced laterite hills and breakaways habitats in the site may provide suitable habitat for this species.

5.2 Fauna habitat

The highest habitat values within the site are associated with the **sandplain**, **eucalyptus woodland**, **laterite hills and breakaways** and **plateau habitats**. These habitats have been subject to low levels of disturbance and supported the highest diversity of reptiles and bird species in the site, with many species recorded only within these habitats. Most of these habitats are connected to native vegetation outside of the site, including Badgingarra National Park. As such there is likely some level of movement by an array of species between these habitats and intact surrounding vegetation. Most of these habitats are fenced and undisturbed, except patches of the laterite hills and breakaways located within paddocks which are heavily degraded due to livestock use

Much of the **riparian and wetland vegetation** habitat is connected to the **dams** habitats. Species utilising the dams, frogs, water birds, invertebrates, are likely to rely on components of the **riparian and wetland vegetation** habitats including drainage to fill dams, insect and other prey species spawning, tall trees for roosting and inundated sedgelands for foraging. Some dams are isolated from surrounding vegetation and would provide little value to fauna.

The **open forest** and **agricultural vegetation** habitats are located in wooded portions throughout the site as isolated pockets of sparse forest vegetation. Due to the lack of understory and heavy disturbace they provide little value for most fauna aside from macrofauna like emus and kangaroos or common birds utilising the canopy. Carnaby's black cockatoo may use the areas of planted tuart for foraging and breeding/roosting.

The remainder of the site consists of the **scattered trees and shrubs** and **bare ground and pasture** habitats which provide limited value for native fauna. These habitats may be used by fauna for traversal between habitats but this would likely only occur where high quality habitats are relatively close, like in the north and south-eastern portions of the site. Raptors may utilise these habitats, as discussed in **Section 5.4**.

5.3 Black cockatoo habitat

Foraging evidence of Carnaby's black cockatoo in the form of chewed banksia fruits were observed during the survey in the sandplain habitat in the south of the site and many records exist for the species in the surrounding area (DBCA 2023c). The site lies within the northern part of the Carnaby's black cockatoo modelled distribution and breeding range which stretches to Eneabba, approximately 40 km north of the site (DoEE 2016).

The site is located outside of the modelled distribution range of Baudin's black cockatoo and forest red-tailed black cockatoo and so these species are not considered likely to occur and have not been discussed further (DoEE 2016).

5.3.1 Breeding and roosting

Approximately 2% of the site supports trees which may be suitable for breeding and roosting for Carnaby's black cockatoo as shown in **Figure 7**. Breeding and roosting habitat was mapped as areas which likely contain breeding trees (eucalypts with DBH >= 50cm) and/or roosting trees (eucalypts >10 m high). Breeding and roosting trees were not individually mapped. The number of habitat trees and presence of suitable hollows for Carnaby's black cockatoo breeding within these areas has not been determined and would require further survey.

5.3.2 Foraging

The site contains native foraging habitat for Carnaby's black cockatoo. The highest value foraging resource in the site is the primary native habitat due to the presence of *Banksia* spp. in the eastern portion and marri and pine trees scattered on the western edge.

The primary native foraging habitat in the eastern portion is close to Badgingarra National Park, which supports extensive foraging habitat and multiple records of Carnaby's black cockatoo (DBCA 2023c). It is likely that Carnaby's black cockatoo forage in the site in combination with other habitat in the region including Badgingarra National Park. The pine and marri trees are more isolated foraging resources but may still be used by Carnaby's black cockatoo as they move throughout the region.

The remainder of the site supports scattered lower value foraging habitat which may be occasionally used by Carnaby's black cockatoo and extensive areas of non-foraging vegetation.

5.4 Birds

The site provides little suitable habitat for most bird species due to being largely comprised of pastureland and planted agricultural vegetation. Habitat at each sample location was similar, being predominantly pasture adjacent to patches of native vegetation.

The highest value to birds was observed in the patches of native vegetation in the south-east of the site with a mixture of native bird species also recorded in the patches of planted tuart stands scattered throughout the site. These patches of vegetation were located on the edges of each of the fixed-point bird survey site and many of the HC2 and HC3 species observed during surveys were attributed to them. A much lower diversity of species and abundance of individuals was observed in the pasture area associated with each survey location. Some individuals were likely permanent residents as the same species and number of individuals were recorded across multiple days and habitats are relatively isolated.

There was little difference in individual abundance and species richness across each site, with one notable difference from **Plate 5** and **Plate 6** showing a large number of HC1 individuals in site 6, being attributed to a flock of corellas and a straw-necked ibis recorded on 19 and 21 September 2023.

The small number of species and individuals observed in HC1 was attributed to the five raptor species found across the site. Seventeen raptors occur within the region and vary in occurrence likelihood depending on distribution, habitat requirements and home ranges. Pastureland, particularly those with annual lambing seasons provide regular, reliable feeding sources for raptors, and so the presence of five common raptors was not unexpected.

The rest of the birds found throughout the site are common and widespread across the region and restricted to pasture/grasses and the high-quality fenced habitats.

The current survey was conducted at six of the XX locations established by Brett Lane & Associates Pty Ltd (2008) and recorded similar results in terms of bird abundance and species richness.

Some differences in methodology exist between the Brett Lane & Associates Pty Ltd (2008) survey and the current survey but comparison of the results is considered valid. The Brett Lane & Associates Pty Ltd (2008) survey was conducted in autumn as opposed to spring, though they noted similar weather conditions to those which occurred during the current survey period. Bird flight height was classified based on direct observations in Brett Lane & Associates Pty Ltd (2008), as opposed to the current survey using categories according to a combination of the species biology and field flight height. These two surveys provide a snapshot of the bird assemblage that occurs within the site over two brief periods 16 years apart. Further surveys would be required to account for seasonal and temporal variation which would likely occur in the site and region.

5.5 Bats

The three species of microbat recorded in the site are common and widespread across several regions in Australia. All species prefer roosting in old tree hollows and occasional utilise cliff overhangs. The open forest, plateau, laterite hills and breakaways, sandplain, eucalyptus woodland habitats in the site contain potential roosting spots for bat species and intact vegetation that supports an array of insect prey for them to feed on. A significant proportion of ridge and breakaway overhangs that may provide suitable roosting habitat contained feral honeybee hives, limiting their usability for bats. This was particularly prevalent in the **plateau** habitat which may contribute to the lack of recordings of bats from sample site C in this area.

6 Conclusions

Outcomes of the basic fauna assessment include the following:

- The site consists of 10 broad habitat types:
  - **Agricultural vegetation** (738.07 hectares (ha)): planted rows o*f Chamaecytisus palmensis*.
  - **Bare ground and pasture** (7247.94 ha): pastureland, paddocks, firebreaks and roads.
  - **Dams and water features** (2.31 ha): agricultural dams and drainage lines.
  - **Eucalyptus woodland** (19.58 ha): native canopy woodland with sparse understory.
  - **Laterite hills and breakaways** (71.76 ha): shrubby/heathy vegetation on rocky ridges and breakaways.
  - **Open forest** (120.68 ha): forest of mostly non-native trees with some native trees over cleared areas and non-native grassland.
  - **Plateau** (58.75 ha): native shrubland on a rocky laterite plateau.
  - **Riparian and wetland vegetation** (22.89 ha): riparian vegetation in areas with seasonal or permanent inundation.
  - **Sandplain** (192.07 ha): open *Eucalyptus* and *Proteaceae* woodland on sandy soils.
  - **Scattered trees and shrubs** (55.73 ha): scattered native and non-native trees with little to no understory.
- A total of 56 native fauna species were recorded within the site.
- One threatened species was recorded during the survey: Carnaby's black cockatoo (EN) under the *EPBC Act* and *BC Act*).
- Despite not being recording during the survey, the following species were considered to have a high or moderate likelihood of occurring within the site:
  - Pacific swift (MI)
  - peregrine falcon (OS)
  - woollybush bee (P3)
  - Mt Lesueur shield-backed trapdoor spider (P2)
  - western brush wallaby (P4)
  - black-striped snake (P4).

Outcomes of the targeted black cockatoo survey include the following:

- Foraging evidence attributed to Carnaby's black cockatoo was recorded in the site.
- The site occurs within the modelled distribution of Carnaby's black cockatoo but outside of the modelled distribution of forest red-tailed black cockatoo and Baudin's black cockatoo.
- The site contains 185.86 ha of breeding and roosting habitat for Carnaby's black cockatoo.
- No black cockatoo roosts occur in close proximity to the site (Peck *et al.* 2019). No roosts or evidence of roosting by any species of black cockatoo was recorded within the site during the field survey. Tall native and non-native trees within the site represent suitable roosting habitat Carnaby's black cockatoo.
- A total of 471.08 ha of foraging habitat for Carnaby's black cockatoo was mapped within the site of which 279.65 ha (59.36%) comprises primary native plants, 6.37 ha (1.35%) comprises primary non-native plants, 47.55 ha (10.09%) provides secondary native plants and 137.51 ha (29.19%) provides secondary non-native plants.

- Additional areas of foraging habitat of similar or higher value occur adjacent to the site and in the wider local area.

Outcomes of the targeted bird survey include the following:

- A total of 51 bird species were observed across the site.
  - 11 species were observed from HC1.
  - 12 species were observed from HC2.
  - 29 species were observed from HC3.

Outcomes of the targeted bat survey include the following:

- Three bat taxa were recorded within the site:
  - *Chalinolobus gouldii* - Gould's wattled bat
  - *Nyctophilus* spp. - Long-eared bats
  - *Vespadelus regulus* - Southern forest bat.

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7.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 7.1**, with access date information provided in **Table R 1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
Atlas of Living Australia	15 September 2023	Atlas of Living Australia – Spatial Portal
BirdLife International (2023)	27 October 2023	Important Bird Areas
BoM (2023)	1 November 2023	Climate Data Online
DAWE (2023)	2 November 2023	Species Profile and Threats Database
DAWE (2023)	20 November 2023	Protected Matters Search Tool
DBCA (2023)	15 September 2023	NatureMap
DCCEEW (2023)	2 November 2023	Australian Faunal Directory
WALIA (2023)	27 October 2023	Landgate Map Viewer

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Figures

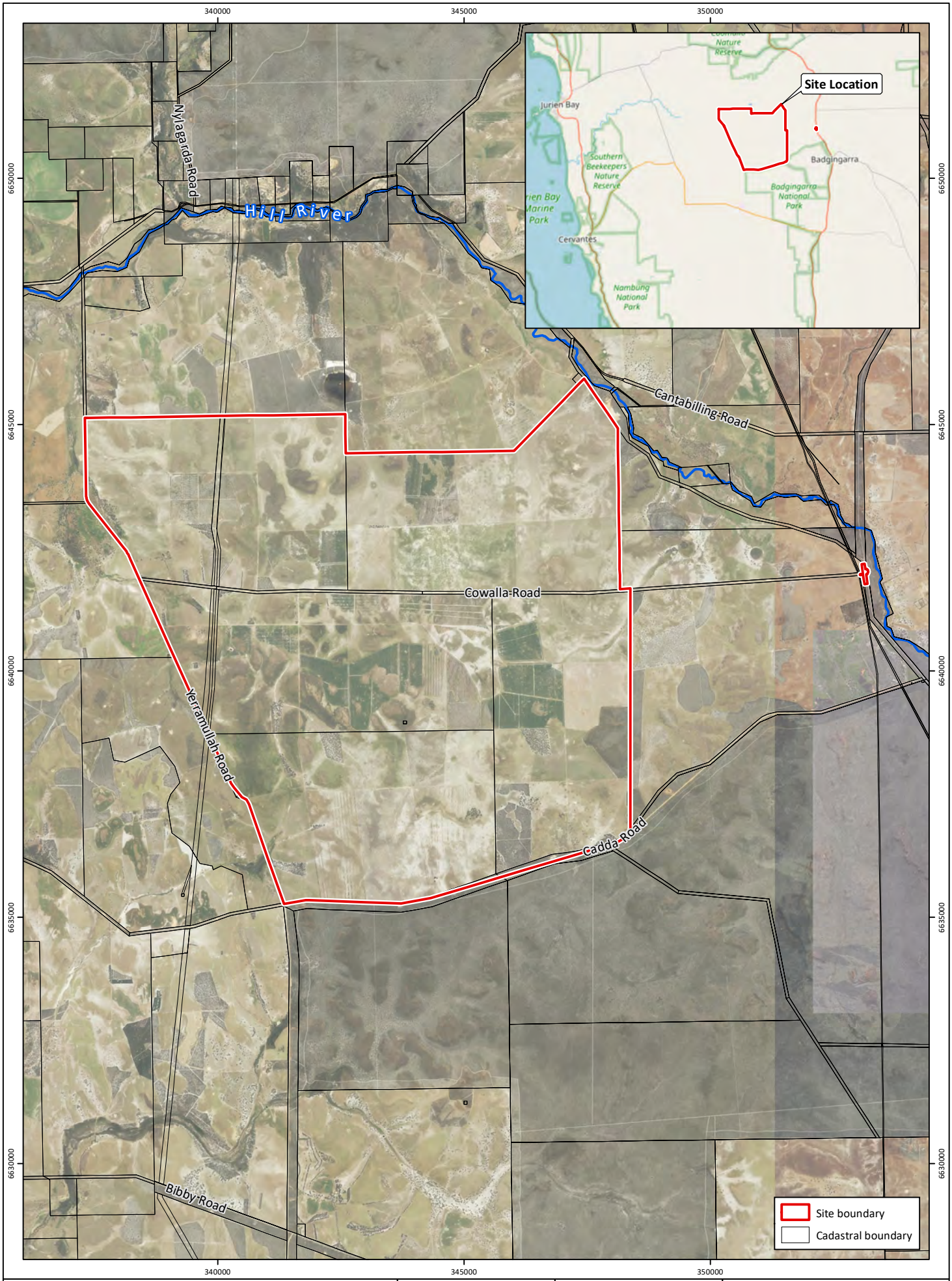

Figure 1: Site Location

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F13a

Drawn:	WJC
Date:	04/112/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

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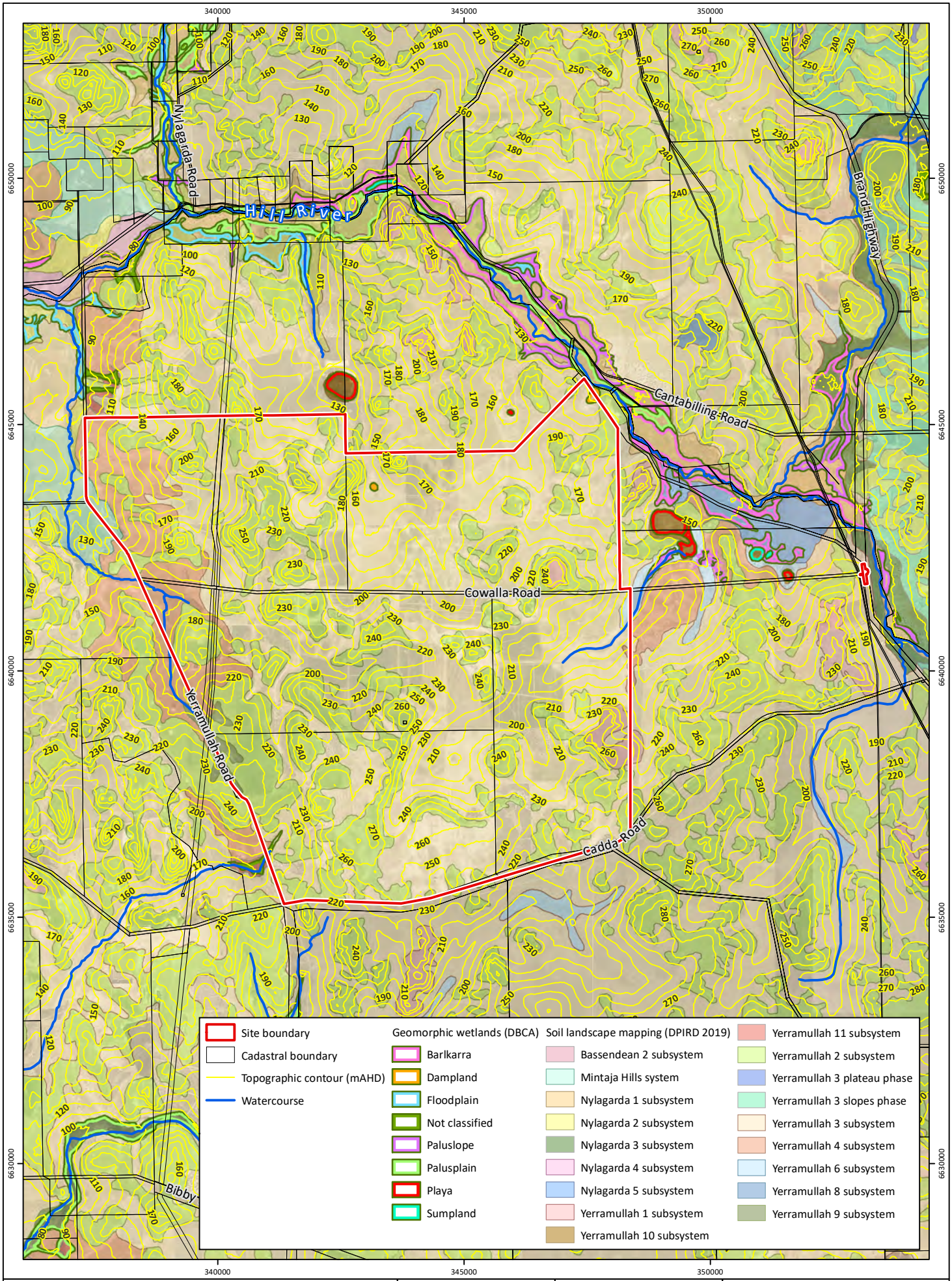

Figure 2: **Hydrography, Soils and Topography**

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F14a

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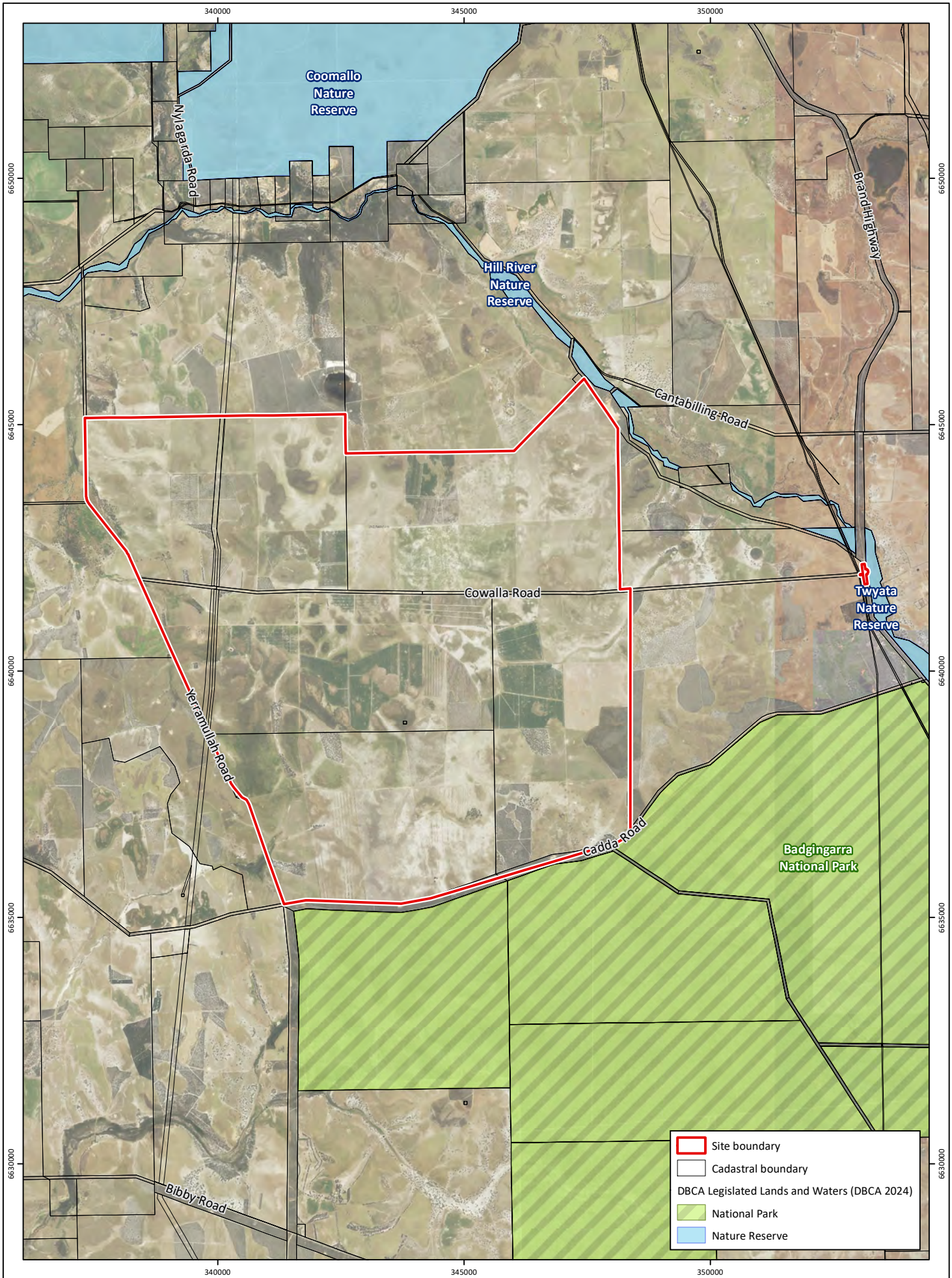

Figure 3: Environmental Features

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F15a

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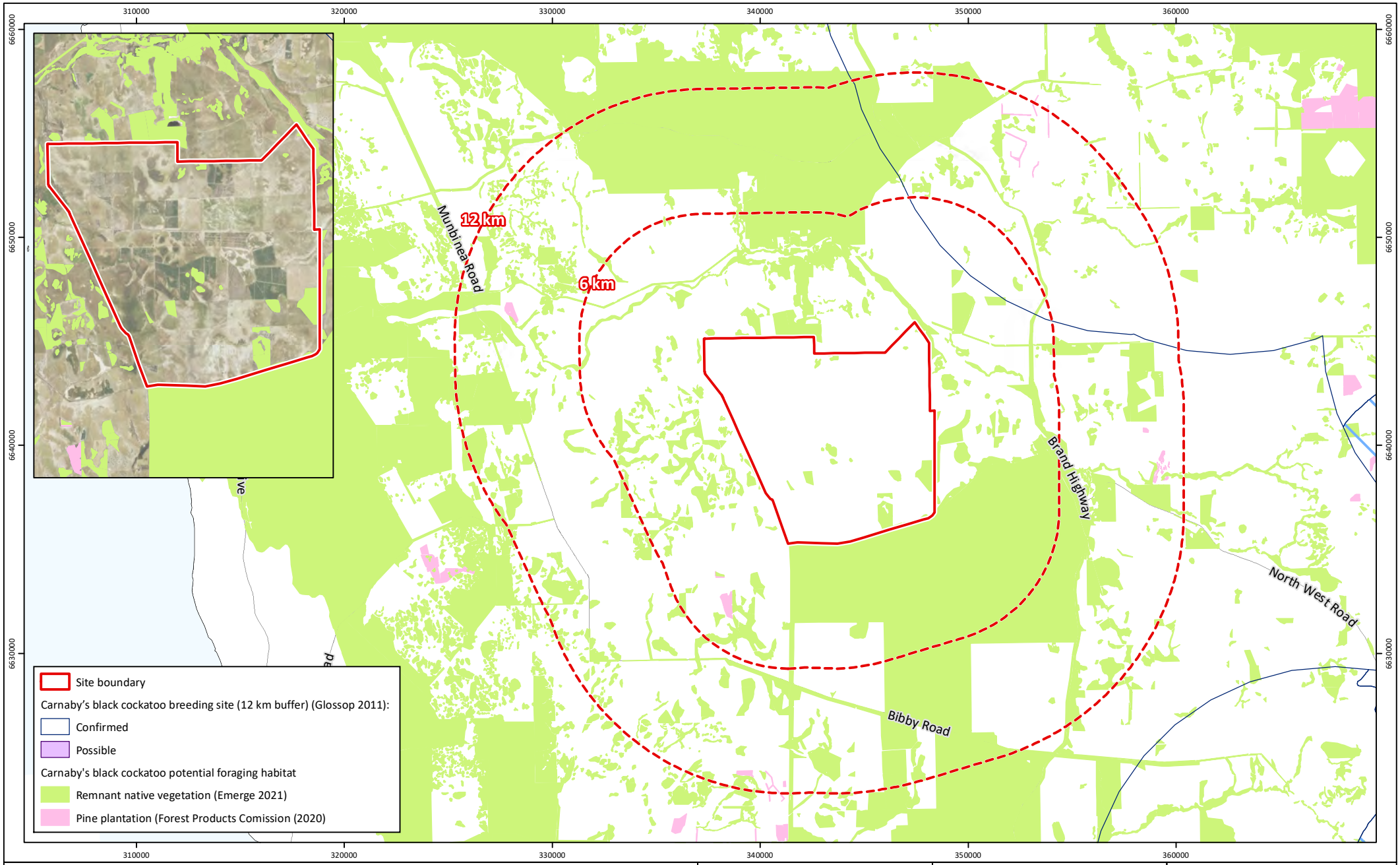

Figure 4: Black Cockatoo Habitat Context

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F16

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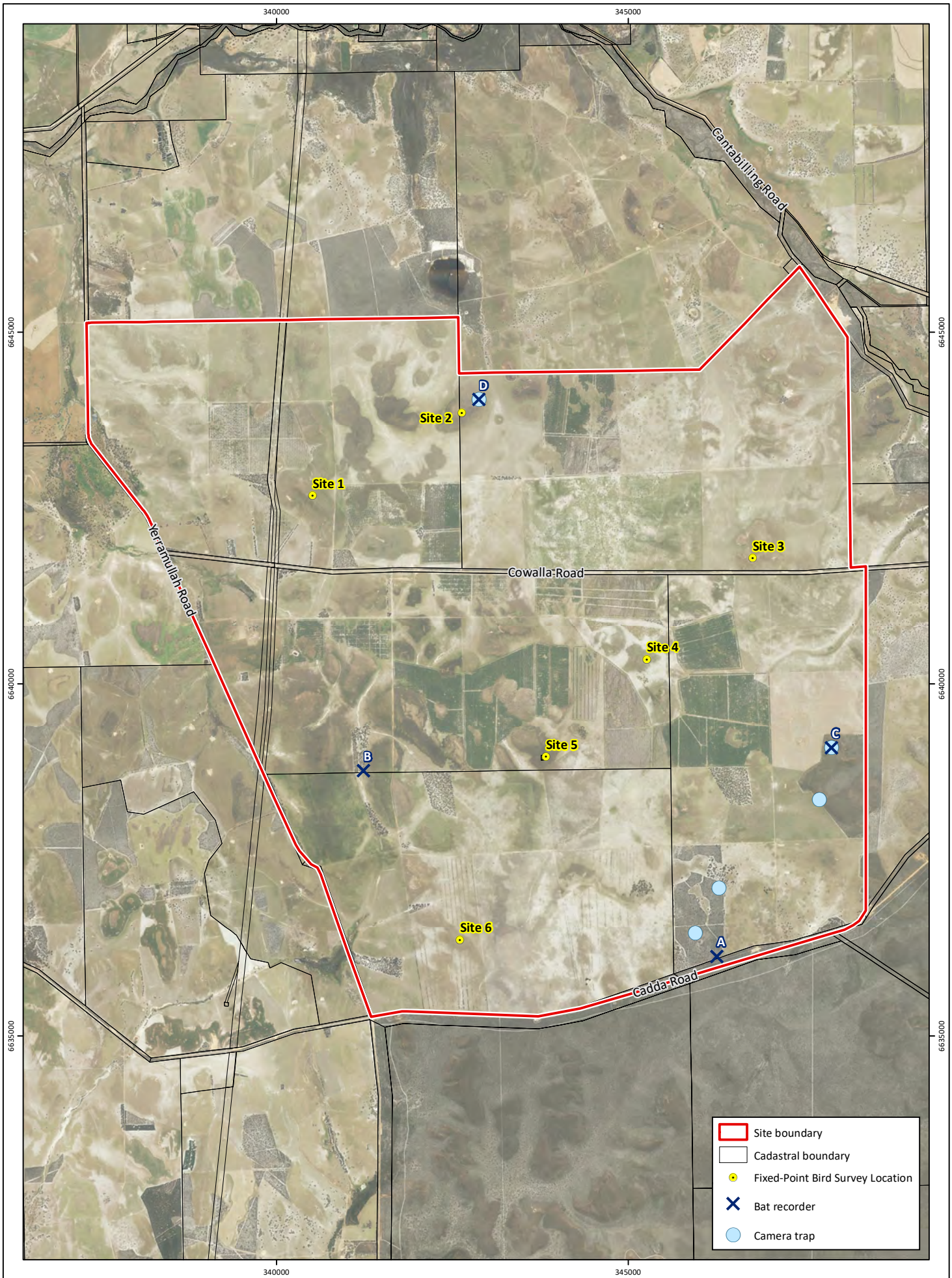

Figure 5: **Fixed-Point Bird Survey, Camera Trap and Bat Recorder Locations**

Project: Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F17

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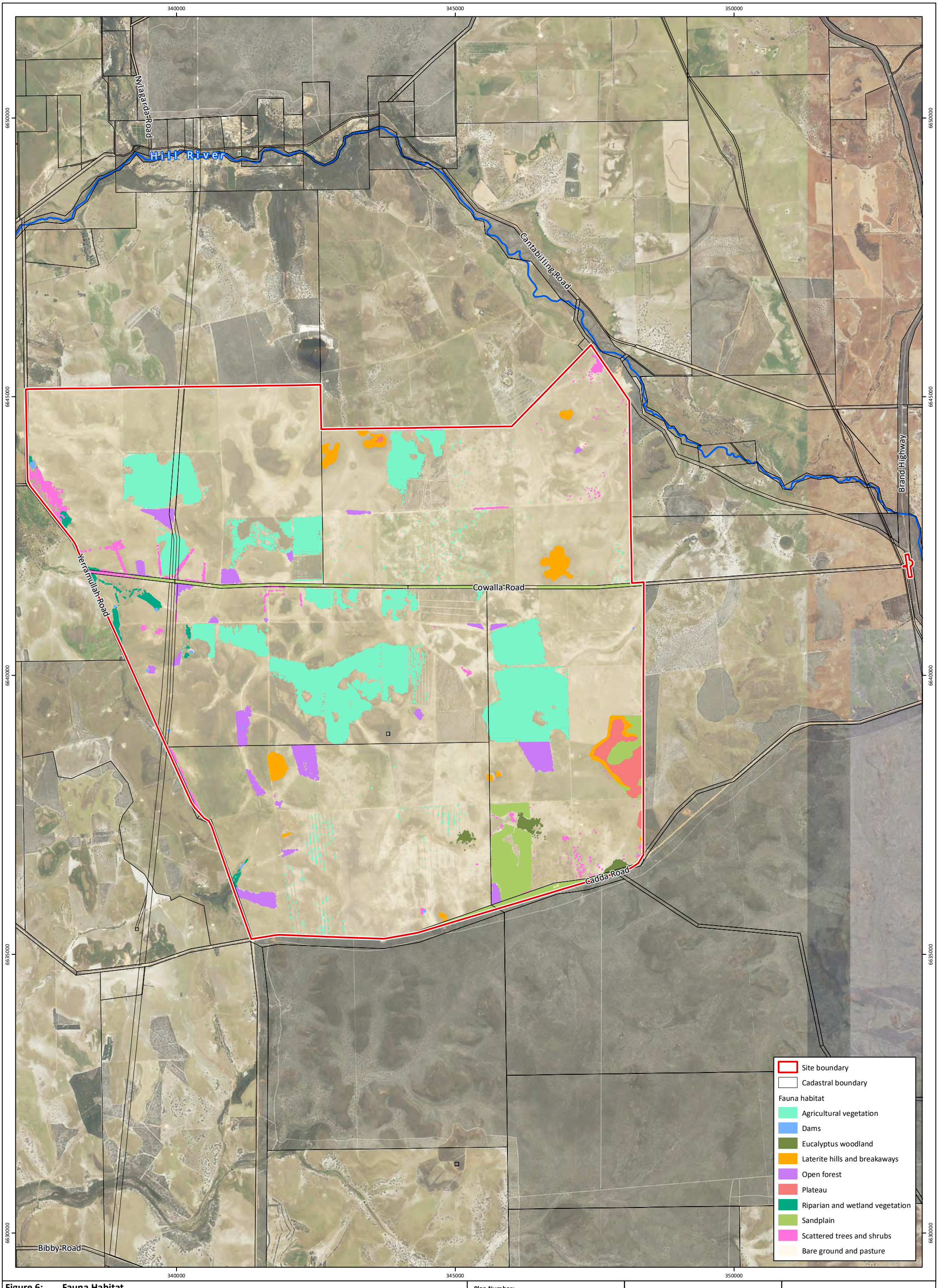

Figure 6: Fauna Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support
Client: Zephyr Energy Pty Ltd

Plan Number:
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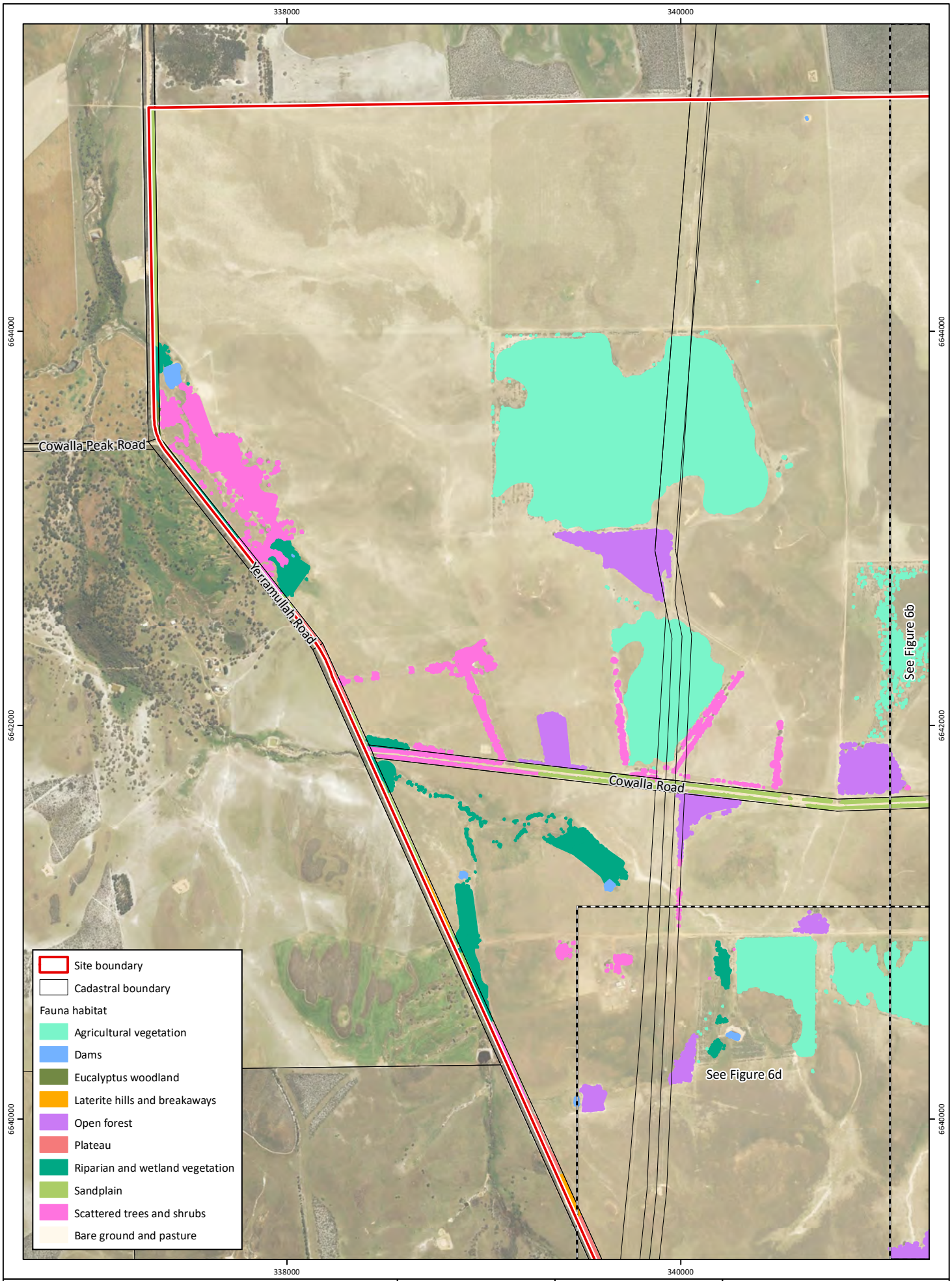

Figure 6a: Fauna Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F19b

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Checked:	AJU	
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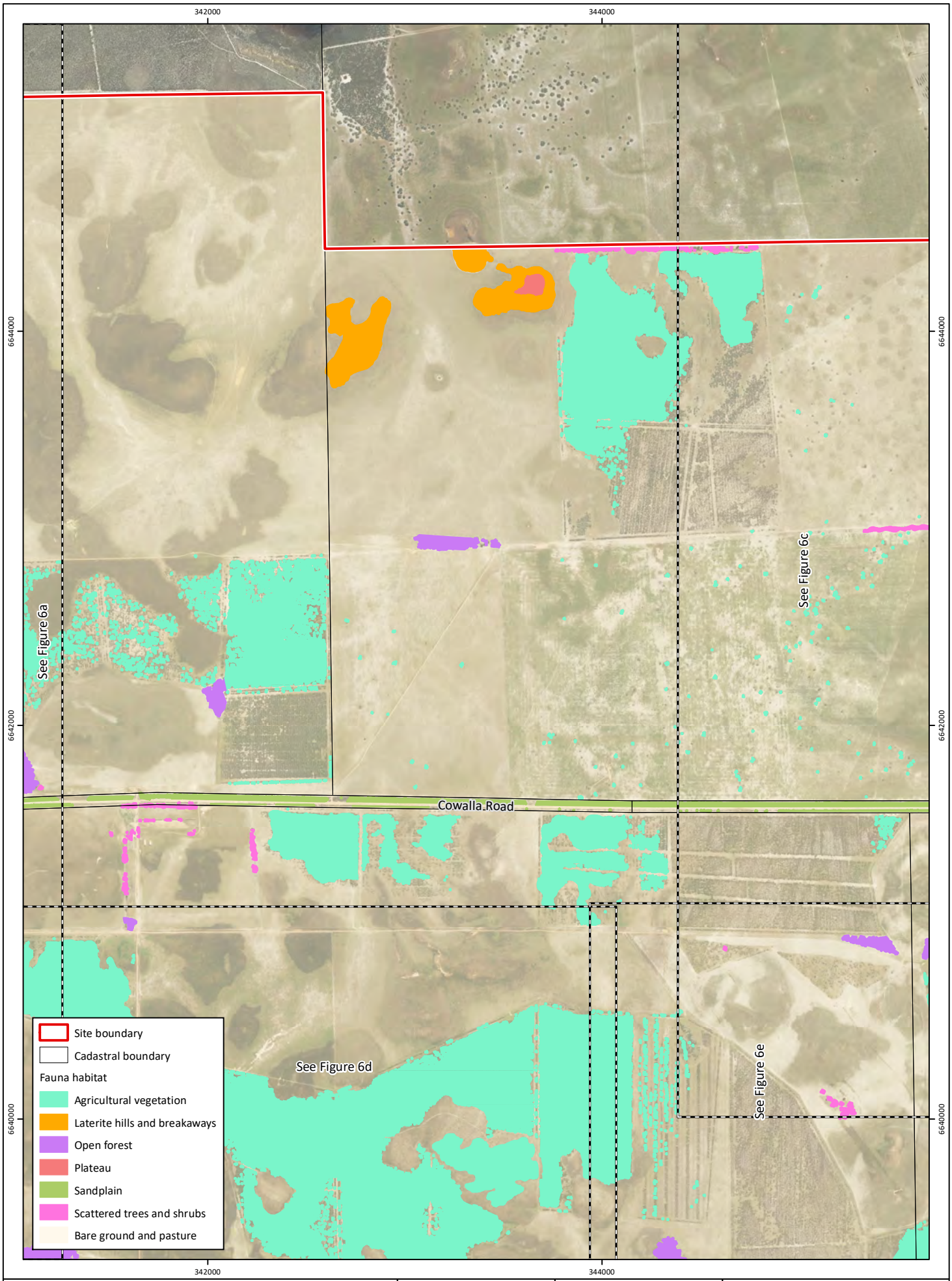

Figure 6b: Fauna Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F19b

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Approved:	GAR
Date:	04/11/2024

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Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

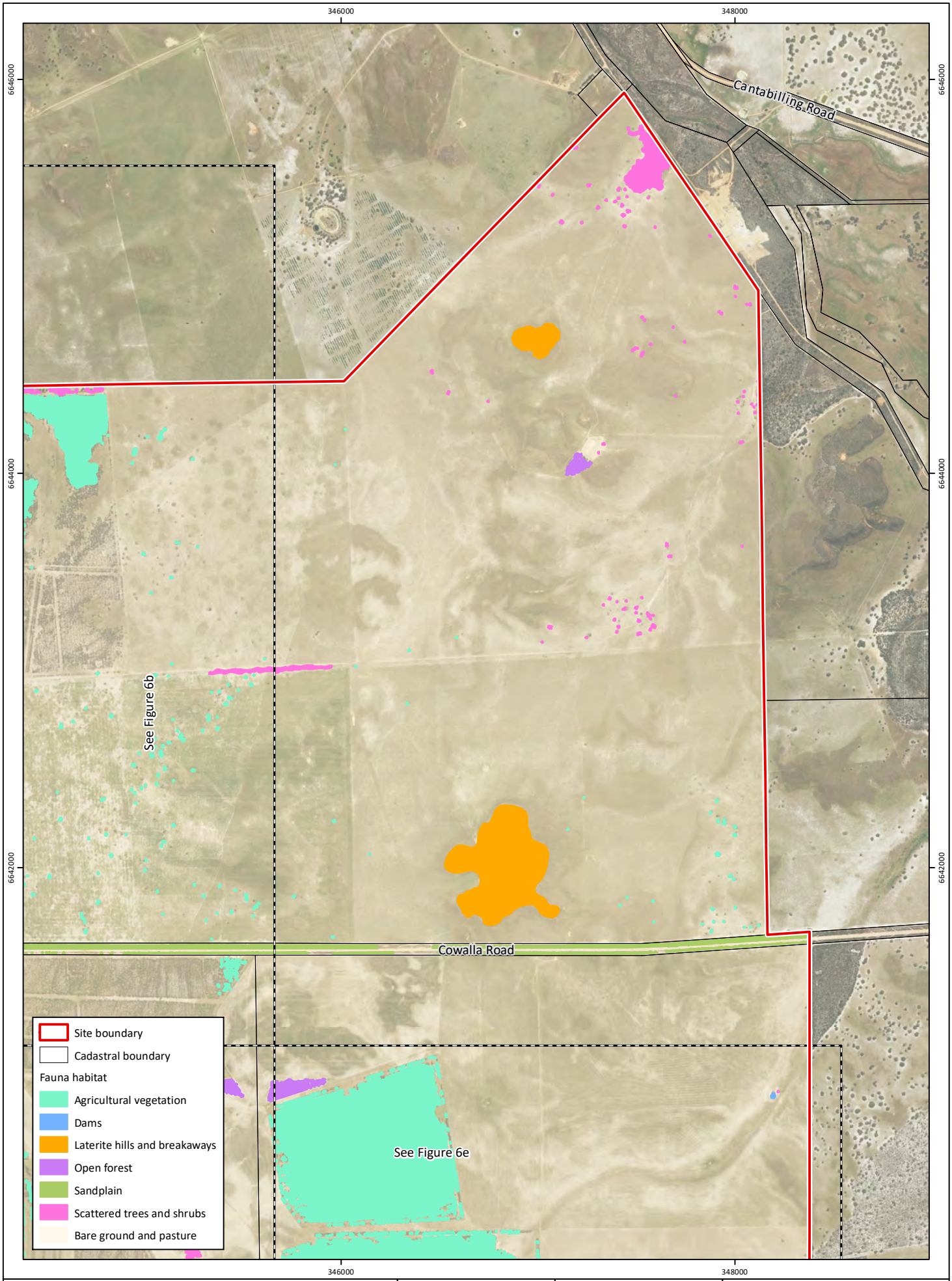

Figure 6c: Fauna Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F19b

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Date:	04/11/2024	
Checked:	AJU	
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Date:	04/11/2024	

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Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

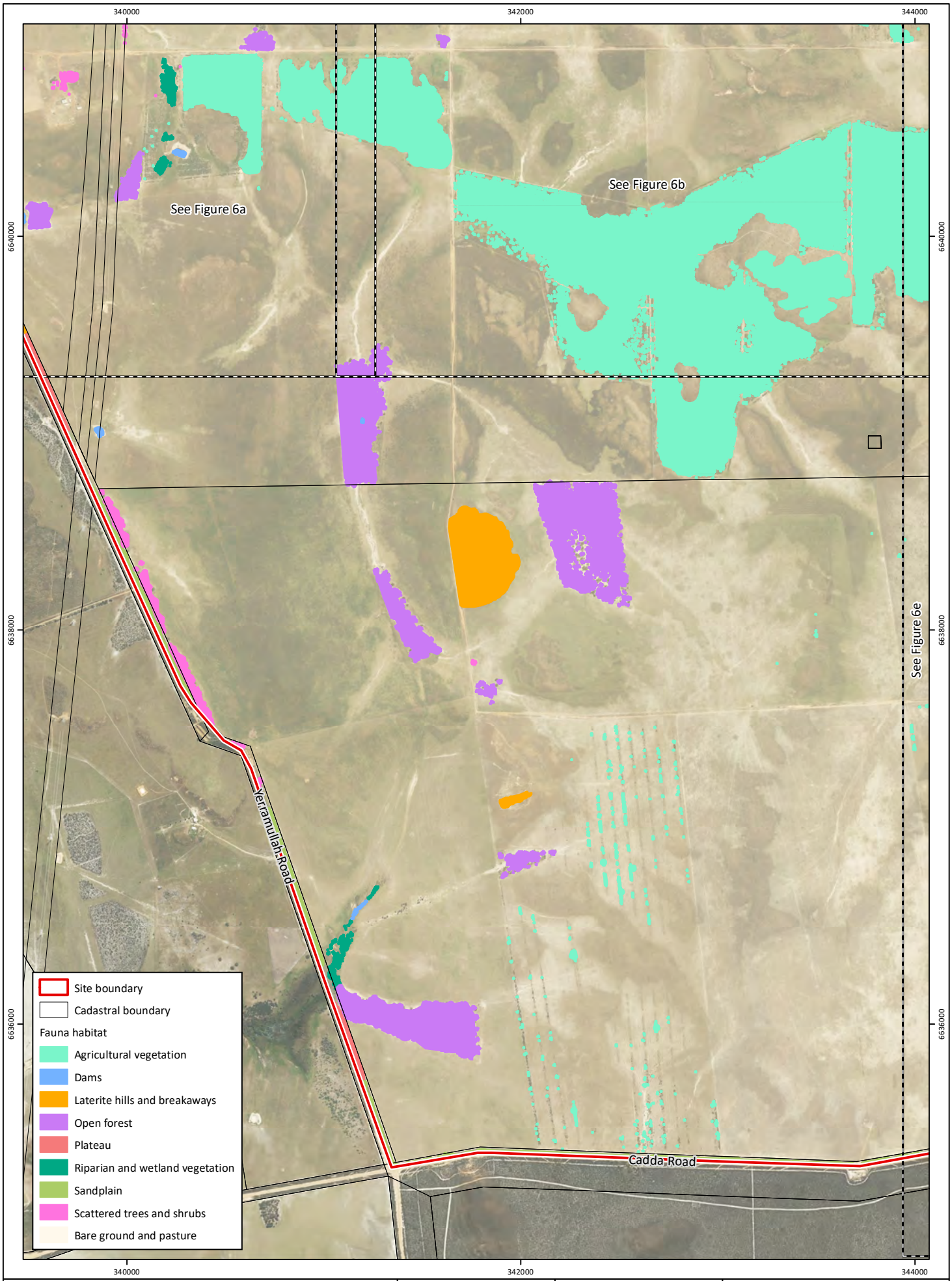

Figure 6d: Fauna Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F19b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	GAR
Date:	04/11/2024

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GDA2020 MGA Zone 50

emerge ASSOCIATES

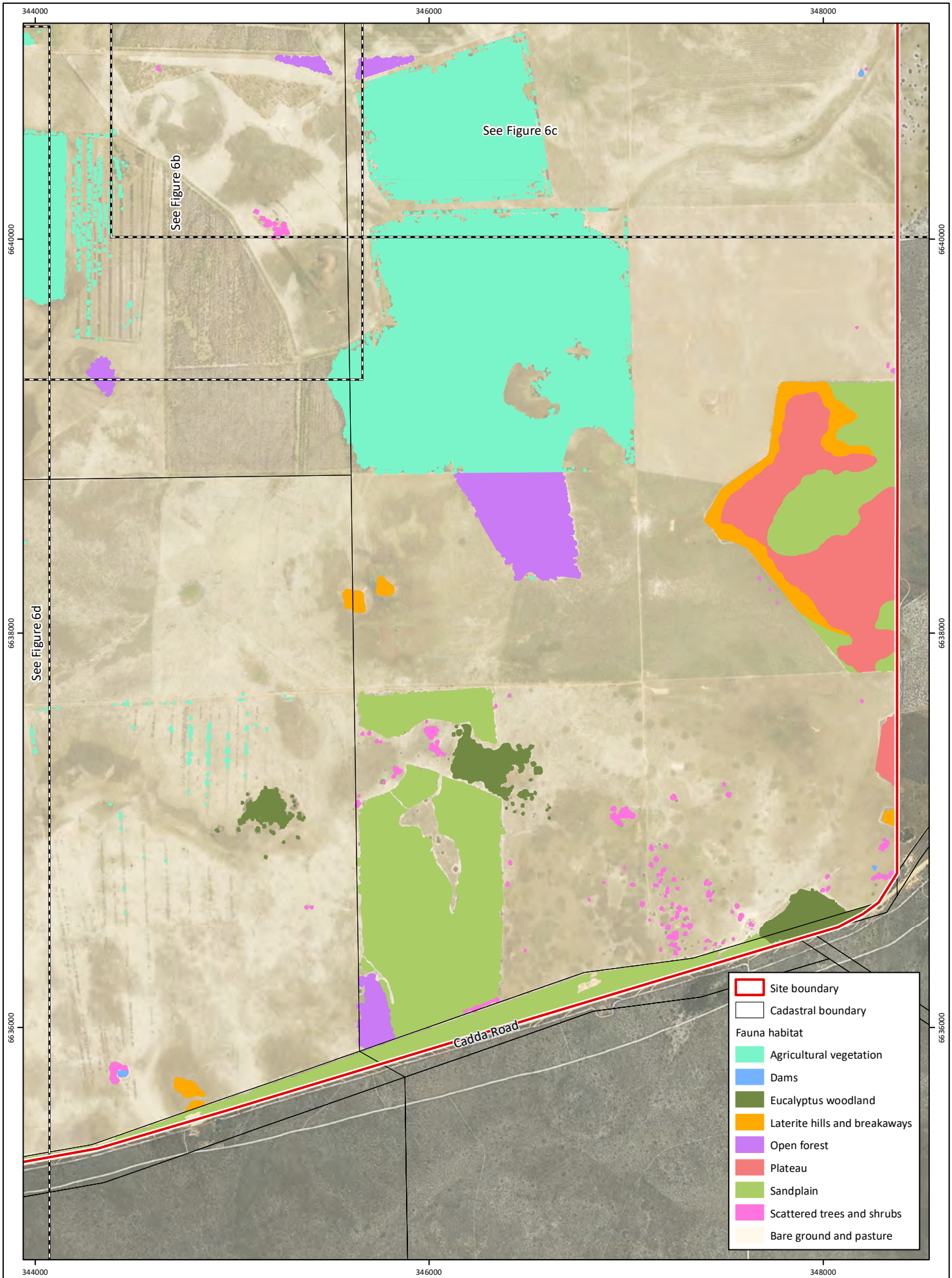

Figure 6e: Fauna Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F19b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	GAR
Date:	04/11/2024

N

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Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

Figure 6f: Fauna Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F19b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	GAR
Date:	04/11/2024

N

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Metres

Scale: 1:2,500@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

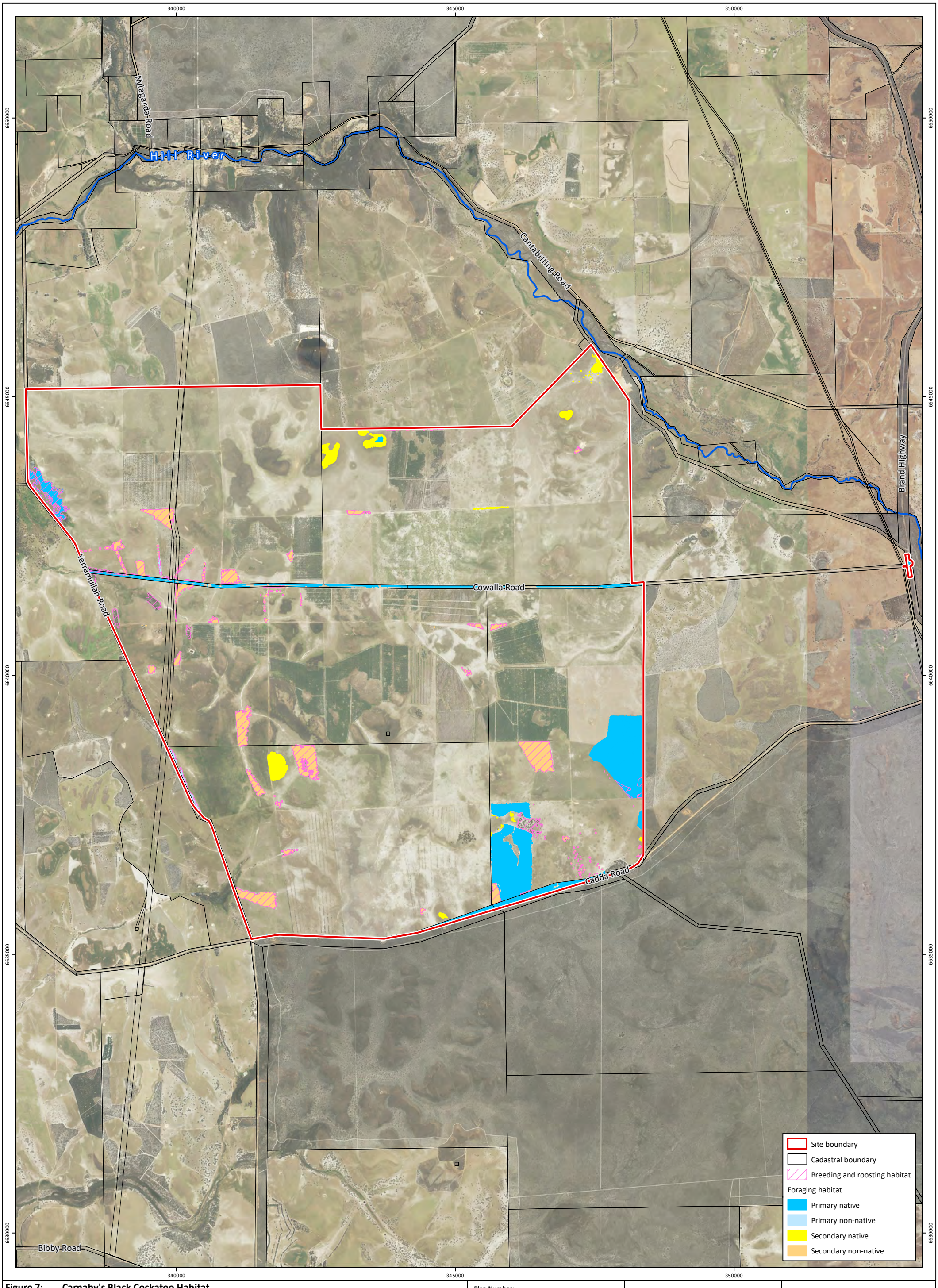

Figure 7: Carnaby's Black Cockatoo Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support
Client: Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F20b
Drawn: WJC
Date: 04/11/2024
Checked: AJU
Approved: RAW
Date: 04/11/2024

N

0 1,000 2,000
Metres
Scale: 1:60,000@A3
GDA2020 MGA Zone 50

emerge ASSOCIATES

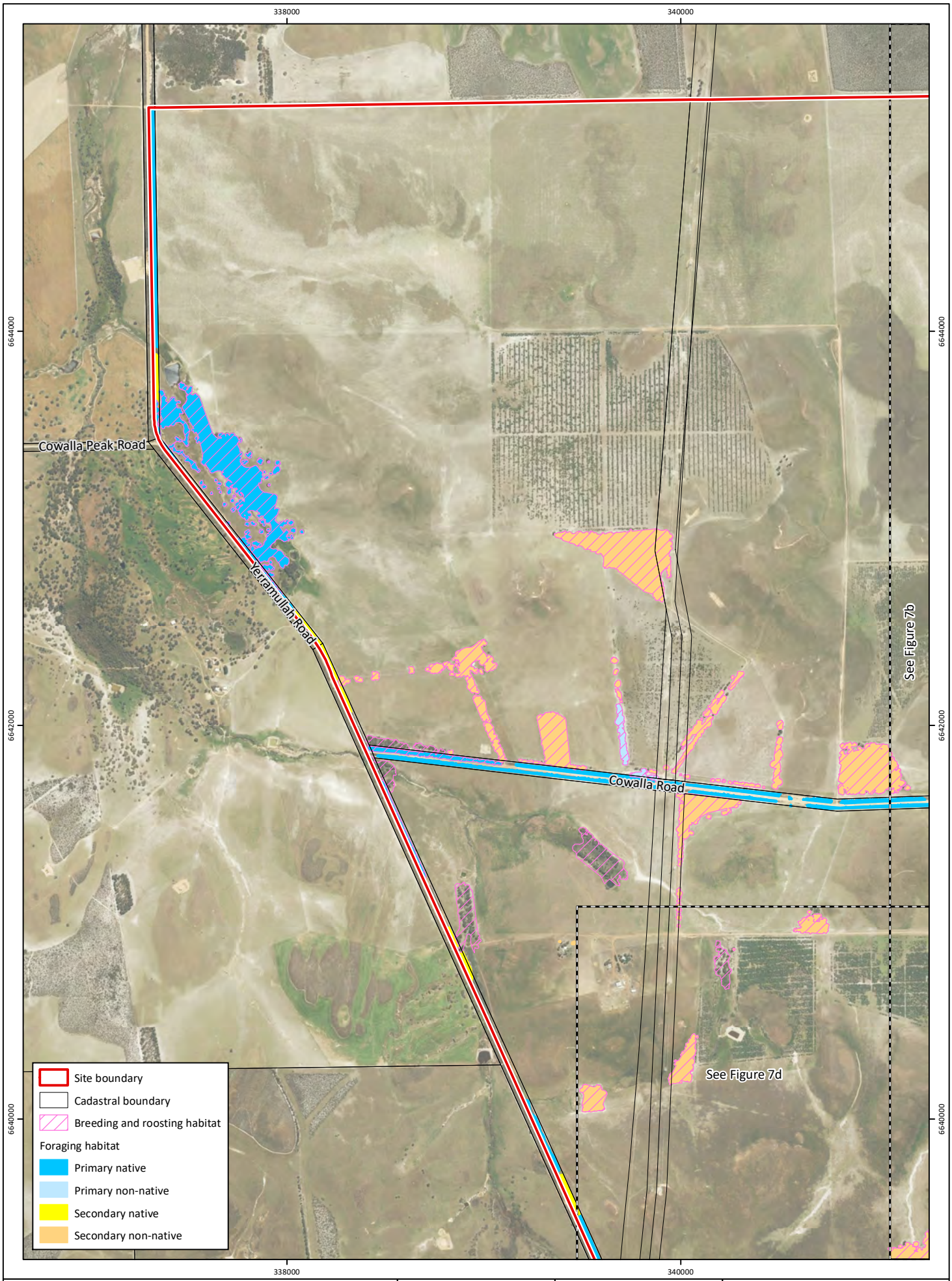

Figure 7a: Carnaby's Black Cockatoo Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F21b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

N

0 250 500
Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

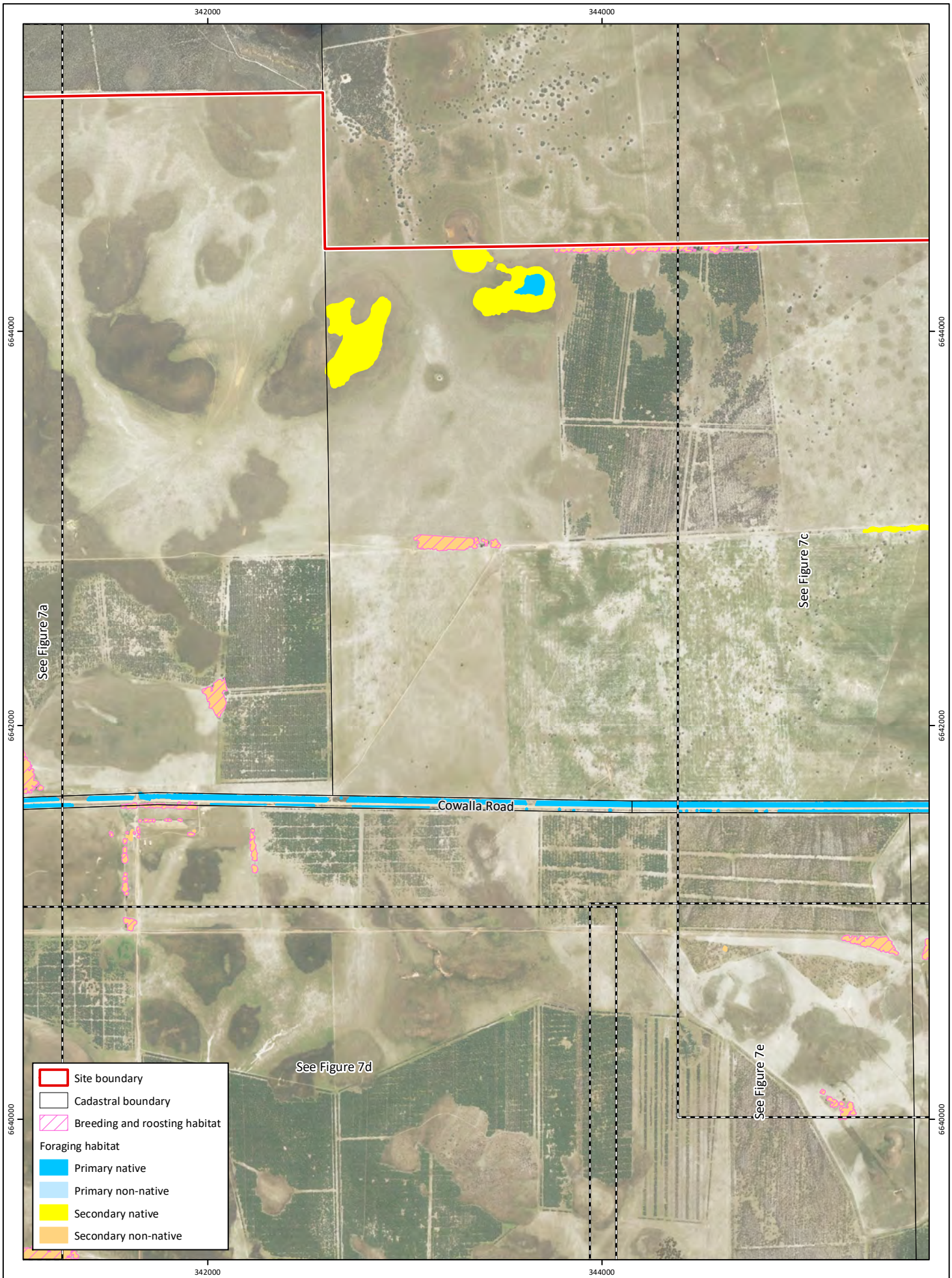

Figure 7b: Carnaby's Black Cockatoo Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F21b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

N

0 250 500
Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

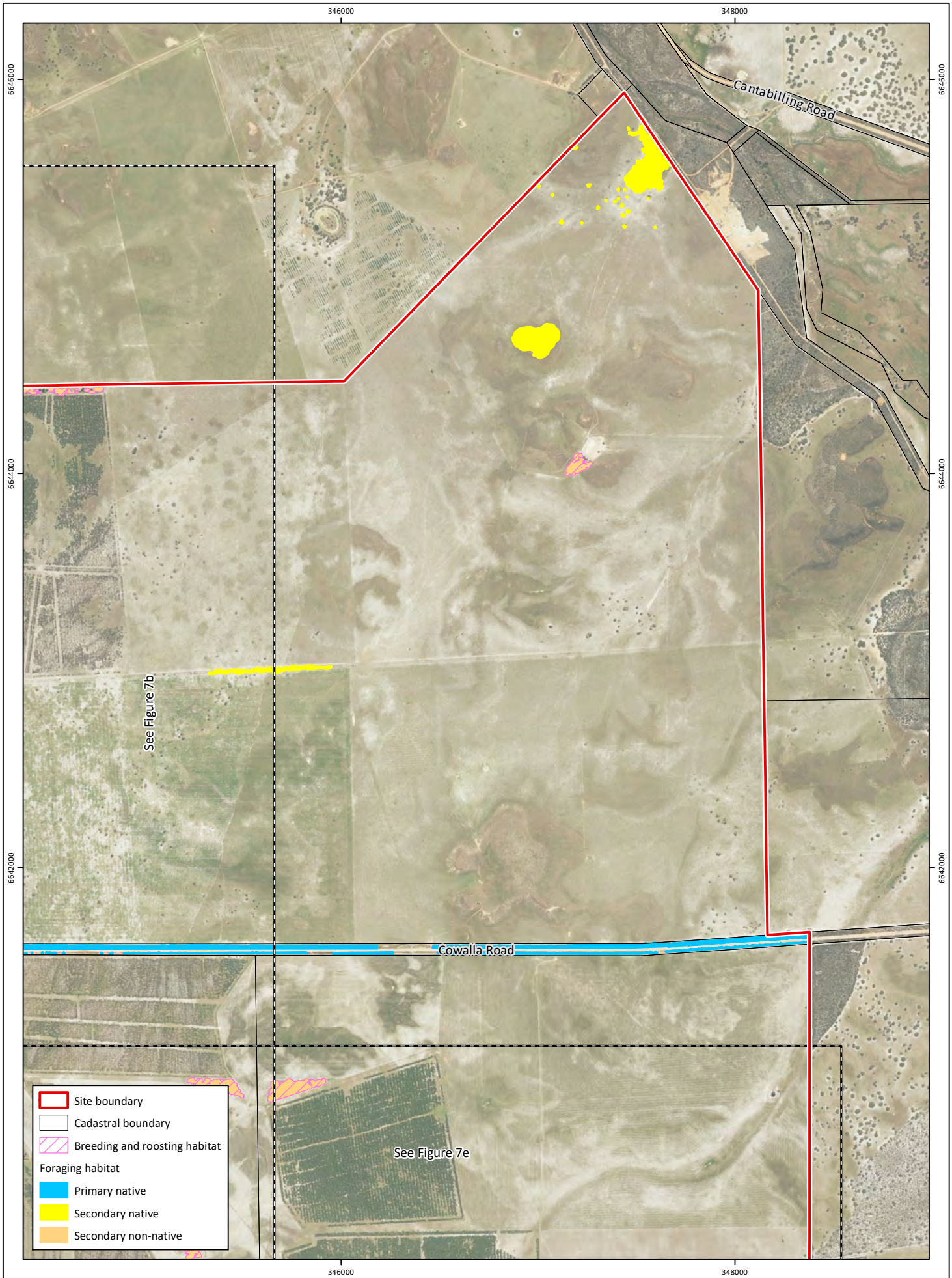

Figure 7c: Carnaby's Black Cockatoo Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number: EP23-085(02)--F21b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

N

0 250 500
Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

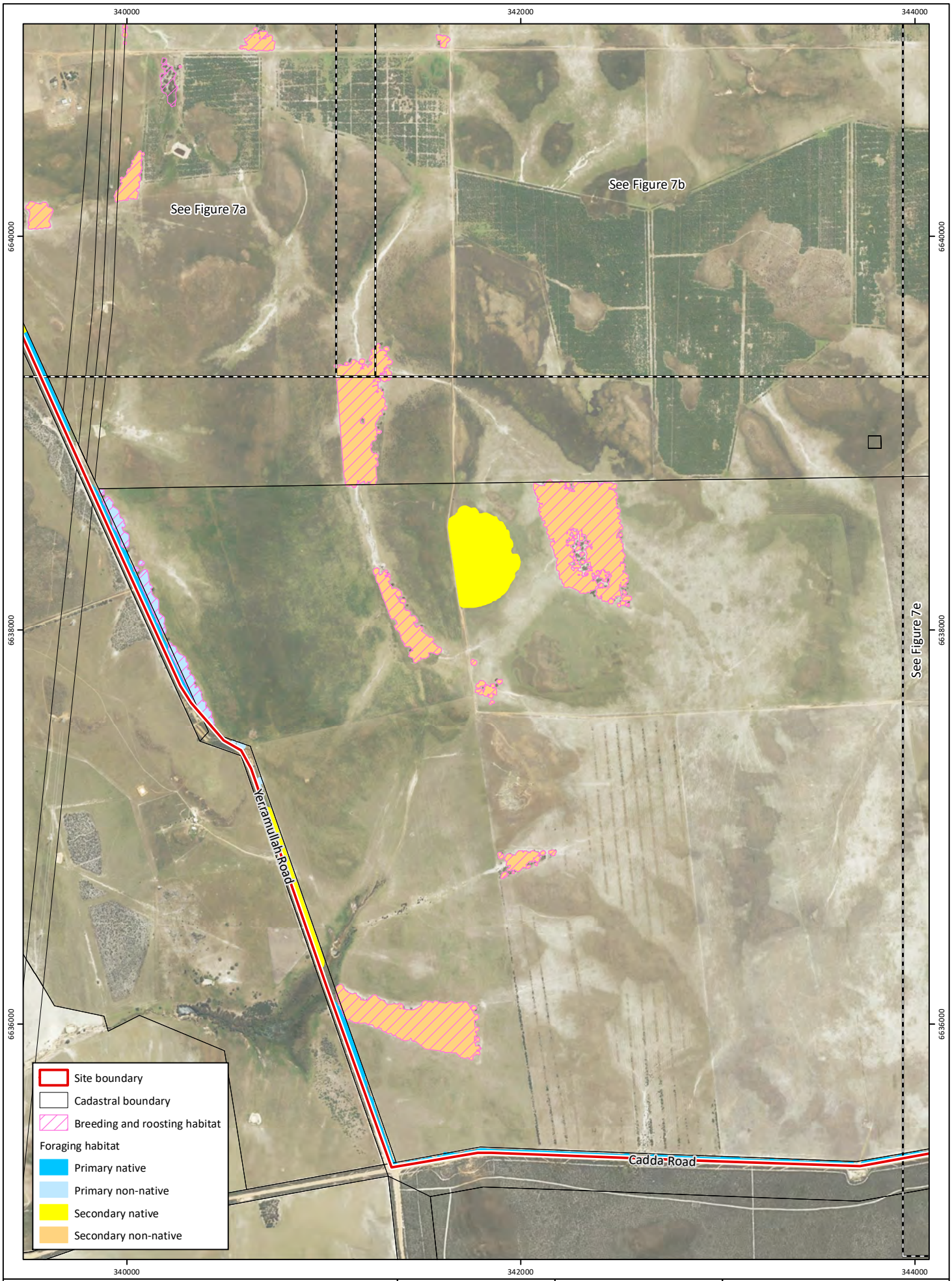

Figure 7d: Carnaby's Black Cockatoo Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F21b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

N

0 250 500
Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

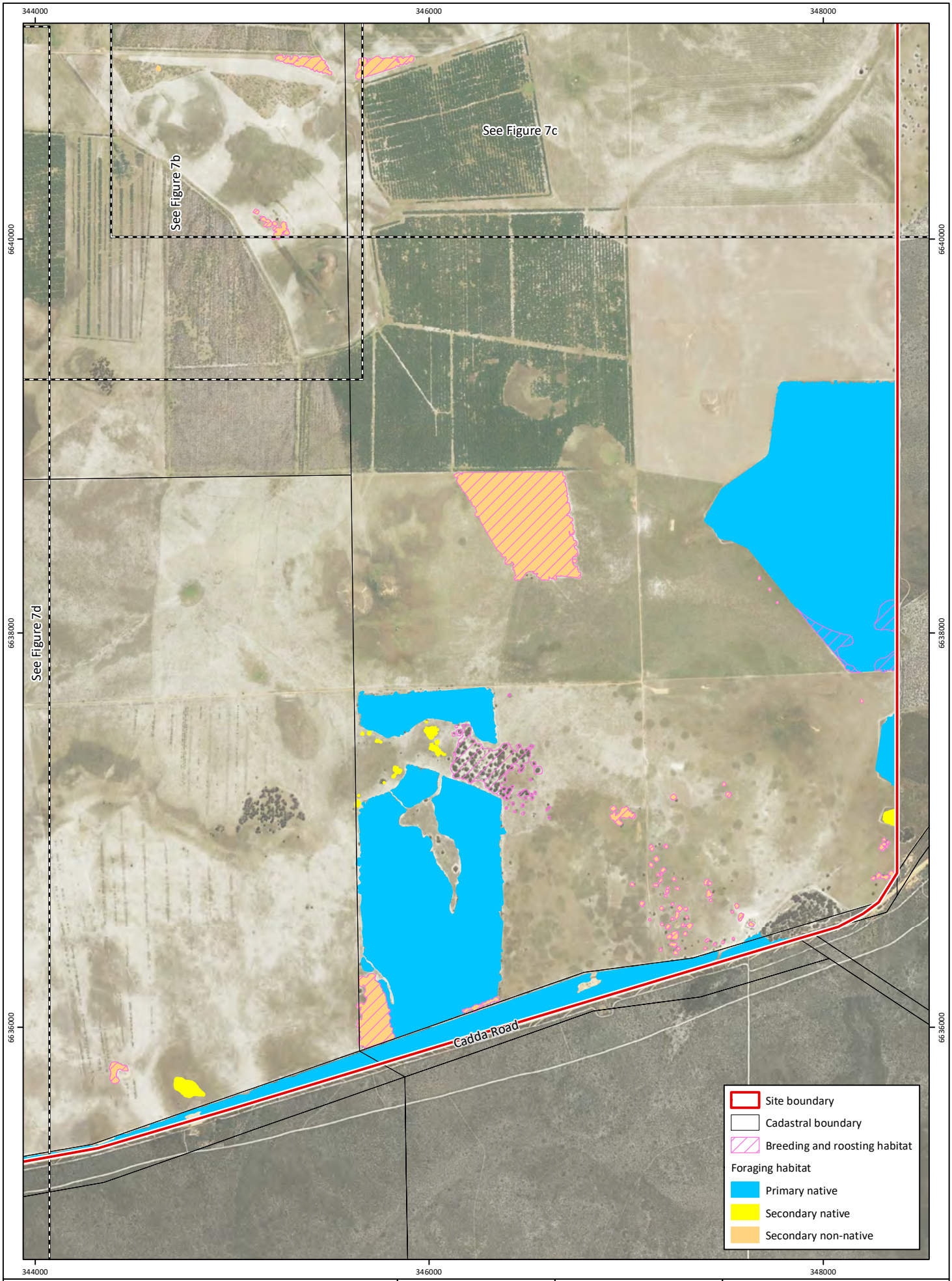

Figure 7e: Carnaby's Black Cockatoo Habitat

Project:	Basic Fauna and Targeted Black Cockatoo Assessment Parron Wind Farm Development Support
Client:	Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F21b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

N

0 250 500
Metres

Scale: 1:25,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

Figure 7f: Carnaby's Black Cockatoo Habitat

Project: Basic Fauna and Targeted Black Cockatoo Assessment
Parron Wind Farm Development Support

Client: Zephyr Energy Pty Ltd

Plan Number:
EP23-085(02)--F21b

Drawn:	WJC
Date:	04/11/2024
Checked:	AJU
Approved:	RAW
Date:	04/11/2024

N

0 25 50
Metres

Scale: 1:2,500@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

Appendix A

Additional Information

Conservation Significant Fauna

Threatened and priority fauna

Fauna species considered rare or under threat warrant special protection under Commonwealth and/or State legislation. At the Commonwealth level, fauna species can be listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as 'threatened', 'migratory' or 'marine' as described in **Table 1**.

Migratory species comprise birds recognised under international treaties including:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA)
- China Australia Migratory Bird Agreement 1998 (CAMBA)
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA)
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

Fauna species listed as threatened and migratory are protected in Australia as 'matters of national environmental significance' (MNES) under the EPBC Act.

Table 1: Definitions of conservation significant fauna species pursuant to the EPBC Act

Conservation Code	Category
X	Threatened Fauna –Extinct There is no reasonable doubt that the last member of the species has died.
EW[#]	Threatened Fauna –Extinct in the Wild Taxa which are known only to survive in cultivation, captivity or as a naturalised population outside its past range, or taxa which have not been recorded in its known and/or expected habitat despite appropriate exhaustive surveys.
CR[#]	Threatened Fauna – Critically Endangered Taxa which are considered to be facing an extremely high risk of extinction in the wild.
EN[#]	Threatened Fauna – Endangered Taxa which are considered to be facing a very high risk of extinction in the wild.
VU[#]	Threatened Fauna – Vulnerable Taxa which are considered to be facing a high risk of extinction in the wild.
Migratory[#]	Migratory Fauna All migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and All native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Ma	Marine Fauna Species in the list established under s248 of the EPBC Act

[#]matters of national environmental significance (MNES) under the EPBC Act

In Western Australia, fauna taxa may be classed as 'threatened', 'extinct', or 'specially protected' under the *Biodiversity Conservation Act 2016* (BC Act), which is enforced by Department of Biodiversity Conservation and Attractions (DBCA) (DBCA 2019a). The definitions of these categories are provided in **Table 2**.

Table 2: Definitions of specially protected fauna schedules under the BC Act (DBCA 2019a)

Category	Conservation Code	Definition
Threatened	CR	Critically endangered Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future.
	EN	Endangered Threatened species considered to be facing a very high risk of extinction in the wild in the near future.
	VU	Vulnerable Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future.
Extinct	EX	Extinct Species where there is no reasonable doubt that the last member of the species has died.
	EW	Extinct in the wild Species that is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form. Note that no species are currently listed as EW.
Specially protected	MI	Migratory species Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth Includes birds that subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds.
	CD	Species of special conservation interest (conservation dependent fauna) Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
	OS	Other specially protected species Fauna otherwise in need of special protection to ensure their conservation.

Fauna species that may be threatened or near threatened but lack sufficient information to be legislatively listed may be added to the DBCA's *Priority Fauna List* (DBCA 2018b). Species listed under priorities 1-3 comprise possible threatened species that do not meet survey criteria or are otherwise data deficient. Species listed under priority 4 are those that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons (DBCA 2019a).

Priority fauna species are considered during State approval processes. Priority fauna categories and definitions are listed in **Table 3** (DBCA 2019a).

Table 3: Definitions of priority fauna categories on DBCA's Priority Fauna List (DBCA 2019a)

Conservation Code	Category
P1	Priority 1 – Poorly known Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Priority 2 – Poorly known Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	Priority 3 – Poorly known Species that are known from several locations and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	(a) Priority 4 – Rare species Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Priority 4 – Near Threatened Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Priority 4 – Other Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Black cockatoos

Three threatened species of black cockatoo occur on the Swan Coastal Plain (referred to herein collectively as 'black cockatoos'):

- *Zanda*[1] *latirostris* (Carnaby's black cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Zanda*[1] *baudinii* (Baudin's black cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) which is listed as 'vulnerable' under the EPBC Act and the BC Act.

There are a range of regional studies and spatial datasets available which provide information on black cockatoo records and potential habitat mapping. These are detailed below.

Species distribution and breeding range

Broad-scale maps are available for the modelled distribution of Baudin's black cockatoo, Carnaby's black cockatoo and forest red-tailed black cockatoo (DSEWPaC 2011; DoEE 2016a, b).

The modelled distribution maps also include 'known breeding areas' and 'predicted breeding range' for Baudin's black cockatoo and 'breeding range' and 'non-breeding range' for Carnaby's black cockatoo.

No breeding range modelling is available for forest red-tailed black cockatoo but the species is known to breed mainly in the jarrah forest region (DBCA 2017a) and in small populations on the Swan Coastal Plain within the Baldivis, Stake Hill, Lake McLarty and Capel area and increasingly in the Perth metropolitan area (DAWE 2022).

Breeding habitat

Department of Environment and Conservation (DEC, now Department of Biodiversity, Conservation and Attractions (DBCA)) and fauna experts, have identified and mapped Carnaby's black cockatoo habitat on the Swan Coastal Plain and Jarrah Forest regions (Glossop *et al.* 2011). This dataset includes mapping of Carnaby's black cockatoo breeding sites based on point records of breeding from a range of sources. Breeding sites were classified as 'confirmed' where eggs or chicks were recorded and 'possible' where observations relating to Carnaby's black cockatoo breeding that did not include actual records of eggs or chicks (e.g. chewed hollows or records of breeding or nesting behaviour by an expert observer).

A 12 km buffer applies to each site to 'reflect the flexible use of these areas by cockatoos and to indicate the important zone for access to potential feeding habitat' (Glossop *et al.* 2011). Glossop *et al.* (2011) state that the areas mapped in the dataset are not a comprehensive record of Carnaby's black cockatoo breeding and that many nesting sites are not known.

While this dataset only applies to Carnaby's black cockatoo, the information it contains is also applicable for Baudin's black cockatoo and forest red-tailed black cockatoo as they have similar

[1] Previously *Calyptorhynchus*

breeding habitat requirements. That is, breeding sites that are suitable for Carnaby's black cockatoo may also be suitable for Baudin's black cockatoo and forest red-tailed black cockatoo, if located within their distribution/breeding ranges.

BirdLife Australia also maintain a database of confirmed black cockatoo breeding sites which is accessible via a paid search system. BirdLife Australia have advised that their database is comprised of data collected during surveys by staff and volunteers of which most (>99%) surveys are of Carnaby's black cockatoo. They have also advised that the dataset is not comprehensive and that an absence of known nests does not necessarily indicate a lack of breeding activity.

The Carnaby's black cockatoo recovery plan also identifies 13 'important bird areas' for Carnaby's black cockatoo, which are identified as 'sites of global bird conservation importance' (DPaW 2013). These 'important bird areas' comprise sites supporting at least 20 breeding pairs or 1% of the population regularly utilising an area in the non-breeding part of the range.

Confirmed roost sites

BirdLife Australia undertakes annual monitoring of black cockatoo overnight roost sites as part of the annual 'Great Cocky Count' community-based survey. Information gathered from these monitoring events provides roost locations and recorded black cockatoo number (Birdlife Australia 2023).

Native foraging habitat

Glossop *et al*. (2011) also mapped 'areas requiring investigation as Carnaby's black cockatoo feeding habitat' for the Swan Coastal Plain and Jarrah Forest regions, based on regional vegetation mapping that may contain plant species known to be foraged upon by Carnaby's black cockatoo. Note that this dataset does not include observations or point records of Carnaby's black cockatoo feeding. This dataset represents areas of vegetation that may potentially provide foraging habitat for Carnaby's black cockatoo.

In order to account for clearing of native vegetation that has occurred since the Glossop *et al.* (2011) dataset was created and to incorporate updated vegetation mapping and information on foraging behaviour of Carnaby's black cockatoo, Emerge have revised this dataset to represent the most up to date information available. Furthermore, Emerge have used a similar methodology to Glossop et al. (2011) to define potential foraging habitat for Baudin's black cockatoo and forest-red tailed cockatoos.

Specifically, DBCA (2021), DBCA (2019b) and DPIRD (2018) regional vegetation complex mapping was used to determine which areas of remnant vegetation support plant species known to be foraged upon by Carnaby's black cockatoo, Baudin's black cockatoo or forest red-tailed cockatoos. Where these vegetation complexes intersect remnant vegetation mapped by DPIRD (2020) they were considered to represent potential foraging habitat for Carnaby's black cockatoo, Baudin's black cockatoo and/or forest red-tailed cockatoo.

Pine plantations also provide an important food source for Carnaby's black cockatoo, but were not included in the original Glossop et al. (2011) dataset. Mapping of pine plantations is available from the Forest Products Commission (Forest Products Commission 2020) and was considered in the assessment of Carnaby's black cockatoo foraging habitat.

Pest fauna

A number of legislative and policy documents exist in relation to pest fauna management at state and national levels. The *Biosecurity and Agriculture Management Act 2007* (BAM Act) is the principle legislation guiding pest fauna management in Western Australia and lists declared pest species.

Declared Pests

Part 2.3.23 of the BAM Act requires a person must not "*a) keep, breed or cultivate the declared pest; b) keep, breed or cultivate an animal, plant or other thing that is infected or infested with the declared pest; c) release into the environment the declared pest, or an animal, plant or other thing that is infected or infested with the declared pest; or d) intentionally infect or infest, or expose to infection or infestation, a plant, animal or other thing with a declared pest*".

Under the BAM Act, all declared pests are assigned a legal status, as described in **Table 4**. Species assigned to the 'declared pest, prohibited - s12' category are placed in one of three control categories, as described in **Table 5**.

The *Biosecurity and Agriculture Management Regulations 2013* specify keeping categories for species assigned to the 'declared pest - s22(2)' category, which relate to the purposes of which species can be kept, as well as the entities that can keep them. The categories are described in **Table 6**.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act (DAFWA 2016).

Table 4: Legal status of declared pest species listed under the BAM Act (DAFWA 2016)

Category	Description
Declared Pest Prohibited - s12	May only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Declared Pest s22(2)	Must satisfy any applicable import requirements when imported and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia

Table 5: Control categories of declared pest species listed under the BAM Act (DAFWA 2016)

Category	Description
C1	Exclusion Not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2	Eradication Present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3	Management Established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Table 6: Keeping categories of declared pest species listed under the BAM Act (DAFWA 2016)

Category	Description
Prohibited	Can only be kept under a permit for public display and education purposes, and/or genuine scientific research, by entities approved by the state authority.
Exempt	No permit or conditions are required for keeping.
Restricted	Organisms which, relative to other species, have a low risk of becoming a problem for the environment, primary industry or public safety and can be kept under a permit by private individuals.

Wetland Habitat

Geomorphic wetland types

On the Swan Coastal Plain DBCA (2017b) have used the geomorphic wetland classification system developed by Semeniuk (1987) and Semeniuk and Semeniuk (1995) to classify wetlands based on the landform shape and water permanence (hydro-period) as outlined in **Table 7**. DBCA maintains a dataset of the *Geomorphic Wetlands of the Swan Coastal Plain* (DBCA 2018a).

Table 7: Geomorphic Wetlands of the Swan Coastal Plain classification categories (DBCA 2017b)

Level of inundation	Geomorphology			
	Basin	Flat	Channel	Slope
Permanently inundated	Lake	-	River	-
Seasonally inundated	Sumpland	Floodplain	Creek	-
Seasonally waterlogged	Dampland	Palusplain	-	Paluslope

Literature

The main literature used for identifying fauna and fauna habitats is listed in **Table 8** below.

Table 8: Standard literature used for identifying fauna species and habitats.

Conservation Code	Category
Birds	Johnstone and Storr (1998b), Johnstone and Storr (1998a), Pizzey and Knight (2012), Slater *et al.* (2003)
Mammals	Menkhorst and Knight (2011), Triggs (2003)
Amphibia	Tyler and Doughty (2009), Bush *et al.* (2002)
Reptiles	Bush *et al.* (2002), Wilson and Swan (2021)

References

General references

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Bush, B., Maryan, B., Browne-Cooper, R. and Robinson, D. 2002, *Reptiles and Frogs of the Perth Region*, UWA Press, Crawley.

Department of Agriculture, Water and the Environment (DAWE) 2022, *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo*, Canberra.

department of biodiversity Conservation and Attractions (DBCA) 2017a, *Fauna Profile - Forest red-tailed black cockatoo Calyptorhynchus banksii naso*, Perth, Western Australia.

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Department of Biodiversity, Conservation and Attractions (DBCA) 2018b, *Threatened and Priority Fauna List 15 February 2018*, Perth.

Department of Biodiversity Conservation and Attractions (DBCA) 2019a, *Conservation Codes for Western Australian Flora and Fauna - last updated 3 January 2019*.

Department of Biodiversity Conservation and Attractions (DBCA) 2019b, *Vegetation Complexes - South West forest region of Western Australia (DBCA-047)*, Kensington.

Department of Biodiversity Conservation and Attractions (DBCA) 2021, *Vegetation Complexes - Swan Coastal Plain (DBCA_046)*, Perth, Western Australia.

Department of Environment and Energy (DoEE) 2016a, *Modelled distribution for Baudin's Cockatoo (Calyptorhynchus baudinii)*, Canberra.

Department of Environment and Energy (DoEE) 2016b, *Modelled distribution for Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)*, Canberra.

Department of Parks and Wildlife (DPaW) 2013, *Carnaby's Cockatoo (Calyptorphynchus latirostris) Recovery Plan*.

Department of Primary Industries and Regional Development (DPIRD) 2018, *Pre-European Vegetation – Western Australia (DPIRD-006)*, South Perth.

Department of Primary Industries and Regional Development (DPIRD) 2020, *Current Extent of Native vegetation - Western Australia dataset (DPIRD-005)*, Perth, Western Australia.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011, *Modelled distribution of Carnaby's black cockatoo (Calyptorhynchus latirostris)*, Commonwealth of Australia, Canberra, Australian Capital Territory.

Forest Products Commission 2020, *Forest Products Commission Plantations (FPC-001)*.

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Appendix B

Database search results

EPBC Act Protected Matters Report

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

Report created: 20-Nov-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	53
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	16
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	15
Key Ecological Features (Marine):	None
Biologically Important Areas:	1
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status
Natural		
Lesueur National Park	WA	Listed place

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Aphelocephala leucopsis		
Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
[Numenius madagascariensis](#)		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Rostratula australis](#)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
[Sternula nereis nereis](#)		
Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
[Zanda latirostris listed as Calyptorhynchus latirostris](#)		
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area
MAMMAL		
[Bettongia penicillata ogilbyi](#)		
Woylie [66844]	Endangered	Species or species habitat likely to occur within area
[Dasyurus geoffroii](#)		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
[Macroderma gigas](#)		
Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area
[Parantechinus apicalis](#)		
Dibbler [313]	Endangered	Species or species habitat may occur within area
PLANT		
[Acacia forrestiana](#)		
Forest's Wattle [17235]	Vulnerable	Species or species habitat known to occur within area
[Acacia splendens](#)		
Splendid Wattle, Dandaragan Wattle [81510]	Endangered	Species or species habitat known to occur within area
[Acacia wilsonii](#)		
Wilson's Wattle [65228]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat known to occur within area
Anigozanthos viridis subsp. terraspectans Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat known to occur within area
Banksia catoglypta [85021]	Vulnerable	Species or species habitat known to occur within area
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area
Banksia serratuloides subsp. perissa Northern Serrate Dryandra [82767]	Critically Endangered	Species or species habitat known to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Caleana dixonii listed as Paracaleana dixonii Sandplain Duck Orchid [87944]	Endangered	Species or species habitat known to occur within area
Chamelaucium lullfitzii listed as Chamelaucium sp. Gingin (N.G.Marchant 6) Gingin Wax [92777]	Endangered (listed as Chamelaucium sp. Gingin	Species or species habitat may occur within area
Conospermum densiflorum subsp. unicephalatum One-headed Smokebush [64871]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat may occur within area
Eremophila scaberula Rough Emu Bush [16729]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Eucalyptus absita Badgingarra Box [24260]	Endangered	Species or species habitat known to occur within area
Eucalyptus argutifolia Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus crispata Yandanooka Mallee [24268]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus dolorosa Dandaragan Mallee, Mount Misery Mallee [56709]	Endangered	Species or species habitat may occur within area
Eucalyptus impensa Eneabba Mallee [56711]	Endangered	Species or species habitat may occur within area
Eucalyptus johnsoniana Johnson's Mallee [14516]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus lateritica Laterite Mallee [6271]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus leprophloia Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat known to occur within area
Eucalyptus pruiniramis Midlands Gum, Jingymia Gum [56403]	Endangered	Species or species habitat known to occur within area
Eucalyptus suberea Cork Mallee, Mount Lesueur Mallee [5529]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Grevillea batrachioides Mt Lesueur Grevillea [21735]	Endangered	Species or species habitat known to occur within area
Grevillea christineae Christine's Grevillea [64520]	Endangered	Species or species habitat likely to occur within area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
Grevillea humifusa Spreading Grevillea [61182]	Endangered	Species or species habitat known to occur within area
Hakea megalosperma Lesueur Hakea [10505]	Vulnerable	Species or species habitat known to occur within area
Hemiandra gardneri Red Snakebush [7945]	Endangered	Species or species habitat likely to occur within area
Leucopogon obtectus Hidden Beard-heath [19614]	Endangered	Species or species habitat known to occur within area
Macarthuria keigheryi Keighery's Macarthuria [64930]	Endangered	Species or species habitat likely to occur within area
Patersonia spirifolia Spiral-leaved Patersonia [83927]	Endangered	Species or species habitat likely to occur within area
Petrophile nivea [75847]	Vulnerable	Species or species habitat may occur within area
Ptychosema pusillum Dwarf Pea [11268]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Spirogardnera rubescens		
Spiral Bush [15667]	Endangered	Species or species habitat known to occur within area
Tetratheca nephelioides		
[83217]	Critically Endangered	Species or species habitat likely to occur within area
Thelymitra stellata		
Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area
REPTILE		
Egernia stokesii badia		
Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area
SHARK		
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Sterna dougallii		
Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Unknown	
Commonwealth Land - [51994]	WA
Commonwealth Land - [52115]	WA
Commonwealth Land - [51489]	WA

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Bird		

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Badgingarra	National Park	WA
Boothendarra	Nature Reserve	WA
Coomallo	Nature Reserve	WA
Drovers Cave	National Park	WA
Hill River	Nature Reserve	WA
Lesueur	National Park	WA
Nambung	National Park	WA
Southern Beekeepers	Nature Reserve	WA
Twyata	Nature Reserve	WA
Unnamed WA29719	Nature Reserve	WA

Protected Area Name	Reserve Type	State
Unnamed WA29901	Conservation Park	WA
Unnamed WA33287	Nature Reserve	WA
Unnamed WA41986	Conservation Park	WA
Unnamed WA48717	Conservation Park	WA
Unnamed WA51272	Conservation Park	WA
Wongonderrah	Nature Reserve	WA

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Atlas Mineral Sands Project	2021/9056		Assessment
Jurien East Road Upgrade, 3 km NNE Jurien Bay, WA	2020/8740		Post-Approval
Waddi Wind Farm	2023/09639		Assessment
Controlled action			
Atlas Mineral Sands Mine	2020/8813	Controlled Action	Completed
Brand Highway Widening and Passing Lanes Project 34.83-164.3 SLK	2017/7864	Controlled Action	Post-Approval
Not controlled action			
Cooljarloo Mine Falcon Extension	2007/3556	Not Controlled Action	Completed
Development of the Badgingarra Wind Farm	2008/4065	Not Controlled Action	Completed
Development of the Dandaragan Wind Farms	2011/6006	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Northern Looping project, Karratha to Gingin	2005/2251	Not Controlled Action	Completed
Waddi Wind and Solar Farm, near Dandaragan, WA	2018/8352	Not Controlled Action	Completed
Not controlled action (particular manner)			
Transmission Line Rebuild and Extension	2009/5105	Not Controlled Action	Post-Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
		(Particular Manner)	
UIL Energy 2D Seismic Survey, Perth Basin, WA	2015/7554	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
Badgingarra Wind Farm	2007/3529	Referral Decision	Completed
Transmission Line Rebuild and Extension	2009/4972	Referral Decision	Completed

Biologically Important Areas

Scientific Name	Behaviour	Presence
Seabirds		
Sterna dougallii		
Roseate Tern [817]	Foraging	Known to occur

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact us page.

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Category	Species name
AMPHIBIA	*Crinia glauerti*
	Crinia insignifera
	Crinia pseudinsignifera
	Crinia sp.
	Heleioporus albopunctatus
	Heleioporus albopunctatus Gray, 1841
	Heleioporus eyrei
	Heleioporus psammophilus
	Heleioporus sp.
	Limnodynastes dorsalis
	Litoria adelaidensis
	Litoria moorei
	Myobatrachus gouldii
	Neobatrachus kunapalari Mahony and Roberts, 1986
	Neobatrachus pelobatoides
	Pseudophryne guentheri
	Pseudophryne guentheri Boulenger, 1882
BIRDS	*Acanthagenys rufogularis*
	Acanthiza apicalis
	Acanthiza chrysorrhoa
	Acanthiza inornata
	Acanthiza uropygialis
	Acanthorhynchus superciliosus
	Accipiter cirrocephalus
	Accipiter fasciatus
	Accipiter fasciatus subsp. fasciatus
	Acrocephalus australis
	Actitis hypoleucos
	Aegotheles cristatus
	Aegotheles cristatus subsp. cristatus

Anas castanea
Anas gracilis
Anas platyrhynchos
Anas rhynchotis
Anas superciliosa
Anhinga novaehollandiae
Anthochaera carunculata
Anthochaera lunulata
Anthus australis
Anthus australis subsp. australis
Apus pacificus
Aquila audax
Ardea alba
Ardea modesta
Ardea pacifica
Ardeotis australis
Arenaria interpres
Arenaria interpres subsp. interpres
Artamus cinereus
Artamus cyanopterus
Artamus personatus
Aythya australis
Barnardius zonarius
Biziura lobata
Cacatua pastinator
Cacatua pastinator subsp. butleri
Cacatua roseicapilla
Cacatua roseicapilla subsp. assimilis
Cacatua sanguinea
Cacatua sanguinea subsp. westralensis
Cacatua tenuirostris
Cacomantis flabelliformis

Cacomantis pallidus
Calamanthus campestris
Calamanthus campestris subsp. montanellus

Calamanthus cautus
Calidris acuminata
Calidris alba
Calidris canutus
Calidris ferruginea
Calidris melanotos
Calidris ruficollis
Calidris subminuta
Calidris tenuirostris
Calyptorhynchus banksii subsp. samueli
Calyptorhynchus sp.
Calyptorhynchus sp. 'white-tailed black cockatoo'
Charadrius leschenaultii
Charadrius mongolus
Charadrius rubricollis
Charadrius ruficapillus
Chenonetta jubata
Cheramoeca leucosterna
Cheramoeca leucosternus
Chroicocephalus novaehollandiae
Chrysococcyx basalis
Chrysococcyx lucidus subsp. plagosus
Cincloramphus cruralis
Cincloramphus mathewsi
Circus approximans
Circus assimilis
Cladorhynchus leucocephalus

Colluricincla harmonica
Colluricincla harmonica subsp. rufiventris
Columba livia
Coracina novaehollandiae
Corvus bennetti
Corvus coronoides
Corvus coronoides subsp. perplexus
Coturnix pectoralis
Coturnix ypsilophora
Cracticus nigrogularis
Cracticus tibicen
Cracticus torquatus
Cracticus torquatus subsp. torquatus
Cuculus pallidus
Cygnus atratus
Dacelo novaeguineae
Daphoenositta chrysoptera
Daphoenositta chrysoptera subsp. pileata
Dicaeum hirundinaceum
Dromaius novaehollandiae
Egretta garzetta
Egretta novaehollandiae
Egretta sacra
Elanus axillaris
Elanus caeruleus subsp. axillaris
Elseyornis melanops
Eolophus roseicapillus
Eopsaltria georgiana
Eopsaltria griseogularis
Epthianura albifrons
Epthianura aurifrons
Epthianura tricolor

Erythrogonys cinctus
Falco berigora
Falco berigora subsp. berigora
Falco cenchroides
Falco cenchroides subsp. cenchroides
Falco hypoleucos
Falco longipennis
Falco peregrinus
Fulica atra
Fulmarus glacialoides
Gallirallus philippensis
Gallirallus philippensis subsp. mellori
Gavicalis virescens
Gelochelidon nilotica
Geophaps plumifera
Gerygone fusca
Gerygone fusca subsp. fusca
Glossopsitta porphyrocephala
Glyciphila melanops
Grallina cyanoleuca
Gygis alba
Haematopus fuliginosus
Haematopus longirostris
Haliaeetus leucogaster
Haliastur sphenurus
Hieraaetus morphnoides
Himantopus himantopus
Hirundo neoxena
Hirundo nigricans
Hydroprogne caspia
Lalage tricolor
Larus dominicanus

Larus novaehollandiae subsp. novaehollandiae

Larus pacificus
Leipoa ocellata
Lichenostomus leucotis
Lichenostomus ornatus
Lichenostomus penicillatus
Lichenostomus virescens
Lichmera indistincta
Lichmera indistincta subsp. indistincta
Limosa lapponica
Limosa lapponica subsp. menzbieri
Limosa limosa
Lophoictinia isura
Macronectes giganteus
Malacorhynchus membranaceus
Malurus lamberti
Malurus lamberti subsp. assimilis
Malurus leucopterus
Malurus leucopterus subsp. leuconotus
Malurus pulcherrimus
Malurus sp.
Malurus splendens
Malurus splendens subsp. splendens
Manorina flavigula
Megalurus gramineus
Megalurus gramineus subsp. gramineus
Melanodryas cucullata
Melithreptus brevirostris
Melopsittacus undulatus
Merops ornatus
Microcarbo melanoleucos

Microeca fascinans
Milvus migrans
Morus serrator
Neophema petrophila
Ninox connivens
Ninox novaeseelandiae
Ninox novaeseelandiae subsp. boobook
Numenius phaeopus
Nycticorax caledonicus
Nymphicus hollandicus
Oceanites marinus subsp. dulciae
Ocyphaps lophotes
Onychoprion anaethetus
Oreoica gutturalis
Oxyura australis
Pachycephala pectoralis
Pachycephala pectoralis subsp. fuliginosa
Pachycephala rufiventris
Pachycephala rufiventris subsp. rufiventris
Pandion cristatus
Pandion haliaetus subsp. cristatus
Pardalotus punctatus
Pardalotus striatus
Pelecanoides urinatrix subsp. exsul
Pelecanus conspicillatus
Petrochelidon ariel
Petrochelidon nigricans
Petroica boodang
Petroica cucullata
Petroica goodenovii
Pezoporus flaviventris
Phalacrocorax carbo

Phalacrocorax sulcirostris
Phalacrocorax varius
Phaps chalcoptera
Phaps elegans
Phylidonyris melanops
Phylidonyris niger
Phylidonyris nigra
Phylidonyris novaehollandiae
Platalea flavipes
Platycercus icterotis subsp. icterotis
Platycercus icterotis subsp. xanthogenys
Platycercus zonarius
Platycercus zonarius subsp. semitorquatus
Platycercus zonarius subsp. zonarius
Plegadis falcinellus
Pluvialis fulva
Pluvialis squatarola
Podargus strigoides
Podiceps cristatus
Poliocephalus poliocephalus
Polytelis anthopeplus
Polytelis anthopeplus subsp. westralis
Pomatostomus superciliosus
Pomatostomus superciliosus subsp. ashbyi
Porphyrio porphyrio
Porzana fluminea
Porzana tabuensis
Puffinus assimilis subsp. assimilis
Puffinus pacificus
Purnella albifrons
Pyrrholaemus brunneus
Recurvirostra novaehollandiae

Rhipidura albiscapa
Rhipidura fuliginosa subsp. preissi
Rhipidura leucophrys
Rhipidura leucophrys subsp. leucophrys
Sericornis frontalis
Sericornis frontalis subsp. maculatus
Smicrornis brevirostris
Stercorarius antarcticus
Sterna anaethetus subsp. anaethetus
Sterna bergii
Sterna caspia
Sterna dougallii
Sterna dougallii subsp. gracilis
Sterna fuscata subsp. nubilosa
Sterna nereis subsp. nereis
Sterna paradisaea
Sternula nereis
Sternula nereis subsp. nereis
Stictonetta naevosa
Stiltia isabella
Stipiturus malachurus
Strepera versicolor
Streptopelia chinensis
Streptopelia senegalensis
Sugomel niger
Tachybaptus novaehollandiae
Tadorna tadornoides
Taeniopygia guttata
Thalasseus bergii
Thinornis rubricollis
Threskiornis molucca
Threskiornis spinicollis

Todiramphus pyrrhopygia
Todiramphus sanctus
Todiramphus sanctus subsp. sanctus
Tribonyx ventralis
Tringa brevipes
Tringa glareola
Tringa nebularia
Turnix varia
Turnix varius
Turnix velox
Tyto alba
Vanellus tricolor
Zanda latirostris
Zosterops lateralis
Zosterops lateralis subsp. gouldi

INVERTEBRATES

Acariformes sp.
Acarina 001
Adoxotoma chinopogon Simon, 1909
Adoxotoma chionopogon
Adversaeschna brevistyla
Aedes alboannulotus
Aedes camptorhynchus
Aedes sp.
Aedes sp. 4 (SAP)
Aeolosoma sp. 1 (PSS)
Aeshnidae sp.
Aganippe sp.
Agraptocorixa eurynome
Agraptocorixa parvipunctata
Ainudrilus sp. WA30 (nr nharna)
Alboa worooa
Allodessus bistrigatus

Alona rectangula novaezealandiae
Alona rigidicaudis
Amblyomma triguttatum
Aname mainae
Aname tepperi
Anax papuensis
Anisops baylii
Anisops gratus
Anisops hyperion
Anisops sp.
Anisops thienemanni
Anopheles annulipes s.l.
Anopheles sp.
ant sp.
Antichiropus sulcatus
Antichiropus whistleri
Antiporus gilberti
Antiporus sp.
Apocyclops dengizicus
Araneae sp.
Araneus cyphoxis
Araneus eburneiventris
Araneus senicaudatus
Archiargiolestes pusillus
Argiope protensa
Arrenurus (Micruracarus) sp. 1 (SAP)
Artoria schizocoides
Artoria sp. 3
Artoria taeniifera
Artoriopsis expolita
Asadipus muckera
Asadipus phaleratus

Asteron-complex sp. 5
Austracantha minax
Australocamptus near sp. 5 (SAP)
Australocyclops australis
Australocypris insularis
Australutica sp. 1
Austrochiltonia subtenuis
Austrolestes aleison
Austrolestes analis
Austrolestes annulosus
Austrolestes io
Austrosaga spinifer
Austrosimulium furiosum
Austrotrombella sp. nov. (SAP)
Backobourkia collina
Backobourkia heroine
Baetidae sp.
Baiami tegenarioides
Baiami volucripes
Ballarra longipalpus
Bassianobdella sp.
Bdelloidea med-large contracted of RJS (SAP)
beetle sp.
Bennelongia barangaroo lineage
Bennelongia sp.
Berosus approximans
Berosus discolor
Berosus majusculus
Berosus nutans
Berosus sp.
Bezzia sp. 2 (SAP)
Bigenditia zuytdorp

Boeckella triarticulata
Bothriembryon perobesus
Bothriembryon sp. nov. 'Gingin Brook'
Buddelundia sp. B38
Buddelundia sp. B39
Caboncypris kondininensis
Caenidae sp.
Calamoecia clitellata
Calamoecia clittellata
Calamoecia sp. 342 (ampulla variant) (CB)
Calanoida sp.
Candonocypris novaezelandiae
Capitella sp.
Cavasteron sp. 1
Ceinidae sp.
Cephalodella gibba
Ceratopogonidae sp.
Cercophonius granulosus
Cercophonius sp.
Cercophonius sulcatus
Cherax quinquecarinatus
Chironominae sp.
Chironomus aff. alternans (V24) (CB)
Chironomus occidentalis
Chironomus tepperi
Cladopelma curtivalva
Cladotanytarsus sp. A (SAP)
Cletocamptus aff deitersi
Cletocamptus dietersi
Cloeon sp.
Clynotis albobarbatus
Coenagrionidae sp.

Corduliidae sp.
Corixidae sp.
Cormocephalus novaehollandiae
Cormocephalus strigosus
Corynoneura sp. (V49) (SAP)
Coxiella sp.
Cryptochironomus griseidorsum
Culex (Culex) australicus
Culex globocoxitus
Culex sp.
Culicidae sp.
Culicoides sp.
Curculionidae sp.
Cypretta baylyi
Cyprideis australiensis
Cyprididae sp.
Cyprinotus cingalensis (ex edwardi)
Daphnia carinata
Daphnia cf. carinata (SAP)
Daphnia jollyi
Daphnia truncata
Daphnia wardi
Dasyhelea sp.
Diacypris compacta
Diacypris spinosa
Dicrotendipes pseudoconjunctus
Dineutus australis
Dingosa murata
Diplacodes bipunctata
Dipoena sp. 2
Dolichopodidae sp.
Dolichopodidae sp. B (SAP)

Dunhevedia crassa
Dytiscidae sp.
earthworm sp.
Empididae sp.
Enchytraeidae jcs1
Enchytraeidae jcs2
Enchytraeidae jcs4
Enchytraeidae jcs5
Enchytraeidae jcs6
Enchytraeidae sp.
Enochrus elongatulus
Ephydridae sp.
Ephydridae sp. 20
Ephydridae sp. 3 (SAP)
Ephydridae sp. 6 (SAP)
Eretes australis
Ethmostigmus curtipes
Ethmostigmus rubripes
Euasteron juliannae
Eucyclops australiensis
Eucyrtops riparia
Eulimnadia sp.
Euoplos mcmillani
Exocelina ater
Eylais sp.
fly 001
fly 004
fly 005
fly 006
fly 007
fly sp.
Forcypomyia sp.

Forcypomyia sp. 2 (SAP)
Gamasomorpha sp. 4
Gamasomorpha sp. 7
Gamasomorpha sp. 9
Geogarypus taylori
Glyptophysa sp
Gmogola sp. B
Goddardobdella elegans
Grayenulla australensis Zabka, 1992
Gripopterygidae sp.
Grymeus sp. 9
Gymnometriocnemus spp. (not V44 or V45)
Gyrinidae sp.
Habronestes australiensis
Habronestes sp. 9
Halicyclops sp. 1 (nr ambiguus) (SAP)
Haliplidae sp.
Haliplus fuscatus
Haliplus sp.
Haloniscus searlei
Hellyethira litua
Hemicordulia tau
Hemisaga vepreculae
Henicops dentatus
Heterocypris incongruens
Heterocypris tatei
Hirudinea sp.
Hogna crispipes
Hogna kuyani
Holocnemus pluchei
Holoplatys chudalupensis Zabka, 1991
Hyderodes sp.

Hydrachna nr. approximata (SAP)
Hydrachna sp.
Hydrometra strigosa
Hydrophilidae sp.
Hydrophilus sp.
Hydroptilidae sp.
Hylaeus globuliferus
Hyphydrus elegans
Hypomegalopsalis tanisphyros
Idiommata blackwalli
Idiosoma nigrum
Idiosoma sigillatum
Ilyocypris australiensis
Ilyodromus sp 573 (SAP)
Indolpium sp. B15
Insulodrilus lacustris s.l.
Ischnura aurora aurora
Ischnura heterosticta heterosticta
Isometroides vescus
Isopeda leishmanni
Kennethia cristata
Kennethia sp.
Keratella australis
Keratella cf. quadrata (SAP)
Keratella procurva
Keratella slacki
Kiefferulus intertinctus
Laetesia mollita
Lamponata daviesae Platnick, 2000
Lamponina scutata
Lamponina sp. 2
Lancetes lanceolatus

Laophontidae sp. 2
Larsia albiceps
Latonopsis brehmi
Latrodectus hasseltii
Latrodectus hasseltii Thorell, 1870
Lecane bulla
Lecane ichthyoura (ex ercodes subsp.)
Lecane ludwigi form appendiculata
Lecane sp. nov. a (Little 3 Springs) (SAP)
Lepadella cf. patella (SAP)
Lepadella sp. nov. (Little 3 Springs) (SAP)
Lepidoptera (non-pyralid)
Lepidoptera (non-pyralid) sp. 3 (SAP)
Lepidoptera sp.
Leptocaris nr brevicornis
Leptoceridae sp.
Leptus minno
Lestidae sp.
Libellulidae sp.
Limbodessus inornatus
Limbodessus shuckhardi
Limbodessus sp.
Limnesia sp.
Limnocythere mowbrayensis
Limnocythere sp.
Limnophyes vestitus (V41)
Limnoxenus sp.
Limnoxenus zelandicus
Lychas sp.
Lychas sp. 5
Lycidas sp. 1
Lycidas sp. 3

Lycidas sp. 4
Lycosa ariadnae
Lycosa australicola
Lycosa sp. 1
Lycosa sp. 25
Lycosa sp. 6
Lynceus sp.
Lynceus tatei
Macrothrix breviseta
Macrothrix sp.
Manayunkia n. sp.
Maratus pavonis
Maratus sp.
Margaromma sp. 1
Margaromma sp. 2
Masasteron sampeyae
Matilda sp. 2
Megapodagrionidae sp.
Megaporus howittii
Megaporus sp.
Melita kauerti
Meridiecyclops baylyi
Merridinia sp. 2
Mesochra baylyi
Mesochra nr flava
Mesochra parva
Mesocyclops brooksi
Mesostigmata sp.
Mesovelia hungerfordi
Mesovelia sp.
Microcyclops varicans
Micronecta gracilis

Micronecta robusta
Micropholcomma? sp. 4
Microvelia (Austromicrovelia) peramoena
Microvelia (Pacificovelia) oceanica
Microvelia sp.
Missulena granulosa
Missulena hoggi
Missulena sp. 1
Moina australiensis
Moina cf. micrura (SAP)
Monohelea sp. 3 (SAP)
Muscidae sp.
Muscidae sp. A (SAP)
Myandra bicincta
Myrmopopaea sp.
Mytilocypris ambiguosa
Mytilocypris mytiloides
Naididae (ex Tubificidae)
Naidinae (ex Naididae)
Necterosoma darwini
Necterosoma penicillatus
Necterosoma regulare
Necterosoma sp.
Nematoda sp.
Neostorena sp. 12
Neostorena sp. 14
Neostorena sp. 2
Neostorena sp. 21
Neostorena sp. 3
Nephila edulis
Nicodamus mainae
Nitocra reducta

Nitocra sp. 4 (SAP)
Nitocra sp. 5 (nr reducta) (SAP)
Nostera sp. 10
Nostera sp. 5
Notalina spira
Notiasemus glauerti
Notonectidae sp.
Nunciella aspera
Oecetis sp.
Ogyris otanes
Oligochaeta sp.
Oniscidae sp.
Onychocamptus bengalensis
Onychohydrus scutellaris
Onychohydrus sp.
Opisthopora sp.
Opopaea sp. 1
Opopaea sp. 13
Opopaea sp. 17
Opopaea sp. 18
Opopaea sp. 5
Oribatida sp.
Oribatida sp. JCS1
Orthetrum caledonicum
Orthocladiinae SO3 sp. A (SAP)
Orthocladiinae sp.
Ozarchaea westraliensis
Palaemonetes australis
Palaemonidae sp.
Paracyclops chiltoni
Paracymus pygmaeus
Paralimnadia sp. a (nr badia) (SAP)

Paralimnophyes pullulus (V42)
Paramerina levidensis
Paranacaena littoralis
Paraplatoides sp. 1
Pararchaea sp. 2
Parartemia extracta
Parastacidae sp.
Parastenocarididae sp.
Paroster niger
Paroster sp.
Pellenes bitaeniata
Pescecyclops sp. 1 (nr stagnalis in Morton)
Pescecyclops sp. 434 (Stuart's original arnaudi sensu Sars)
Pescecyclops sp. 442=462=465=CB2 (salinarum in Morton)
Pezidae sp.
Phasmodes jeeba
Phenasteron longiconductor
Phenasteron longiconductor Baehr & Jocqu???, 2001
Philosciidae sp.
Phreatoicidae sp.
Physidae sp.
Pinkfloydia harveii
Planorbidae sp.
Platycypris baueri
Platynectes aenescens
Platynectes decempuntatus var polygrammus
Pleuroxus inermis
Polyarthra dolichoptera
Polypedilum nubifer
Potamothrix bavaricus
Procladius paludicola
Procladius villosimanus

Protochelifer cavernarum
Pseudolampona boree Platnick, 2000
Pseudopallene ambigua
pseudoscorpion sp.
Psychodinae sp. 2 (SAP)
Pyralidae sp.
Raveniella arenacea
Raveniella cirrata
Recifella sp. JCS
Reticypris clava
Reticypris sp.
Rhantus suturalis
Richardsonianidae sp.
Saldidae sp.
Sarscypridopsis aculeata
Sarscypridopsis sp. 165
Sciomyzidae sp.
Scirtidae sp.
Sigara mullaka
Simocephalus elizabethae
Simuliidae sp.
Simulium ornatipes
spider sp.
springtail 003
springtail sp.
Staphylinidae sp.
Sternopriscus multimaculatus
Sternopriscus sp.
Stratiomyidae sp.
Supunna funerea
Supunna picta
Symphytognatha fouldsi

Synemon gratiosa
Synsphyronus callus
Syrphidae sp.
Tabanidae sp.
Tamopsis circumvidens
Tanypodinae sp.
Tanytarsus barbitarsis
Tanytarsus fuscithorax/semibarbitarsus
Tanytarsus sp. E (SAP)
Tardigrada sp.
Tasmanicosa leuckartii
Tasmanocoenis tillyardi
Teyl sp. 1
Teyl sp. 10
Teyl sp. 16
Thereuopoda lesueurii
Thienemanniella sp. (V19) (SAP)
Tipulidae type C (SAP)
Trichocerca similis
Triplectides australis
Urodacus armatus
Urodacus hartmeyeri
Urodacus hoplurus
Urodacus novaehollandiae
Urodacus sp. 10
Veliidae sp.
Venator immansueta
Venator koyuga
Wandella barbarella Gray, 1994
white ant sp.
Xanthagrion erythroneurum
Zachria flavicoma

	Zebraplatys keyserlingi
Mammals	*Balaenoptera acutorostrata*
	Bettongia penicillata subsp. ogilbyi
	Canis lupus
	Canis lupus subsp. dingo
	Cercartetus concinnus
	Chalinolobus gouldii
	Chalinolobus morio
	Dugong dugon
	Eubalaena australis
	Felis catus
	Hydrurga leptonyx
	Isoodon fusciventer
	Isoodon obesulus
	Macroderma gigas
	Macropus fuliginosus
	Macropus irma
	Macropus robustus subsp. erubescens
	Macropus sp.
	Megaptera novaeangliae
	Mus musculus
	Mus musculus Linnaeus, 1758
	Neophoca cinerea
	Notamacropus eugenii subsp. derbianus
	Notamacropus irma
	Nyctophilus geoffroyi
	Oryctolagus cuniculus
	Parantechinus apicalis
	Phascogale tapoatafa subsp. wambenger
	Potorous platyops
	Pseudomys albocinereus
	Pteropus scapulatus

Rattus fuscipes
Rattus rattus
Sminthopsis crassicaudata
Sminthopsis dolichura
Sminthopsis dolichura Kitchener, Stoddart and Henry, 1984
Sminthopsis fuliginosus
Sminthopsis gilberti
Sminthopsis granulipes
Sminthopsis granulipes Troughton, 1932
Sminthopsis griseoventer
Sminthopsis griseoventer subsp. boullangerensis
Sminthopsis griseoventer subsp. griseoventer
Stenella coeruleoalba
Tachyglossus aculeatus
Tadarida australis
Tarsipes rostratus
Tarsipes rostratus Gervais and Verraux, 1842
Tursiops aduncus
Tursiops truncatus
Vespadelus regulus
Vulpes vulpes

REPTILES

Aclys concinna
Acritoscincus trilineatus
Anilios australis
Antaresia stimsoni subsp. stimsoni
Aprasia repens
Aprasia sp.
Aspidites ramsayi
Brachyurophis fasciolatus subsp. fasciolatus
Brachyurophis semifasciata
Brachyurophis semifasciatus
Chelodina colliei

Christinus marmoratus
Crenadactylus ocellatus subsp. ocellatus
Cryptoblepharus buchananii
Cryptoblepharus plagiocephalus
Ctenoph sp B SAP
Ctenophorus adelaidensis
Ctenophorus adelaidensis subsp. chapmani
Ctenophorus maculatus
Ctenophorus maculatus subsp. griseus
Ctenophorus maculatus subsp. maculatus
Ctenotus australis
Ctenotus catenifer
Ctenotus fallens
Ctenotus fallens Storr, 1974
Ctenotus gemmula
Ctenotus gemmula subsp. (Swan Coastal Plain subpop.)
Ctenotus impar
Ctenotus lancelini
Ctenotus pantherinus
Ctenotus pantherinus subsp. calx
Ctenotus pantherinus subsp. pantherinus
Ctenotus schomburgkii
Cyclodomorphus branchialis
Cyclodomorphus celatus
Cyclodomorphus sp.
Delma australis
Delma concinna
Delma concinna subsp. concinna
Delma fraseri
Delma grayii
Demansia psammophis
Demansia psammophis subsp. reticulata

Dermochelys coriacea
Diplodactylus alboguttatus
Diplodactylus alboguttatus Werner, 1910
Diplodactylus granariensis
Diplodactylus ornatus
Diplodactylus ornatus Gray, 1845
Diplodactylus polyophthalmus
Diplodactylus pulcher
Diplodactylus sp.
Echiopsis curta
Egernia kingii
Egernia multiscutata
Egernia multiscutata Mitchell and Behrndt, 1949
Egernia napoleonis
Egernia stokesii subsp. badia
Gehyra variegata
Hemiergis quadrilineata
Hydrophis elegans
Lerista christinae
Lerista christinae Storr, 1979
Lerista distinguenda
Lerista elegans
Lerista lineopunctulata
Lerista planiventralis
Lerista planiventralis subsp. decora
Lerista praepedita
Lialis burtonis
Liopholis multiscutata
Liopholis pulchra subsp. longicauda
Lucasium alboguttatum
Lucasium alboguttatus
Menetia greyii

Menetia greyii Gray, 1845
Moloch horridus
Moloch horridus Gray, 1841
Morelia spilota imbricata
Morelia spilota subsp. imbricata
Morethia lineoocellata
Morethia obscura
Morethia obscura Storr, 1973
Morethia sp.
Neelaps bimaculatus
Neelaps calonotos
Parasuta gouldii
Parasuta nigriceps
Pletholax gracilis
Pletholax gracilis Cope, 1864
Pletholax gracilis subsp. gracilis
Pogona minor
Pogona minor subsp. minima
Pogona minor subsp. minor
Pseudechis australis
Pseudonaja affinis subsp. affinis
Pseudonaja mengdeni
Pygopus lepidopodus
Ramphotyphlops australis
Ramphotyphlops pinguis
Rankinia adelaidensis
Rankinia adelaidensis subsp. adelaidensis
Simoselaps anomalus
Simoselaps bertholdi
Simoselaps littoralis
Strophurus michaelseni
Strophurus spinigerus

Strophurus spinigerus subsp. inornatus
Strophurus spinigerus subsp. spinigerus
Tiliqua occipitalis
Tiliqua rugosa
Tiliqua rugosa subsp. rugosa
Underwoodisaurus milii
Varanus gouldii
Varanus tristis

Appendix C

Conservation Significant Species and Likelihood of Occurrence Assessment

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Birds					
Actitis hypoleucos	Common sandpiper	MI	MI	Edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal saltlakes (including saltwork ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available (Johnstone & Storr 1998).	Nil
Aphelocephala leucopsis	Southern whiteface	-	VU	Relatively undisturbed open woodlands and shrublands with low tree densities, with an understory of grasses or herbaceous litter cover. They require hollows and crevices in living or dead trees for roosting and nesting (DCCEEW 2023).	Nil
Apus pacificus	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities (Pizzey & Knight 2012).	Moderate
Arenaria interpres	Ruddy turnstone	MI	MI	Tidal mud and reef flats, sheltered rocky coasts, stony and seaweedy beaches and sandpits, dry coral ridges (Abrolhos) and pebbly shores of near-coastal saltlakes (including saltwork ponds) (Johnstone and Storr 1998).	Nil

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Calidris acuminata	Sharp-tailed sandpiper	MI	MI	Occurs in tidal mudflats, saltmarshes and mangroves, as well as, shallow fresh, brackish or saline inland wetlands. It is also known from floodwaters, irrigated pastures and crops, sewage ponds, saltfields (Pizzey & Knight 2012).	Nil
Calidris canutus	Red knot	EN	EN (MI	Mud and sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds (Pizzey & Knight 2012).	Nil
Calidris ferruginea	Curlew sandpiper	CR	CR (MI	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds (Johnstone & Storr 1988).	Nil
Calidris melanotos	Pectoral sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and saltlakes (Johnstone & Storr 1998).	Nil
Calidris ruficollis	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds (Pizzey and Knight 2012).	Nil
Charadrius leschenaultii	Great sand plover	VU	VU (MI	Wide sandy or shelly beaches, sandpits, tidal mudflats, reefs, sand cays, mangroves, saltmarsh, dune wilderness, bare paddocks, seldom far inland (Pizzey & Knight 2012).	Nil

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Falco peregrinus	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes (Johnstone and Storr 1998).	Moderate
Leipoa ocellata	Malleefowl	VU	VU	Scrubs and thickets of Eucalyptus spp., Melaleuca lanceolata and Acacia linophylla; also other dense litter-forming shrublands. Attracted to fallen wheat in stubbles and along roads (Johnstone and Storr 1998).	Nil
Limosa lapponica	Bar-tailed godwit	MI (&	MI	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork and sewage ponds) (Johnstone and Storr 1998).	Nil
Motacilla cinerea	Grey wagtail	MI	MI	In Australia mostly near running water in disused quarries, sandy and rocky streams in escarpments and rainforests, sewage ponds, ploughed fields and airfields (Pizzey & Knight 2012).	Nil
Ninox connivens connivens	Barking owl (southwest subpo	P3	-	Open forests, woodlands, dense scrubs, foothills, river red gums, and other large trees near watercourses penetrating otherwise open country. Also Melaleuca woodlands, mangroves, rainforests and deciduous vine scrubs (Johnstone and Storr 1998; Pizzey & Knight 2012).	Nil
Numenius madagascariensis	Eastern curlew	CR	CR (MI)	Mainly tidal mudflats; also reef flats, sandy beaches and rarely near-coastal lakes (including saltwork ponds) (Johnstone and Storr 1998).	Nil

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Pezoporus flaviventris	Western ground parrot	CR	CR	Low, dry or swampy near-coastal heathland. (DCCEEW 2023).	Nil
Pluvialis squatarola	Grey Plover	MI	MI	Mudflats, saltmarsh, tidal reefs and estuaries, rarely inland (Pizzey and Knight 2012).	Nil
Rostratula australis	Australian painted snipe	EN	EN	Mainly shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (Marchant and Higgins 1993).	Nil
Sterna dougallii	Roseate tern	MI	MI	Offshore waters, islands, coral reefs, sand cays, beaches, tidal inlets (Pizzey & Knight 2012).	Nil
Sternula nereis nereis	Australian fairy tern	VU	VU	Sheltered blue-water seas close to land, estuaries (when free of silt) and near-coastal lakes (Johnstone and Storr 1998).	Nil
Thalasseus bergii	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries (DCCEEW 2023).	Negligible
Tringa glareola	Wood sandpiper	MI	MI	Mainly shallow fresh waters (lagoons, swamps, claypans, river pools, dams, bore overflows and sewage ponds); occasionally brackish swamps, rarely saltlakes and estuaries (Pizzey & Knight 2012).	Negligible
Tringa nebularia	Common greenshank	MI	MI	Mudflats, estuaries, saltmarshes, margins of lakes, wetlands, claypans (fresh and saline), commercial saltfields, sewage ponds (Pizzey & Knight 2012).	Negligible

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Zanda baudinii	Baudin's black cockatoo	EN	EN	Mainly eucalypt forests. Attracted to seeding Corymbia calophylla, Banksia spp., Hakea spp., and to fruiting apples and pears (Johnstone and Storr 1998).	Nil
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of Pinus spp. Attracted to seeding Banksia spp., Hakea spp., Eucalyptus spp., Corymbia calophylla, Grevillea spp., and Allocasuarina spp. (Johnstone and Storr 1998).	High
Invertebrates					
Austrosaga spinifer	spiny katydid	P2	-	Unknown.	Nil
Hylaeus globuliferus	Woollybush bee	P3	-	Males are territorial and may be found perched on the growing tips of Adenanthos sp., Banksia sp. or Jacksonia sp. Has also been recorded visiting the flowers of Grevillea sp. (PaDIL 2022).	Moderate
Idiosoma gardneri	Mt Lesueur shield-backed trap	P2	-	Only one recorded specimen. Found in Lesueur National Park, likely has similar biology to Idiosoma sigillatum (Rix et al. 2018).	Moderate
Mammals					
Bettongia penicillata ogilbyi	Woylie	CR	EN	Woodlands and adjacent heaths with a dense understorey of shrubs, particularly Gastrolobium spp. (TSSC 2018).	Nil

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Dasyurus geoffroii	Chuditch	VU	VU	Wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. Appears to utilise native vegetation along roadsides in the wheatbelt (DEC 2012).	Nil
Isoodon fusciventer	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high (DEC 2012)	Nil
Macroderma gigas	Ghost bat	VU	VU	Requires undisturbed roost caves or mineshafts, usually complex systems with several openings (Menkhorst and Knight 2011).	Nil
Notamacropus irma	Western brush wallaby	P4	-	Dry sclerophyll forest, Banksia spp. woodlands and shrublands, typically favouring dense low vegetation that provides dense cover (Christensen and Strahan 1983).	Moderate
Parantechinus apicalis	Dibbler	EN	EN	Old-growth mallee heath in coastal southwest and Escape Island off Jurien Bay (Menkhorst and Knight 2011).	Nil
Reptiles					
Egernia stokesii badia	Western Spiny-tailed Skink	VU	EN	Generally widespread though patchy distribution in dry to semi-arid habitats. E.s badia subspecies occupies hollow crevices and hollow timber in the southwest interior of WA and on Dirk Hartog Island. All known localities are east of Brand Highway (Wilson and Swan 2021)	Low
Neelaps calonotos	Black-striped snake	P3	-	Coastal and near-coastal dunes, sandplains supporting heathlands and Banksia spp. woodlands (Bush et al. 2010).	Moderate

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Note: CR=critically endangered, EN=endangered, VU=vulnerable, CD=conservation dependent, MI=migratory, OS=other specially protected, P1=Priority 1, P2=Priority 2. P3=Priority 3. P4=Priority 4. Species with a high or moderate likelihood to occur within the site are shaded green.					

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Appendix D

Black Cockatoo Foraging Plant Species

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Acacia baileyana	Cootamundra wattle	Secondary	-	-	Groom 2011
Acacia pentadenia	Karri wattle	Secondary	-	-	Groom 2011
Acacia saligna	Orange wattle	Secondary	-	-	Groom 2011
Agonis flexuosa	Peppermint tree	Secondary	-	-	Groom 2011
Allocasuarina fraseriana	Sheoak	Secondary	Secondary	Secondary	Johnstone & Storr 1998; Johnstone *et al.* 2010; Johnstone 2017; DoEE 2017
Allocasuarina spp.		Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Anigozanthos flavidus	Tall kangaroo paw	-	Secondary	-	Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Araucaria heterophylla	Norfolk island pine	Secondary	-	-	Groom 2011; DoEE 2017
Banksia ashbyi	Ashby's banksia	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia attenuata	Slender banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia baxteri	Baxter's banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia carlinoides	Pink dryandra	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia coccinea	Scarlet banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia dallanneyi	Couch honeypot dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia ericifolia	Heath-leaved banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia fraseri		Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia gardneri	Prostrate banksia	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia grandis	Bull banksia	Primary	Secondary	-	Saunders 1980; Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia hookeriana	Hooker's banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia ilicifolia	Holly banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; Johnstone & Storr 1998; DoEE 2017
Banksia kippistiana		Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia leptophylla		Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia lindleyana	Porcupine banksia	Primary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Banksia littoralis	Swamp banksia	Primary	Secondary	-	Saunders 1980; Groom 2011Johnstone & Storr 1998; Johnstone *et al.* 2010; DoEE 2017
Banksia menziesii	Firewood banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia mucronulata	Swordfish dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia nivea	Honeypot dryandra	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia nobilis	Golden dryandra	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Banksia praemorsa	Cut-leaf banksia	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia prionotes	Acorn banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia prolata		Primary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Banksia quercifolia	Oak-leaved banksia	Primary	Secondary	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia sessilis	Parrot bush	Primary	Secondary	-	Saunders 1980; Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia speciosa	Showy banksia	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia spp.		Primary	Secondary	-	Saunders 1979; DSEWPaC 2012; DoEE 2017
Banksia squarrosa	Pingle	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Banksia tricuspis	Pine banksia	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia undata	Urchin dryandra	Primary	Secondary	-	Groom 2011; DoEE 2017
Banksia verticillata	Granite banksia	Primary	Secondary	-	Saunders 1980; Groom 2011; DoEE 2017
Brassica campestris	Canola	Secondary	-	-	Groom 2011; DoEE 2017
Callistemon spp.		Secondary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Callistemon viminalis	Captain cook bottlebrush	Secondary	-	-	Groom 2011
Callitris sp.		Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Carya illnoinensis	Pecan	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; Groom 2014; DoEE 2017
Casuarina cunninghamiana	River sheoak	Secondary	-	-	Groom 2011
Citrullus lanatus	Pie or afghan melon	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Corymbia calophylla	Marri	Primary	Primary	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Saunders 1979; Johnstone & Kirkby 2008
Corymbia citriodora	Lemon scented gum	Secondary	Secondary	Secondary	Johnstone *et al.* 2010; DSEWPaC 2012; Groom 2011; Johnstone 2017
Corymbia ficifolia	Red flowering gum	Secondary	-	-	Groom 2011
Corymbia haematoxylon	Mountain marri	Secondary	-	Secondary	Groom 2011; DoEE 2012; DoEE 2017
Corymbia maculata	Spotted gum	-	-	-	-
Darwinia citriodora	Lemon-scented darwinia	Secondary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Diospryros sp.	Sweet persimmon	Secondary	Secondary	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eremophila glabra	Tarbush	Secondary	-	-	Groom 2011
Erodium aureum		Secondary	-	-	Groom 2011
Erodium botrys	Long storksbill	Secondary	Secondary	-	Groom 2011; Johnstone & Storr 1998; Johnstone *et al.* 2010
Erodium spp.		Secondary	Secondary	-	Johnstone *et al.* 2010; DoEE 2017
Eucalyptus caesia	Silver princess	Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone 2017
Eucalyptus camaldulensis	River red gum	-	-	Secondary	DoEE 2012; DoEE 2017
Eucalyptus decipiens	Red heart/moit	-	-	Secondary	Johnstone 2017
Eucalyptus diversicolor	Karri	-	-	Primary	Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998
Eucalyptus erythrocorys	Illyarrie	Secondary	-	Secondary	DSEWPaC 2012; DoEE 2017; Johnstone 2017, Johnstone *et al.* 2010
Eucalyptus gomphocephala	Tuart	Secondary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus grandis	Flooded gum, rose gum	-	-	Secondary	DoEE 2012; DoEE 2017
Eucalyptus lehmannii	Bushy yate	-	-	Secondary	Johnstone 2017
Eucalyptus leucoxylon	Yellow gum	Secondary	-	-	Groom 2014

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Eucalyptus loxophleba	York gum	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus marginata	Jarrah	Primary	Secondary	Primary	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone 2017
Eucalyptus patens	Blackbutt	Primary	-	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Groom 2011
Eucalyptus pleurocarpa	Tallerack	Secondary	-	-	Groom 2011
Eucalyptus preissiana	Bell-fruited mallee	Secondary	-	-	Groom 2011
Eucalyptus robusta	Swamp mahogany	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Eucalyptus salmonophloia	Salmon gum	Primary	-	-	Johnstone *et al.* 2010; Groom 2011; DSEWPaC 2012; DSEWPaC 2012; DoEE 2017
Eucalyptus staeri	Albany blackbutt	-	-	Secondary	Johnstone & Storr 1998
Eucalyptus todtiana	Coastal blackbutt	Secondary	-	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011; Johnstone & Kirkby 2008
Eucalyptus wandoo	Wandoo	Primary	Secondary	Primary	Saunders 1980; Johnstone *et al* . 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Ficus sp.	Fig	Secondary	-	-	Groom 2011
Grevillea armigera	Prickly toothbrushes	Primary	-	-	Groom 2011
Grevillea bipinnatifida	Fuschia grevillea	Primary	-	-	Groom 2011
Grevillea hookeriana	Red toothbrushes	Primary	-	-	Groom 2011
Grevillea hookeriana subsp. api	Black toothbrushes	Primary	-	-	Groom 2011
Grevillea paniculata	Kerosene bush	Primary	-	-	Groom 2011
Grevillea paradoxa	Bottlebrush grevillea	Primary	-	-	Groom 2011
Grevillea petrophiloides	Pink poker	Primary	-	-	Groom 2011
Grevillea robusta	Silky oak	Primary	-	-	Johnstone *et al.* 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Grevillea spp.		Primary	-	-	Saunders 1979; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Grevillea wilsonii	Native fuchsia	-	Secondary	-	Johnstone *et al.* 2010
Hakea auriculata		Primary	-	-	Saunders 1980; Groom 2011
Hakea candolleana		Primary	-	-	Groom 2011
Hakea circumalata	Coastal hakea	Primary	-	-	Groom 2011
Hakea commutata		Primary	-	-	Groom 2011
Hakea conchifolia	Shell-leaved hakea	Primary	-	-	Groom 2011
Hakea costata	Ribbed hakea	Primary	-	-	Groom 2011
Hakea cristata	Snail hakea	Primary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Hakea cucullata	Snail hakea	Primary	-	-	Groom 2011
Hakea cyclocarpa	Ramshorn	Primary	-	-	Saunders 1980; Groom 2011
Hakea eneabba		Primary	-	-	Groom 2011
Hakea erinacea	Hedgehog hakea	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Hakea falcata	Sickle hakea	Primary	-	-	Groom 2011
Hakea flabellifolia	Fan-leaved hakea	Primary	-	-	Groom 2011
Hakea gilbertii		Primary	-	-	Saunders 1980; Groom 2011
Hakea incrassata	Golfball or marble hakea	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Hakea lasiantha	Woolly flowered hakea	Primary	-	-	Johnstone *et al* . 2010; Groom 2011
Hakea lasianthoides		Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Hakea laurina	Pin-cushion hakea	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Hakea lissocarpha	Honeybush	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea marginata		-	Secondary	-	Johnstone *et al.* 2010
Hakea megalosperma	Lesueur hakea	Primary	-	-	Groom 2011
Hakea multilineata	Grass leaf hakea	Primary	-	-	Groom 2011
Hakea neospathulata		Primary	-	-	Groom 2011
Hakea obliqua	Needles and corks	Primary	-	-	Saunders 1980; Groom 2011
Hakea oleifolia	Dungyn	Primary	-	-	Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Hakea pandanicarpa subsp. crassifolia	Thick-leaved hakea	Primary	-	-	Groom 2011
Hakea petiolaris	Sea urchin hakea	Primary	-	-	Groom 2011
Hakea polyanthema		Primary	-	-	Groom 2011
Hakea preissii	Needle tree	Primary	-	-	Groom 2011
Hakea prostrata	Harsh hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea psilorrhyncha		Primary	-	-	Groom 2011
Hakea ruscifolia	Candle hakea	Primary	Secondary	-	Saunders 1980; Groom 2011; Johnstone *et al.* 2010
Hakea scoparia	Kangaroo bush	Primary	-	-	Groom 2011
Hakea smilacifolia		Primary	-	-	Groom 2011
Hakea spp.		Primary	Secondary	-	Saunders 1979; DSEWPaC 2012; DoEE 2017
Hakea stenocarpa	Narrow-fruited hakea	Primary	Secondary	-	Johnstone et al. 2010; Groom 2011
Hakea sulcata	Furrowed hakea	Primary	-	-	Groom 2011
Hakea trifurcata	Two-leaved hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea undulata	Wavy-leaved hakea	Primary	Secondary	-	Saunders 1980; Johnstone *et al.* 2010; Groom 2011
Hakea varia	Variable-leaved hakea	Primary	Secondary	-	Saunders 1980; Groom 2011
Harpephyllum caffrum	Kaffir plum	-	-	Secondary	Johnstone 2017
Helianthus annuus	Sunflower	Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Hibiscus sp.	Hibiscus	Secondary	-	-	Groom 2011
Isopogon scabriusculus		Secondary	-	-	Groom 2011
Jacaranda mimosifolia	Jacaranda	Secondary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Jacksonia furcellata	Grey stinkwood	Secondary	-	-	Groom 2011
Kingia australis	Kingia	-	Secondary	-	Johnstone *et al.* 2010
Lambertia inermis	Chittick	Secondary	-	-	Johnstone & Storr 1998; Groom 2011
Lambertia multiflora	Many-flowered honeysuckle	Secondary	-	-	Saunders 1980; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Liquidamber styraciflua	Liquid amber	Primary	-	Secondary	Johnstone *et al.* 2010; Groom 2011; Groom 2014; Personal observation
Lupinus sp.	Lupin	Secondary	-	-	Saunders 1980; Groom 2011
Macadamia integrifolia	Macadamia	Primary	Secondary	-	Johnstone *et al.* 2010; Grooms 2011; Groom 2014
Malus domestica	Apple	Secondary	Secondary	-	Johnstone *et al* . 2010; Johnstone & Storr 1998; DSEWPaC 2012; DoEE 2017; Groom 2011
Melaleuca leuropoma		Secondary	-	-	Saunders 1980; Groom 2011
Melia azedarach	Cape lilac or white cedar	Secondary	-	Primary	Johnstone *et al.* 2010; Groom 2011
Mesomeleana spp.		Secondary	-	-	Johnstone *et al.* 2010; Groom 2011
Olea europea	Olive	-	-	Secondary	Johnstone 2017
Persoonia longifolia	Snottygobble	-	-	Secondary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Pinus canariensis	Canary island pine	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Pinus caribea	Caribbean pine	Primary	-	-	Johnstone *et al.* 2010; Groom 2011
Pinus pinaster	Pinaster or maritime pine	Primary	-	-	Groom 2011
Pinus radiata	Radiata pine	Primary	Secondary	-	Johnstone *et al.* 2010; Groom 2011
Pinus spp.		Primary	Secondary	-	Johnstone & Storr 1998; Saunders 1979; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Protea 'Pink Ice'		Secondary	-	-	Groom 2011
Protea repens		Secondary	-	-	Groom 2011
Protea spp.		Secondary	-	-	Johnstone *et al.* 2010
Prunus amygdalus	Almond tree	Secondary	-	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; Groom 2011; DoEE 2017
Pyrus communis	European pear	-	Secondary	-	Johnstone & Storr 1998; Johnstone *et al.* 2010; DSEWPaC 2012; DoEE 2017
Quercus spp.	Oak	-	Secondary	-	Johnstone *et al.* 2010

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Raphanus raphanistrum	Wild radish	Secondary	-	-	Groom 2011; DoEE 2017
Reedia spathacea		-	Secondary	-	Johnstone *et al.* 2010
Rumex hypogaeus	Doublegee	Secondary	-	-	Saunders 1980
Stenocarpus sinuatus		Secondary	-	-	Johnstone *et al.* 2010
Syzygium smithii	Lilly pilly	Secondary	-	-	Groom 2014
Tipuana tipu	Tipu or rosewood tree	Primary	-	-	Groom 2011, Groom 2014
Xanthorrhoea preissii	Grass tree	Secondary	Secondary	-	Groom 2011; Johnstone *et al.* 2010
Xylomelum occidentale	Woody pear	Secondary	-	-	Groom 2014

CBC=Carnaby's black cockatoo, BBC=Baudin's black cockatoo and FRTBC=Forest red-tailed black cockatoo

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Appendix E

Black Cockatoo Roost Counts

Table 1: White-tailed black cockatoo recorded in roosts within 12 km of the site

Roost ID	Year and number of individuals									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
DANBADR001	NS	NS	NS	NS	NS	205	NS	2	0	0
DANHILR001	250	0	0	0	0	70	NS	0	0	0
DANHILR002	NS	11	NS	0	0	0	NS	NS	NS	0
DANHILR003	131	NS	NS	0	NS	NS	NS	NS	0	0
DANHILR004	NS	NS	NS	NS	16	NS	NS	0	0	0
DANHILR005	NS	NS	NS	NS	NS	NS	NS	NS	200	0

NS = Not surveyed

Appendix F

Camera Trap Data

Table 1: Camera trap data

Camera Number	Easting	Northing	Deployment Date	Retrieval Date	Number of Camera Nights	Number of Camera Days	Capture Event 1	Capture Event 2
Camera 1	345953.51	6636458.82	18/09/2023	22/09/2023	4	5	-	-
Camera 2	347720.75	6638354.35	18/09/2023	22/09/2023	4	5	-	-
Camera 3	342880.38	6644044.03	20/09/2023	22/09/2023	2	3	0010037 (Emu)	-
Camera 4	346288.96	6637092.7	19/09/2023	22/09/2023	3	4	020005 (Western Grey Kangaroo)	0020027 (Honeypossum)
Camera 5	347892.3	6639094.13	18/09/2023	22/09/2023	4	5	-	-

Appendix G

Bat Recorder Data

Assessment of Bat Species from the Badgingarra area

Completed by Brenden Metcalf (Jan 30th 2024)

Microbat echolocation calls were recorded from four different locations in the Badgingarraarea (Western Australia) using two recording units.

Recording details (locations and dates)

Recorder ID	Location	Records	Lattitude	Longtitude
EBAT1	A	20/09/23 6:13pm - 21/09/23 6:09am	-30.3690	115.3996
	B	21/09/23 6:44pm - 22/09/23 6:07am	-30.37420	115.3478
EBAT2	C	20/09/23 6:13pm - 21/09/23 6:10am	-30.37050	115.417
	D	21/09/23 6:14pm - 22/09/23 6:07am	-30.32530	115.3656

Calls were assessed using a cluster analysis (Kaleidoscope software, Wildlife Acoustics) and low-quality calls were discarded. Cluster groups were compared to known voucher calls and where possible identified to species.

High quality calls were recorded from three taxa in the study area:

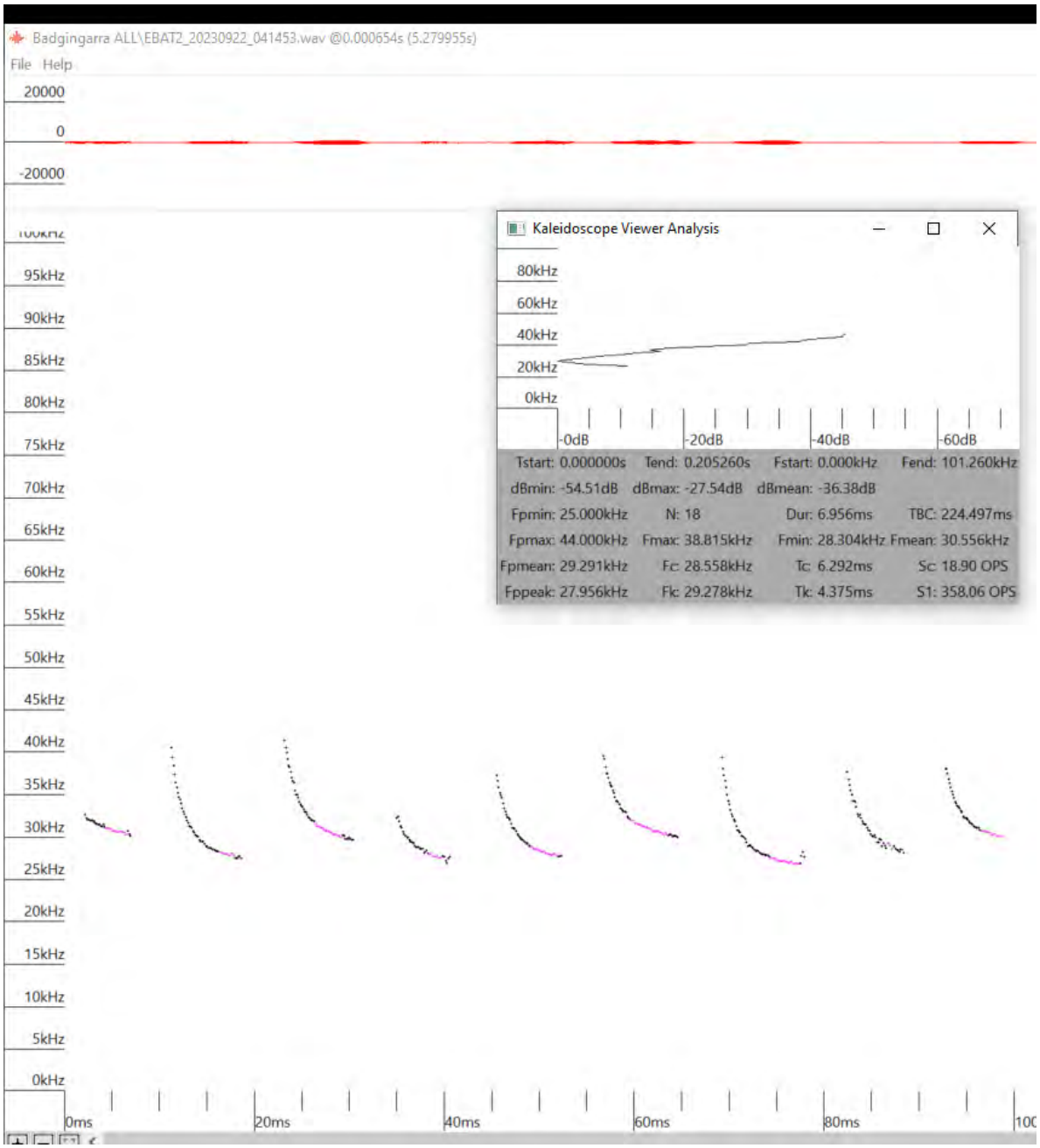
- Gould's Wattled Bat *Chalinolobus gouldii*
- Long-eared Bats *Nyctophilus spp.**
- Southern Forest Bat *Vespadelus regulus*

*Unable to separate *Nyctophilus* species based on echolocation call, but in this location it is considered most likely to be *Nyctophilus geoffroyi* – Lesser Long-eared Bat.

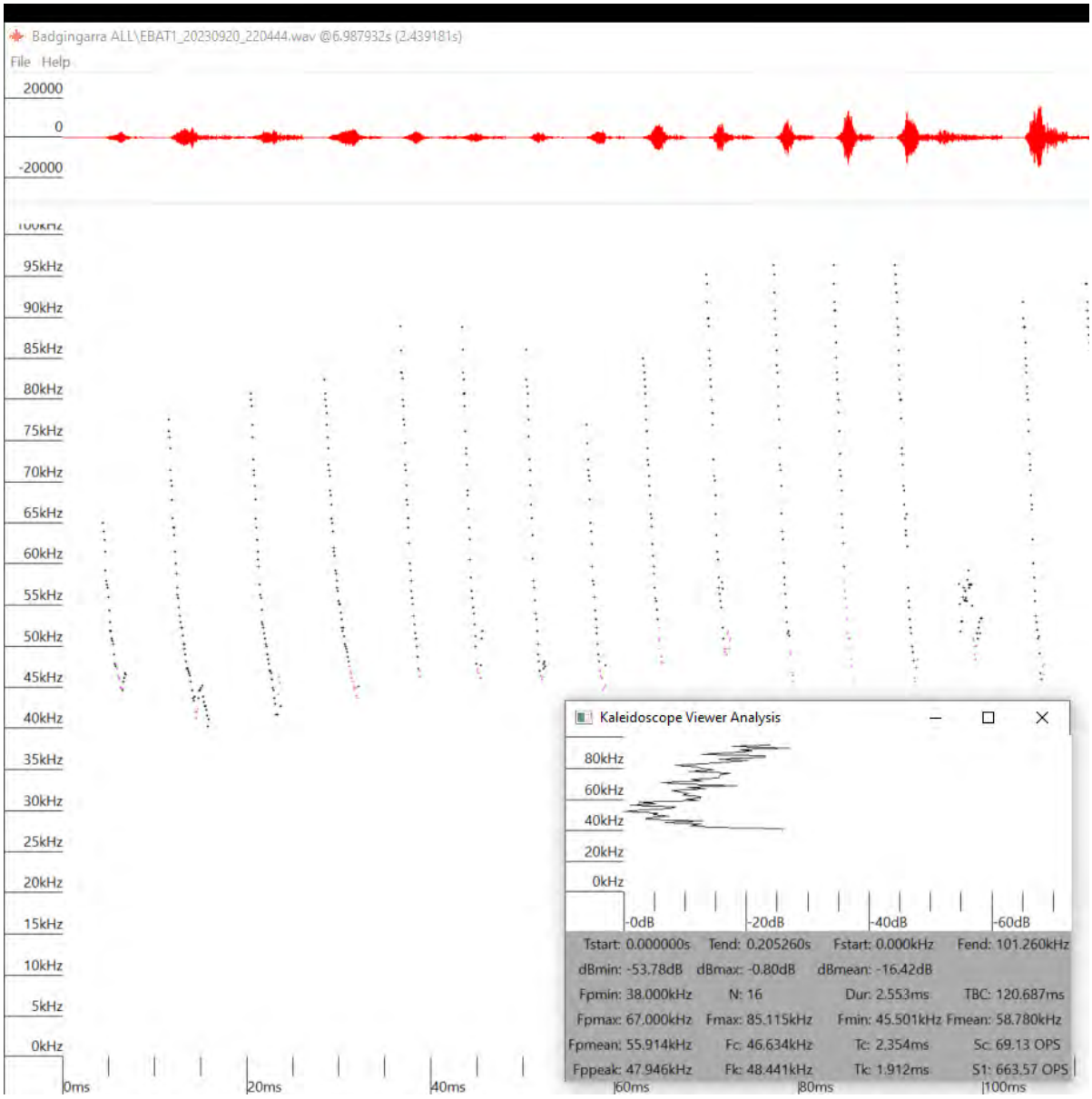
Call records for each species/Locations, showing relative abundance of species

	Location			
Species	A	B	C	D
Chalinolobus gouldii	22	1	-	132
Nyctophilus sp	22	4	-	-
Vespadelus regulus	9	10	-	5

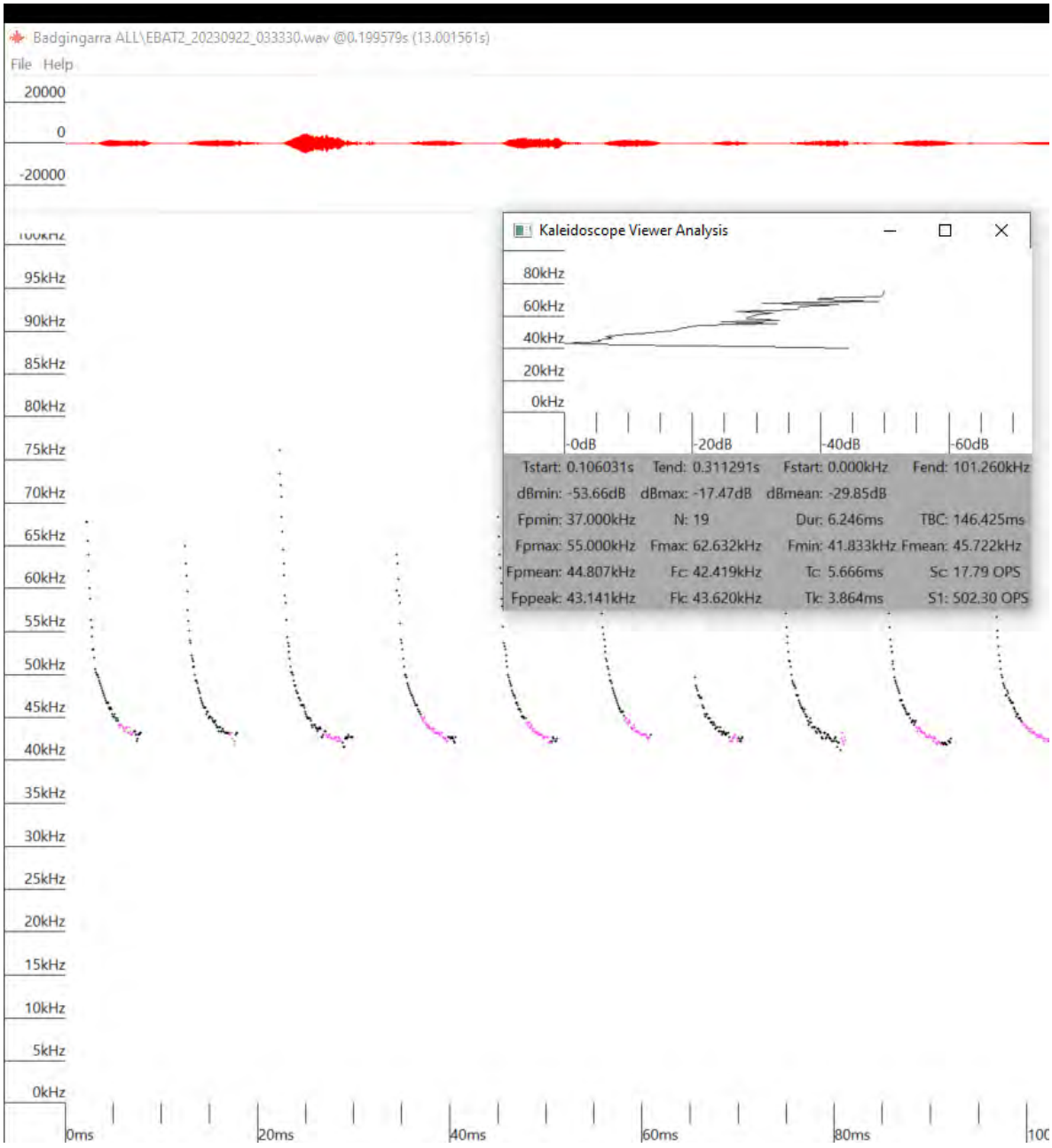
Example sonograms from species detected in the Badgingarra area



Chalinolobus gouldii – Gould's Wattled Bat



Nyctophilus sp. – Long-eared Bat



Vespadelus regulus – Southern Forest Bat

Appendix H

Species List

Species list

Parron Wind Farm Development Support

Category	Status	Species name	Common name	Record type
Birds				
		Acanthiza chrysorrhoa	Yellow-rumped thornbill	Sight
		Anas gracilis	Grey teal	Sight
		Anas superciliosa	Pacific black duck	Sight
		Anthochaera carunculata	Red wattlebird	Call
		Anthus australis	Australian pipit	Sight
		Aquila audax	Wedge-tailed eagle	Sight
		Artamus cinereus	Black-faced woodswallow	Sight
		Barnardius zonarius	Australian ringneck	Sight
		Cacatua sp.	Corella sp.	Sight
		Cacomantis flabelliformis	Fan-tailed cuckoo	Call
		Chenonetta jubata	Australian wood duck	Sight
		Chrysococcyx basalis	Horsfield's Bronze-Cuckoo	Call
		Cincloramphus cruralis	Brown songlark	Sight
		Cincloramphus mathewsi	Rufous songlark	Call
		Circus approximans	Swamp harrier	Sight
		Colluricincla harmonica	Grey shrikethrush	Call
		Corvus bennetti	Little crow	Call
		Corvus coronoides	Australian raven	Sight
		Coturnix pectoralis	Stubble quail	Call
		Cracticus nigrogularis	Pied butcherbird	Sight
		Cracticus tibicen	Australian magpie	Sight
		Dromaius novaehollandiae	Emu	Sight
		Egretta novaehollandiae	White-faced heron	Sight
		Elanus axillaris	Black-shouldered kite	Sight
		Eolophus roseicapilla	Galah	Sight
		Epthianura albifrons	White-fronted chat	Sight
		Falco cenchroides	Nankeen kestrel	Sight
		Gerygone fusca	Western gerygone	Call
		Gliciphila melanops	Tawny-crowned honeyeater	Sight
		Grallina cyanoleuca	Magpie-lark	Sight
		Hirundo neoxena	Welcome swallow	Sight

	Lichmera indistincta	Brown honeyeater	Sight
	Lophoictinia isura	Square-tailed kite	Sight
	Malurus assimilis	Purple-backed fairywren	Sight
	Malurus leucopterus	White-winged fairywren	Sight
	Malurus spendens	Splendid fairywren	Sight
	Manorina flavigula	Yellow-throated miner	Sight
	Melithreptus brevirostris	Brown-headed honeyeater	Sight
	Neophema elegans	Elegant parrot	Sight
	Ocyphaps lophotes	Crested pigeon	Sight
	Pachycephala rufiventris	Rufous whistler	Call
	Phaps chalcoptera	Common bronzewing	Sight
	Phylidonyris niger	White-cheeked honeyeater	Sight
	Rhipidura albiscrapa	Grey fantail	Call
	Rhipidura leucophrys	Willy wagtail	Sight
	Sericornis maculatus	Spotted scrubwren	Sight
	Smicrornis brevirostris	Weebill	Sight
	Tachybaptus novaehollandiae	Australasian grebe	Sight
	Threskiornis spinicollis	Straw-necked ibis	Sight
	Vanellus tricolor	Banded lapwing	Sight
EN	*Zanda latirostris*	Carnaby's black cockatoo	Foraging evidence
	Zosterops lateralis	Silvereye	Call
Mammals			
	Macropus fuliginosus	Western grey kangaroo	Sight
*	*Ovis aries*	Sheep	Sight
*	*Bos taurus*	Cow	Sight
DP	*Vulpus vulpus*	European red fox	Sight
	Tarsipes rostratus	Honeypossum	Camera
DP	*Sus scrofa*	Pig	Diggings
DP	*Oryctolagus cuniculus*	Rabbit	Sight
Reptile			
	Tiliqua rugosa	Bobtail lizard	Sight
	Pogona minor	Dwarf bearded dragon	Sight
	Pseudonaja affinis	Dugite	Sight

		Demansia reticulata	Reticulated whipsnake	Sight
Invertebrate				
	*	*Cherax destructor*	Common yabby	Anectodal

Note: * denotes introduced fauna species, DP=declared pest under the BAM Act, EN=Endangered under the BC and EPBC Acts

Appendix I

Bird Survey Site Data

Table 1: Site 5 bird survey data

Species Name	Common Name	Date and Time			
		19/09/2032	20/09/2023	21/09/2023	22/09/2023
		11:15 AM	8:10 AM	8:40 AM	10:00 AM
Anthus novaeseelandiae	Australian pipit	0	2	~10	4
Cacomantis flabelliformis	Fan-tailed cuckoo	0	0	1	0
Chrysococcyx basalis	Horsfield's bronze-cuckoo	1	1	0	0
Cincloramphus cruralis	Brown songlark	3	2	8	5
Cincloramphus mathewsi	Rufous songlark	1	1	0	1
Coracina novaehollandiae	Black-faced cuckoo shrike	0	0	2	0
Corvus coronoides	Australian raven	0	1	2	3
Coturnix pectoralis	Stubble quail	~5	4	2	2
Cracticus nigrogularis	Pied butcherbird	0	0	1	0
Cracticus tibicen	Australian magpie	2	2	7	0
Grallina cyanoleuca	Magpie-lark	3	2	3	2
Hirundo neoxena	Welcome swallow	5	4	3	2
Lichmera indistincta	Brown honeyeater	0	0	2	1
Lophoictinia isura	Square-tailed kite	0	0	0	2
Rhipidura leucophrys	Willy wagtail	0	1	1	1

Table 2: Site 6 bird survey data

Species Name	Common Name	Date and Time			
		19/09/2032	20/09/2023	21/09/2023	22/09/2023
		10:30 AM	8:35 AM	8:05 AM	10:25 AM
Anthus novaeseelandiae	Australian pipit	0	1	0	2
Cincloramphus cruralis	Brown songlark	10	6	~7	3
Corvus coronoides	Australian raven	1	0	1	0
Coturnix pectoralis	Stubble quail	~5	6	~10	1
Cracticus nigrogularis	Pied butcherbird	0	2	1	0
Cracticus tibicen	Australian magpie	1	2	5	0
Dromaius novaehollandiae	Emu	3	6	0	0
Elanus axillaris	Black-shouldered kite	0	0	1	0
Falco cenchroides	Nankeen kestrel	0	1	2	0
Grallina cyanoleuca	Magpie-lark	0	1	0	0
Malurus leucopterus	White-winged fairywren	3	3	3	3

Table 3: Site 7 bird survey data

Species Name	Common Name	Date and Time			
		19/09/2032	20/09/2023	21/09/2023	22/09/2023
		9:50 AM	9:10 AM	7:30 AM	11:10 AM
Anthus novaeseelandiae	Australian pipit	0	2	0	0
Barnardius zonarius	Australian ringneck	0	0	2	0
Cacomantis flabelliformis	Fan-tailed cuckoo	0	1	1	1
Chrysococcyx basalis	Horsfield's bronze-cuckoo	1	0	0	0
Cincloramphus cruralis	Brown songlark	~5	10	~5	3
Cincloramphus mathewsi	Rufous songlark	2	2	0	2
Corvus coronoides	Australian raven	1	2	2	3
Coturnix pectoralis	Stubble quail	5	2	3	2
Cracticus nigrogularis	Pied butcherbird	0	0	1	0
Cracticus tibicen	Australian magpie	1	2	3	2
Falco cenchroides	Nankeen kestrel	0	1	1	0
Gliciphila melanops	Tawny-crowned honeyeater	1	0	0	0
Grallina cyanoleuca	Magpie-lark	2	0	3	2
Lichmera indistincta	Brown honeyeater	0	5	2	2
Malurus leucopterus	White-winged fairywren	0	1	0	1
Manorina flavigula	Yellow-throated miner	0	3	3	0
Ocyphaps lophotes	Crested pigeon	0	0	1	0
Pachycephala rufiventris	Rufous whistler	0	1	0	0
Rhipidura leucophrys	Willy wagtail	1	1	1	1
Zosterops lateralis	Silvereye	2	0	0	0

Table 4: Site 8 bird survey data

Species Name	Common Name	Date and Time			
		19/09/2032	20/09/2023	21/09/2023	22/09/2023
		9:15 AM	9:45 AM	10:15 AM	8:40 AM
Anthochaera carunculata	Red wattlebird	0	2	0	0
Anthus novaeseelandiae	Australian pipit	0	2	2	6
Barnardius zonarius	Australian ringneck	0	0	0	1
Cincloramphus cruralis	Brown songlark	~4	4	2	5
Corvus bennetti	Little crow	1	0	0	0
Corvus coronoides	Australian raven	2	5	2	5
Coturnix pectoralis	Stubble quail	~5	1	1	2
Cracticus nigrogularis	Pied butcherbird	1	1	1	1
Cracticus tibicen	Australian magpie	3	3	4	4
Dromaius novaehollandiae	Emu	1	0	0	0
Eolophus roseicapilla	Galah	2	3	0	0
Falco cenchroides	Nankeen kestrel	0	0	0	1
Gerygone fusca	Western gerygone	0	0	1	0
Grallina cyanoleuca	Magpie-lark	2	2	2	2
Lichmera indistincta	Brown honeyeater	0	3	1	1
Manorina flavigula	Yellow-throated miner	4	~3	4	1
Threskiornis spinicollis	Straw-necked ibis	7	0	0	0

Table 5: Site 9 bird survey data

Species Name	Common Name	Date and Time			
		19/09/2032	20/09/2023	21/09/2023	22/09/2023
		8:25 AM	10:15 AM	9:50 AM	9:05 AM
Anthus novaeseelandiae	Australian pipit	0	2	3	2
Aquila audax	Wedge-tailed eagle	0	0	1	0
Cincloramphus cruralis	Brown songlark	~10	10	~5	2
Coracina novaehollandiae	Black-faced cuckoo shrike	0	0	1	0
Corvus coronoides	Australian raven	3	2	13	2
Coturnix pectoralis	Stubble quail	0	1	0	0
Cracticus nigrogularis	Pied butcherbird	0	1	1	0
Cracticus tibicen	Australian magpie	0	0	5	3
Falco cenchroides	Nankeen kestrel	0	1	1	0
Grallina cyanoleuca	Magpie-lark	0	3	2	1

Table 6: Site 10 bird survey data

Species Name	Common Name	Date and Time			
		19/09/2032	20/09/2023	21/09/2023	22/09/2023
		7:30 AM	10:50 AM	9:25 AM	9:30 AM
Anthus novaeseelandiae	Australian pipit	0	2	2	1
Barnardius zonarius	Australian ringneck	0	0	2	0
Cacatua sanguinea	Little corella	25	0	0	0
Cincloramphus cruralis	Brown songlark	~7	5	3	3
Coracina novaehollandiae	Black-faced cuckoo shrike	0	0	2	0
Corvus coronoides	Australian raven	2	15	5	7
Coturnix pectoralis	Stubble quail	1	0	2	1
Cracticus tibicen	Australian magpie	1	3	2	0
Falco cenchroides	Nankeen kestrel	0	0	2	0
Grallina cyanoleuca	Magpie-lark	2	0	0	2
Threskiornis spinicollis	Straw-necked ibis	0	0	46	8