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Draft Report

Bat and Avifauna Management Plan: Watta Wella Renewable Energy Project, Joel Joel, Victoria

Prepared for

Umwelt (Australia) Pty Ltd

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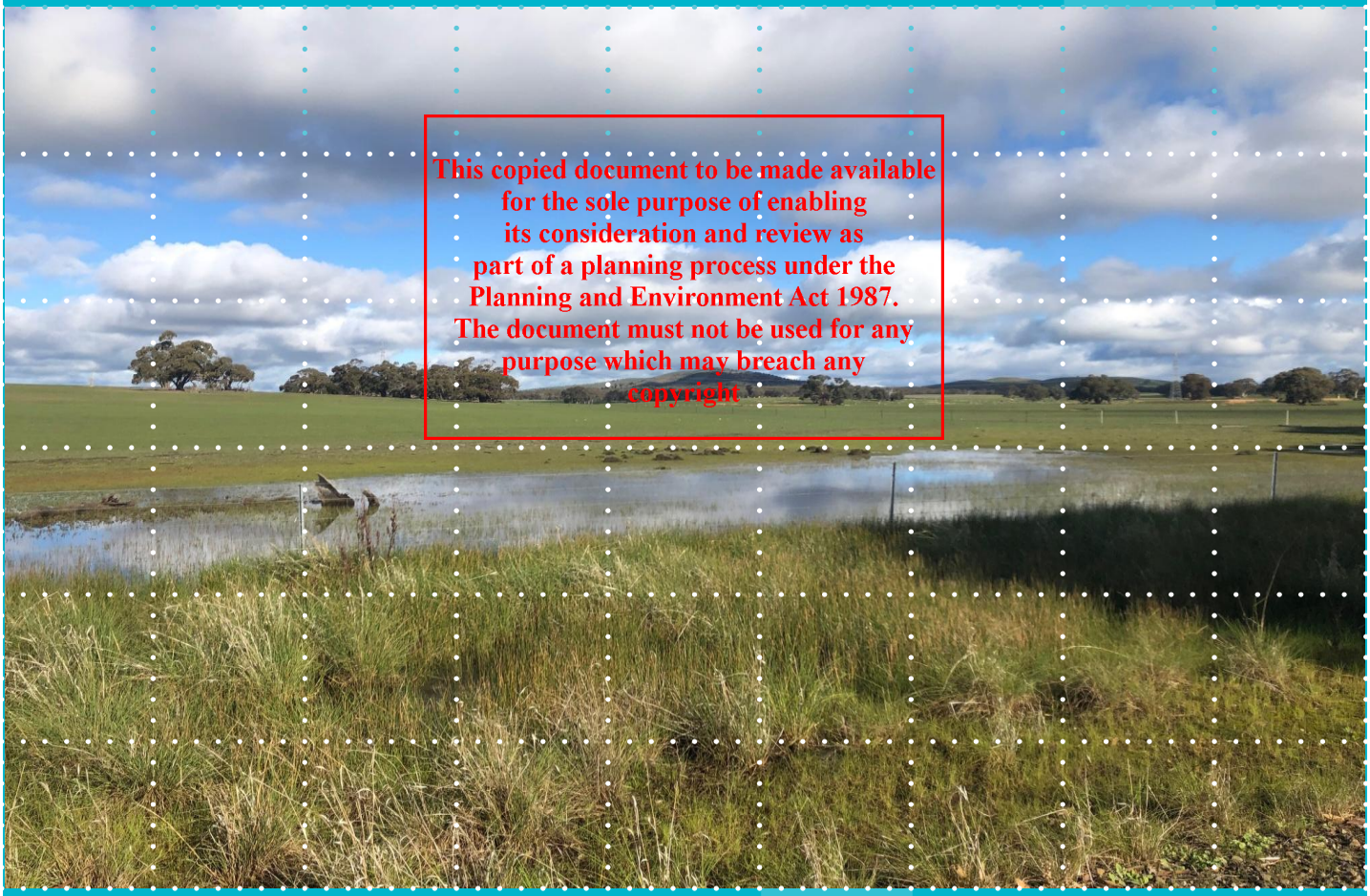

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Ecology and Heritage Partners acknowledge the Traditional Owners of the country we live and work on, and we pay our respect to Elders past, present and emerging.

GLOSSARY

Acronym	Description
Assessment Area	Native vegetation assessments (including the detailed habitat hectares assessment) were only undertaken within and adjacent to the proposed infrastructure layout, including a 100 metre buffer around each turbine, a 25 metre buffer along each side of all tracks and reticulation, and a 50 metre buffer around all other infrastructure. This area is referred to throughout the report as the Assessment Area.
BAM	Bat and Avifauna Management (Plan)
CoA	Conditions of Approval
CRM	Collision Risk Model
DAWE	(former) Commonwealth Department of Agriculture, Water and the Environment
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEECA	Victorian Department of Energy, Environment and Climate Action
DELWP	(former) Victorian Department of Environment, Land, Water and Planning
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FFG Act	Victoria's *Flora and Fauna Guarantee Act 1988*
PPE	Personnel Protective Equipment
Project Area	Refers to the proposed Watta Wella Renewable Energy Project boundary, located near Joel Joel, approximately 16 kilometres north-east of Stawell and 30 kilometres north of Ararat, Victoria as shown on Figure 1.
PVA	Population Viability Assessment
Radius of Investigation (ROI)	Refers to a 10-kilometre radius around the Project Area.
RSA	Rotor Swept Area
The 'Project'	Watta Wella Renewable Energy Project
VBA	Victorian Biodiversity Database
WWREP	Watta Wella Renewable Energy Project

EXECUTIVE SUMMARY

This Bat and Avifauna Management (BAM) Plan has been prepared to address pre-approval requirements for the Watta Wella Renewable Energy Project (WWREP), located in Joel Joel, Victoria. Pre-approval requirements specifically addressed in the *Onshore Wind Farms – interim guidance on bird and bat management* state the requirement to prepare a BAM Plan, aimed at mitigating and managing any significant bat or bird strike events from operation of the wind farm (DAWE 2021). This is an adaptive management plan which will be reviewed and updated progressively in response to ongoing survey and assessment outcomes. Ecological investigations for the WWREP identified several bird and bat species with potential to utilise the Project Area for foraging, breeding or simply travelling through. Certain species have a risk of impact from wind turbines due to the proximity of their preferred habitat and flight behaviours, of which 22 species are discussed in this report.

Mortality Monitoring

During the life of the 2-year monitoring plan, monthly carcass searches will be undertaken at 15 randomly selected turbine sites, evenly distributed across three zones (Figure 5). During the overwintering period for Swift Parrot, a proportion (6) of the selected turbines will be selected randomly from all turbines within one kilometre of High-value Foraging Habitat (HVFH) for Swift Parrot i.e. Watta Wella Reserve and Joel Joel Nature Conservation Reserve. Site groupings will allow for impacts in proximity to large, forested areas to be monitored (Figure 5).

During the early construction period (up to 15 turbines operational) monitoring will be conducted at all operational turbines. When 16 to 45 (all) turbines are operational, monitoring will occur at a random selection of 15 turbines, which is approximately 33% of the total number of turbines , which aligns with the proportion of turbines surveyed at similarly sized wind farms in Victoria.

Throughout the life of the 2-year monitoring plan, scavenger trials will be undertaken to estimate the length of time bat and bird carcasses remain detectable before being taken by scavengers (Red Fox, Feral Cat etc.). The average carcass duration and confidence interval will be used to refine mortality estimates and account for the likely effects of scavengers on carcass detectability. Two one-month scavenger trials will be undertaken in April and October in each year.

Throughout the life of the 2-year monitoring plan, detectability trials will be undertaken to estimate searcher efficiency and refine mortality estimates. Two one-month scavenger trials will be undertaken randomly during the monthly carcass search events. The detectability trials will use a total of 30 deployed carcasses.

Species Monitoring

Consistent with the Before and After Control-Impact (BACI) monitoring framework, long-term avifauna site utilisation monitoring will be undertaken for species of concern with a 'High' overall risk rating due to the WWREP (Section 2.3).

The Swift Parrot monitoring program will be undertaken from commencement of turbine operation. During the Swift Parrot *Lathamus discolor* migration and over-wintering period from February – September, regular monitoring (i.e. twice a week) of ecological databases including Birdata, ebird, Birdlife Swift Parrot Search results and other frequently updated ecological databases will be undertaken by an ecologist or inducted site personnel for Swift Parrot to determine the species' proximity to the Project Area.

In the event that monitoring of ecological database and/or stakeholder engagement indicates that Swift Parrot are present within 20 kilometres of the Project Area, this will trigger a requirement to commence on-ground surveys for Swift Parrot within all HVFH for the species located within five kilometres of the Project Area.

Surveying for the species is proposed to occur at a minimum - on a weekly basis for 1-2 days at a time, for the duration that the species is known to be present within 20 kilometres of the Project Area. Surveying would involve a weekly visit to each area of HVFH within five kilometres of the Project Area and the closest known location of the species (Figure 3).Two years of annual surveys for migratory birds will be undertaken to target migratory birds that may occupy the Project Area (e.g. White-throated Needletail *Hirundapus caudacutus*). Two zoologists, experienced in bird identification, will undertake a round of fixed-point counts and roaming surveys in Spring/early Summer (November-January). The timing of the annual survey period in late Spring/early Summer will align with the optimal survey period for many of the migratory species that may occupy the Project Area (including White-throated Needletail).

Two years of annual surveys for microbats will be undertaken to targeted Eastern Bent-wing Bat *Miniopterus orianae oceansis* within the Project Area. Post-construction microbat surveys will be undertaken to target Eastern Bent-wing Bat, in accordance with the Survey guidelines for Australia's threatened bats (DEWHA 2010b). Song Meter SM4 (Wildlife Acoustics™) sound recorders will be deployed at 12 sites within the Project Area, including sites where Eastern Bent-wing Bat was previously recorded. The post construction monitoring surveys will be undertaken over a minimum four-week period during the period of highest activity. A precautionary approach is applied to Eastern Bent-wing Bat with the species inclusion within the operational monitoring program.

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1 INTRODUCTION

1.1 Background

This Bat and Avifauna Management (BAM) Plan has been prepared to address pre-approval requirements for the Watta Wella Renewable Energy Project (WWREP), located in Joel Joel, Victoria. Pre-approval requirements specifically addressed in the *Onshore Wind Farms – interim guidance on bird and bat management* state the requirement to prepare a BAM Plan, aimed at managing and mitigating any significant bat or bird strike events arising from operation of the wind farm (DAWE 2021).

Consultation with the Department of Planning (DTP), Department of Energy, Environment and Climate Action (DEECA) and Department of Climate Change, Energy, the Environment and Water (DCCEEW) has informed preparation of the BAM Plan. Once approved, the BAM Plan will be made publicly accessible on the WWREP website and remain for the operating life of the Project.

A two year monitoring period for birds and bats are proposed (aside from Swift Parrot). Two years is considered a sufficient length of time for background monitoring given that surveys for birds and bats have been frequently undertaken for the Project since 2020, enabling the development of a strong understanding of site utilisation patterns, species presence and the presence and location of suitable habitats within the Project Area (see Section 2.2 for more details).

The WWREP is committed to developing a Collision Risk Model (CRM) for Swift Parrot and White-throated Needletail, should the opportunity arise to collect site-specific data to inform it.

Swift Parrot monitoring will be undertaken for the life of the Project. If the CRM is developed and is able to be prepared that adequately demonstrates the collision risk to the species is acceptable (i.e. reduction from 'high' to 'low' or 'medium' as per Section 2.3), curtailment of the selected turbines and associated monitoring requirements will be revisited, unless a Swift Parrot mortality event occurs that is attributed to turbine strike.

Annual surveys for migratory birds will be undertaken to target migratory birds that may occupy the Project Area (e.g. White-throated Needletail). The aim of the monitoring surveys for migratory birds is to determine with greater certainty the likelihood of occurrence, site utilisation, and collision risk of White-throated Needletail and other migratory birds. Migratory bird monitoring surveys will be undertaken for two-years from commencement of turbine operation, at which point DEECA will be consulted to determine whether further monitoring surveys are required

1.2 Objectives

This BAM Plan establishes monitoring and management procedures consistent with the methods outlined by the Australian Wind Energy Association (AusWea 2005) and endorsed by the Clean Energy Council '*Best Practice Guidelines*' (CEC 2013). The objectives of this BAM Plan are as follows:

- Establish an outcome-focussed and adaptive monitoring program aimed at answering the following key questions:
    - Is operation of the wind farm resulting in bat or bird mortality, and if so:
        - What is the estimated annual mortality rate?

  - What species are being impacted?
  - Is there seasonal variation in the number of mortalities?
- Describe mitigation measures to reduce the risk of bat and bird mortality through turbine strike;
- Provide a framework for responding to detected impacts on bats and birds;
- Detail procedures for the periodic reporting of findings to DEECA and DCCEEW; and,
- Provide a clear summary of management actions required.

The scope of the BAM Plan responds specifically to the *Onshore Wind Farms – interim guidelines on bird and bat management*. The BAM Plan must be informed by desktop and field-derived information, and best available practices, and include the following key requirements at a minimum:

- Standards for pre- and post-commissioning surveys that are appropriate to the scale and environmental risks of the WWREP;
- Evidence of effectiveness of the methods used for other similar actions;
- Demonstration that the proposed measures and outcomes of the BAM Plan are supported by published scientific evidence; and,
- Where innovative measures are proposed, details about how desired outcomes will be met.

Assuming endorsement of this BAM Plan by the Responsible Authority, the WWREP Owner will be responsible for implementation and incorporation of management measures.

1.2.1 *Compliance Summary*

The required scope relating to this BAM Plan are presented in Table 1, with an accompanying reference showing where each point has been addressed. The scope specifically addresses the requirements under *Onshore Wind Farms – interim guidance on bird and bat management.*

Table 1. Scope relating to this BAM Plan.

Phase #	Requirements	Comment/ Reference
1	An initial desktop assessment (a species and site characterisation to get an overview of potential risks and impacts)	Section 2.1, 2.2
2	Assessment requirements where potential significant impacts to listed bird and/or bat species are identified	Section 5.1
3	Post commissioning requirements, including monitoring and adaptive management to identify any impacts and ongoing improvement measures	Section 3, 4, 5, 6

1.3 Project Overview

The WWREP is wholly located within the Northern Grampians Shire Council local government area in Victoria's central west, approximately 220 kilometres northwest of Melbourne. The nearest urban centres are Stawell, approximately 16 kilometres southwest of the Project Area, and Ararat approximately 30 kilometres to the south of the Project Area (Figure 1).

The following describes the location and infrastructure details of the two components that form the proposed Project:

- The wind farm component covers the majority of the Project Area, approximately 4,850 hectares and 11 landholdings:
    - The wind farm will include to 45 wind turbines generators (WTGs) with a generation capacity of approximately 360 MW and an anticipated turbine tip height up to 255 metres.
- The BESS facility covers approximately 12 hectares and is located in the southeastern portion of the Project Area, west of the Bulgana Terminal Station:
    - The BESS will capture energy from the wind farmand is anticipated to have a storage capacity of 400MW / 1,600MWh of (4 hours at 400MW).

In addition, the WWREP will include:

- On-site substations for the wind farm and BESS (220 kilovolt (kV) / 33kV);
- Overhead 220kV connection from the wind farm and BESS to the existing Bulgana Terminal Station (approximately 1,300 metres in length from the BESS substation and 2,400 metres in length from the wind farm substation, pending final design detail of the Western Renewables Link Project). The indicative design for the transmission route comprises approximately 10 transmission towers between 30 metre and 60 metres in height; and,
- Associated ancillary infrastructure (onsite concrete batching plant, access tracks, overhead and underground cabling, an operational and maintenance facility and hardstand/laydown areas).

1.4 Area Definitions

1.4.1 Project Area

The Project Area refers to the extent of the proposed WWREP and is approximately 4,850 hectares. It skirts Joel Joel Nature Conservation Reserve in the south, surrounds Seven Mile Creek Streamside Reserve in the west, and covers part of an ephemeral wetland in the east. Greens Creek Swamp Wildlife Reserve lies approximately two kilometres northeast of the Project Area. The terrain is predominantly flat with some gentle slopes to the southwest.

All fauna surveys completed for the WWREP were based on the extent of potential habitat located within, and surrounding the Project Area.

1.4.2 Radius of Investigation

The Radius of Investigation (ROI) refers to a 10-kilometre radius of the Project Area (unless otherwise specified) and was adopted to ensure highly mobile bat and avifauna are appropriately considered beyond the Project Area as part of pre-construction and post-approval monitoring. The desktop assessment and some ecological surveys were conducted with reference to the ROI, to ultimately determine the likelihood of presence for significant flora and fauna species.

2 PRE-COMMISSIONING REQUIREMENTS

2.1 Desktop Assessment: Preliminary Site Characterisation

2.1.1 *Methods*

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the Project Area and immediate surrounds. Detailed methods and results for the desktop assessment are presented in *Ecological Assessment (Environment Report): Watta Wella Renewable Energy Project* (Ecology and Heritage Partners 2025).

2.1.2 *Findings*

An investigation of biological databases for bird and bat species recorded ten bird species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), eight bird species listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act), and one FFG Act-listed bat species within the ROI (Table 2). There are 11 significant bird and bat species within the ROI are identified within *'Species of Concern' list for Victoria, relevant to onshore wind energy facilities* as 'Species of Concern', with all identified species listed under 'probable concern' and no species listed under 'precautionary concern' (DEECA 2024).

Table 2. Significant birds and bats within the ROI.

 # indicates species identified through Protected Matters Search Tool (PMST).

Scientific name	Common name	Total no. documented records (DEECA 2023e)	Last documented record	EPBC	FFG	'Species of Concern' listing
NATIONAL SIGNIFICANCE						
Botaurus poiciloptilus#	Australasian Bittern	-	-	EN	CR	PC
Calidris ferruginea#	Curlew Sandpiper	-	-	CR	CR	-
Falco hypoleucos#	Grey Falcon	-	-	VU	VU	PC
Grantiella picta#	Painted Honeyeater	-	-	VU	VU	-
Hirundapus caudacutus	White-throated Needletail	6	2014	VU	VU	PC
Lathamus discolour	Swift Parrot	11	2019	CR	CR	PC
Leipoa ocellate#	Malleefowl	-	-	VU	VU	-
Numenius madagascariensis#	Eastern Curlew	-	-	CR	CR	PC
Pedionomous torquatus#	Plains-wanderer	-	-	CR	CR	PC
Rostratula australis#	Australian Painted-snipe	-	-	EN	CR	PC
STATE SIGNIFICANCE						
Antigone rubicunda	Brolga	5	2008	-	EN	PC
Aythya australis	Hardhead	1	1989	-	VU	-
Burhinus grallarius	Bush Stone-curlew	3	2011	-	CR	PC
Hieraaetus morphnoides	Little Eagle	5	2013	-	VU	PC

Scientific name	Common name	Total No. of documented records (DEECA 2023e)	Last documented record	EPBC	FFG	'Species of Concern' listing
Melanodryas cucullata	Hooded Robin	8	2019	-	VU	-
Miniopterus orianae oceanensis	Eastern Bent-wing Bat	-	-	-	CR	PC
Ninox strenua	Powerful Owl	4	2019	-	VU	-
Spatula rhynchotis	Australasian Shoveler	1	1991	-	VU	-
Stagonopleura guttata	Diamond Firetail	10	2019	-	VU	-

2.1.3 *Site Characteristics*

The characterisation of the Project Area and ROI is presented below (Table 3).

Table 3. Site characteristics within the Project Area and ROI (Figure 2 and 3).

Site Characteristic	Features within the Project Area and ROI
Focal habitat features	The Wimmera River loosely tracks the northern and eastern boundaries of the Project Area, while ephemeral creeks such as Six Mile Creek and, Seven Mile Creek run through the Project Area.
Topography	The terrain is predominantly flat with some gentle slopes to the southwest.
Prevailing wind and weather patterns	Mean 3pm wind speed of 17.8km/hr (BOM 2025). Warm temperate climate.
Wetlands	Greens Creek Swamp Wildlife Reserve and Greeks Creek Streamside Reserve lie approximately two kilometres northeast of the Project Area. An ephemeral wetland is present in the east of the Project Area, while numerous scattered dams are present.
Bushland Reserves	Several bushland reserves exist in the ROI (not within the Project Area), including Greens Creek Swamp Wildlife Reserve and Greens Creek Streamside Reserve to the north, Malakoff Bushland Reserve to the east, Holden Bushland to the south, Watta Wella I18 Bushland Reserve to the west, and Joel Joel Nature Conservation Reserve in the south.

2.2 Pre-Construction Surveys

2.2.1 *Summary of Survey Effort*

Pre-Construction surveys for bats and avifauna were undertaken in accordance with *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (DEWHA 2010a) and *Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (DEWHA 2010b)

The ecological field assessment program commenced in July 2019 and was completed in December 2024. The field assessments had particular consideration for significant species and species of conservation concern, such as threatened and migratory bat and avifauna, and were designed to optimise the survey timing, methods and frequency to enable sampling of those species which occur seasonally, to ultimately determine presence

or the probability of presence of these species. Pre-Construction surveys were undertaken by Ecology and Heritage Partners and the results are documented in *Ecological Assessment (Environment Report): Watta Wella Renewable Energy Project* Ecology and Heritage Partners (2025).

Ecology and Heritage Partners (2025) discusses species of conservation concern (listed as threatened and/or migratory under the EPBC Act and/or as threatened under the FFG Act) that have potential to be impacted by the WWREP. The risk to bat and avifauna species by the WWREP is discussed in Section 2.3. This section summarises the survey effort undertaken to determine the presence or otherwise of species with a 'high' risk of being impacted by the WWREP.

2.2.2 *Swift Parrot Assessment*

Swift Parrot *Lathamus discolor* is a nationally significant migratory parrot, listed critically endangered under the EPBC Act. The species overwinters in Victoria and New South Wales between approximately February and September. The Project Area is adjacent to areas of high-quality foraging and potential roosting habitat for Swift Parrot, largely within Joel Joel Nature Conservation Reserve which the species is known to frequent, with several areas of low-moderate quality also present in other bushland reserves and roadside remnants. There are no reported turbine collisions for Swift Parrot in Victoria and New South Wales. While the species is difficult to detect during mortality monitoring due to its small size and swift flight speed, this may be an indication that the species does not regularly fly at rotor swept height, however, Swift Parrot migratory flight behaviour is still not well understood.

Results

Habitat Assessment

Habitat assessments were conducted in May and August 2020, June and July 2023 and May 2024 across the ROI, as well as Deep Lead Nature Conservation Reserve. The method and results of Swift Parrot assessments are outlined in the Ecology and Heritage Partners 2025. The objective of the assessments was to identify the presence of important eucalypt species known to provide a food source for Swift Parrot in Victoria, including Yellow Gum *Eucalyptus leucoxylon*, Red Ironbark *Eucalyptus sideroxylon*, Yellow Box *Eucalyptus melliodora*, and Grey Box *Eucalyptus microcarpa*, as well as determine the potential value of these sites for foraging.

A total of four sites were recorded to support High Value Foraging Habitat (HVFH) for Swift Parrot comprising:

- SP1 (Glynwylln State Forest);
- SP2 (Watta Wella Bushland Reserve);
- SP4 (Joel Joel Nature Conservation Reserve); and,
- SP6 (Deep Lead Nature Conservation Reserve [No. 2]).

Two HVFH sites (SP2 and SP4) are located within five kilometres of the Project Area (see Figure 3). HVFH sites are considered to support the highest quality foraging habitat, and these areas are likely to be regularly utilised for foraging purposes when the species is present within the broader locality, and the eucalypts are flowering.

Five additional sites (SP3, SP5, SP7, SP8 and SP9; see Figure 3) are considered to secondary foraging habitat for the species rather than HVFH due to their small size or discrete nature and low numbers of preferred eucalypts species. Secondary foraging habitat is likely to be used on an occasional basis only.

All sites that support HVFH within five kilometres of the Project Area will be the focus of on-ground monitoring for the species (Section 3.2). While significant flowering of Swift Parrot habitat was not observed during the 2020 habitat assessments, a larger flowering event was documented in 2023. This highlights the variability in flowering events across the ROI and therefore site occupancy and relative use of the landscape by the species will change on temporal and spatial scales.

Point-counts and Targeted Searches

Point-count surveys were undertaken in May and August 2020, and in May and July 2023 when targeted searches were also undertaken, across the Project Area and broader locality (i.e. within 30km of Project Area) within a range of habitat types to ensure chosen locations were representative of the wider site. The total number of point counts was determined based on both the habitat conditions of the Project Area and the number of turbines proposed, in addition to any existing data that has already been collected (e.g. detailed significant species data). The fixed point-count surveys and targeted searches were designed to coincide with the Swift Parrot overwintering period.

No Swift Parrot observations were recorded within the Project Area and broader locality during fixed point-count surveys. Given the cryptic nature of the species, broad geographic distribution, and low number of breeding pairs, it is acknowledged that the likelihood of observing the species during temporary discrete surveys is low.

2.2.3 *White-throated Needletail Assessment*

White-throated Needletail *Hirundapus caudacutus* is a nationally significant migratory bird, listed critically endangered under the EPBC Act. White-throated Needletail are a predominantly aerial species, regularly flying at 1.5 kilometres above the ground. However, the species is known to occasionally forage from tree-tops and roost in trees with dense foliage, often containing hollows, within forested areas. The Project Area and immediate surrounds includes several large, contiguous tracts of forest featuring large, hollow bearing trees, including Watta Wella Bushland Reserve, Joel Joel Nature Conservation Reserve, Seven Mile Creek, Wimmera River and other riparian corridors, and areas of roadside vegetation (Vineyard Road, Watta Wella Road, etc.).

Results

Multiple surveys for White-throated Needletail were undertaken as part of bird utilisation survey fixed-point bird counts, during a period when the species is known to occur in southern Australia (i.e. October-May), including on 11-15 May 2020, 23-27 November 2020 and 22-25 February 2021.

White-throated Needletail was not recorded during any survey event, although several historical records of the species within the locality have been recorded within the VBA and online databases.

While it is likely that low to moderate numbers of White-throated Needletail could conceivably fly over the Project Area and ROI several days a year when the species is in southern Australia (i.e. October-May) and use forested areas within the Project Area for roosting and foraging activity on occasion, it remains unlikely that an ecologically significant population would utilise the site, flying at, or below rotor swept area.

2.2.4 *Eastern Bent-wing Bat Assessment*

Eastern Bent-wing Bat *Miniopterus orianae oceansis* and Southern Bent-wing Bat *Miniopterus orianae bassanii* are currently recognised as subspecies of the Common Bent-wing Bat Miniopterus orianae (previously Miniopterus schreibersii). Eastern Bent-wing Bat is listed as Critically Endangered under the FFG Act.

The Eastern Bent-wing Bat species is a cave dwelling bat that forages at and around canopy height in treed areas, and close to the ground in grassy areas. The species has previously been shown to fly consistently below turbine height, with no collision mortalities published in Victoria (Moloney *et al*., 2019).

While all roost sites are important habitat for the subspecies, roosts used for cold-weather hibernation and breeding (i.e. maternity sites) are the most significant for conservation of this subspecies. There is a single recognised maternity cave in Victoria for the Eastern Bent-wing Bat, located in East Gippsland, near Bairnsdale. However, it is likely that additional maternity sites exist in Victoria. No major caves are known in the Stawell / Grampians region however several small caves occur in the quartz sandstones of the Grampians, as well as several disused mines within the Stawell region (Wakelin Associates 2023).

Results

A minimum of nine native bat species were previously detected during the bat surveys undertaken between 2019 and 2020, including Southern Free-tailed Bat *Vespadelus regulus*, White-striped Freetail Bat *Tadarida australis*, Eastern Falsistrelle *Falsistrellus tasmaniensis*, Gould's Wattled Bat *Chalinolobus gouldii*, Chocolate Wattled Bat and Little Forest Bat (Ecology and Heritage Partners 2025). A maximum of up to thirteen native bat species were recorded when calls that could not be identified to species level are considered, including one call complex (Eastern Bent-wing Bat / Large Forest Bat) as the only result that may be attributed to a significant species – the FFG Act listed Eastern Bent-wing Bat.

Eastern Bent-Wing Bat was recorded twice as part of additional targeted bat surveys undertaken in 2023 for the WWREP, while a further four calls were detected for the Eastern Bent-wing Bat / Large Forest Bat call complex (Ecology and Heritage Partners 2025). The method and detailed results of the microbat assessments are further outlined in the Ecological Assessment (Environment Report): Watta Wella Renewable Energy Project (Ecology and Heritage Partners 2025).

During the survey event, the species was recorded at two sites (10 and 11) on one occasion at each (Ecology and Heritage Partners Pty Ltd 2025). The Eastern Bent-wing Bat / Large Forest Bat call complex was detected at two sites (6 and 7) on one occasion and one site (11) on two occasions. The detection of Eastern Bent-wing Bat in the Project Area (as well as recent records from a site near Beaufort [Ecology and Heritage Partners unpublished data]) suggests greater activity in the region than was previously understood.

2.3 Risk Assessment

The Risk Assessment reviews the potential risk of impacts to bird and bat populations in the vicinity of wind farm developments, and is specifically designed by Ecology and Heritage Partners with reference to *'Species of Concern' list for Victoria, relevant to onshore wind energy facilities* (DEECA 2024) to address Section 2.1.3 of the *Onshore Wind Farms – interim guidance on bird and bat management* guidance document.

The Risk Assessment applies a risk matrix, which considers the likelihood and consequence of incidents such as blade collisions and secondary effects like barotrauma.

Assessment of 'likelihood' of incident is based on the following:

- Likelihood of species' presence (Ecology and Heritage Partners 2025); and,
- Species estimated risk of turbine collision based on species behaviour and previously recorded turbine collisions (Ecology and Heritage Partners 2025).

Assessment of 'consequence' of incident is based on the following:

- Species listing status under the FFG and/or EPBC Act; and,
- 'Species of Concern' rating (DEECA 2024).

The Risk Assessment includes all threatened birds and bats with a low to high likelihood of occurrence within the Project Area as determined in the Ecological Assessment (Environment Report) (Ecology and Heritage Partners (2025)(Section 2.1 and 2.2).

This assessment is undertaken using a dual set of criteria for determining the likelihood of occurrence and a set of criteria for ascertaining potential consequences. The specific criteria for evaluating likelihood and consequences are outlined in Table 5 and Table 6 respectively.

Table 4. Risk Framework

		Consequence				
Likelihood		Minor	Moderate	High	Major	Critical
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Medium	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rarely or never	Low	Low	Low	Medium	Medium

Table 5. Qualitative measure of likelihood of incident (how likely is it that this event/circumstances will occur before management actions have been put in place/are being implemented)

Level	Rating	Criteria Description
1	Highly likely	Is expected to occur in most circumstances

Level	Rating	Criteria Description
2	Likely	Will probably occur during the life of the WWREP
3	Possible	Might occur during the life of the WWREP
4	Unlikely	Could occur but considered unlikely or doubtful
5	Rarely or never	May occur in exceptional circumstances

Table 6. Criteria for determining level of consequence of incident

Level	Rating	Criteria Description
1	Minor	• Non-listed species; • Non 'Species of Concern' species.
2	Moderate	• State listed Vulnerable under the FFG Act but not listed under the EPBC Act, and 'Precautionary Species of Concern'.
3	High	• State listed Vulnerable under the FFG Act but not listed under the EPBC Act, and 'Probable Species of Concern'; • State listed Endangered or Critically Endangered under the FFG Act but not listed under the EPBC Act, and 'Precautionary Species of Concern'
4	Major	• State listed Endangered or Critically Endangered under the FFG Act but not listed under the EPBC Act, and 'Probable Species of Concern'; • Nationally listed Vulnerable under the EPBC Act, and 'Precautionary Species of Concern'
5	Critical	• Nationally listed Vulnerable under the EPBC Act, and 'Probable Species of Concern'; • Nationally listed Endangered or Critically Endangered under the EPBC Act, and 'Precautionary or Probable Species of Concern'.

Of the 22 species (listed in Table 7) assessed, the risk assessment concluded:

- None are 'Severe' risk,
- Two are 'High' risk,
- Ten are 'Medium' risk, and
- Ten are 'Low' risk of being impacted by the WWREP.

Due to the findings of this risk assessment, the BAM plan will hereafter primarily focus on the two species of concern assessed as ''High' risk of being impacted by the WWREP (White-throated Needletail, Swift Parrot), as well as Eastern Bent-wing Bat. A precautionary approach is applied to Eastern Bent-wing Bat with the species inclusion within the operational monitoring program. Mitigation for species with low and medium risk ratings are adequately addressed by the operational monitoring program and significant impacts and responses outlined within Sections 4.2 and 5.

Table 7. Risk Assessment of Bats and Avifauna for turbine collision at the WWREP.

Scientific name	Common name	Likelihood	Consequence	Risk Rating
BIRDS				
Anthochaera phrygia	Regent Honeyeater	Rarely or never	Critical	Medium
Antigone rubicunda	Brolga	Rarely or never	Major	Medium
Aphelocephala leucopsis	Southern Whiteface	Rarely or never	Minor	Low
Burhinus grallarius	Bush Stone-curlew	Rarely or never	Major	Medium
Callocephalon fimbriatum	Gang-gang Cockatoo	Rarely or never	Critical	Medium
Climacteris picumnus	Brown Treecreeper	Rarely or never	Minor	Low
Falco hypoleucos	Grey Falcon	Rarely or never	Critical	Medium
Grantiella picta	Painted Honeyeater	Rarely or never	Minor	Low
Hieraaetus morphnoides	Little Eagle	Unlikely	High	Medium
Hirundapus caudacutus	White-throated Needletail	Possible	Critical	**High**
Lathamus discolour	Swift Parrot	Unlikely	Critical	**High**
Melanodryas cucullata	Hooded Robin	Rarely or never	Minor	Low
Neophema chrysostoma	Blue-winged Parrot	Unlikely	Minor	Low
Ninox strenua	Powerful Owl	Unlikely	Minor	Low
Numenius madagascariensis	Eastern Curlew	Rarely or never	Critical	Medium
Oreoica gutturalis	Crested Bellbird	Rarely or never	Minor	Low
Pyrrholaemus sagittatus	Speckled Warbler	Rarely or never	Minor	Low
Rostratula australis	Australian Painted-snipe	Rarely or never	Critical	Medium
Spatula rhynchotis	Australasian Shoveler	Possible	Minor	Low
Stagonopleura guttata	Diamond Firetail	Rarely or never	Minor	Low
BATS				
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	Unlikely	Major	Medium
Pteropus poliocephalus	Grey-headed Flying-fox	Possible	High	Medium

2.4 Environmental Outcomes

The BAM Plan defines the specific environmental outcomes it intends to achieve, as per the *Onshore Wind Farms – interim guidelines on bird and bat management* (DAWE 2021).

The following long-term environmental outcomes are proposed for minimising bird and bat risk management as part of the WWREP:

- An improved understanding of site utilisation changes for species with a 'High' risk rating (see Section 2.3) species throughout Project phases via ongoing species monitoring;
- The development of corrective actions to promote a long-term reduction in risk to avifauna due to the WWREP (e.g. an adaptive management approach) through:

- The testing and implementation of on-ground management measures where appropriate (e.g. habitat turbine buffers, acoustic deterrents, etc.);
- The timely identification of turbine collisions and collection and analysis of data via the operational monitoring program;
- The implementation of an evidence-based mitigation approach, including an impact-trigger review of mitigation effectiveness as part of a broader adaptive management approach; and,
- Regular reporting and communication with DEECA and DCCEEW to engage in a consultative approach to monitoring, mitigation and management.

- An improved understanding of the risk of turbine collision and barotrauma impacts on listed bird and bat species (e.g. data collected through the operation monitoring program).

3 MITIGATION MEASURES TO REDUCE RISK

The following mitigation measures will be implemented to reduce the risk of bat and bird mortality, and address the permit conditions relating to bird and bat mortality.

3.1 Carrion Removal Protocol

The wind farm is located within an agricultural setting, within paddocks supporting livestock and native macropods. Animal carcases are known to attract raptors and as such, their regular removal is required to reduce the risk of bird mortality through turbine strike. The following protocol will be adopted during the operational life of the wind farm:

- Site managers and staff, in consultation with the host landowners, will ensure any carrion stockpiles/pits (i.e. during lambing) are located at least 500 metres from the nearest turbine;
- All site personnel will be responsible for notifying the Site Manager or nominated person of any identified carrion within 250 metres of the turbines. The Site Manager or nominated person, in consultation with the host landowners, will arrange for any identified carrion to be removed in a timely manner. Carcass occurrence and removal will be recorded by the Site Manager or nominated person;
- In the event that large numbers of European Rabbit *Oryctolagus cuniculus* (>5 individuals or warren activity) are sighted within 250 metres of a turbine, collapsing of rabbit warrens will be undertaken, with any additional control activities subject to host landowner consultation. All control activities must be undertaken in accordance with best practice methods (JACRC 2012a; 2012b;2012c); and,
- An annual summary of carcass removal will be provided in the annual monitoring reports (Section 6).

3.2 Species Mitigation Measures

3.2.1 Swift Parrot

The risk of turbine collision can be substantially reduced by ensuring turbines are configured to provide an appropriate buffer between possible Swift Parrot feeding grounds (i.e. large or contiguous patches of remnant eucalypt forests) and turbines in the Project Area (Smales 2005). There are no guidelines as to what constitutes an 'appropriate buffer' between Swift Parrot foraging habitat and turbines and very little is known about Swift Parrot flight behaviour. Ecological investigations for other wind farm projects have been reviewed to inform the WWREP's design response to minimise the potential risk of impacts to the species.

The risk of collision for Swift Parrot is likely to be significantly reduced by ensuring turbines are configured to provide a buffer from HVFH). The proposed turbine configuration has been developed to ensure a minimum buffer of 300 metres is applied from HVFH to the centre of all turbines (Figure 2). While Swift Parrot may briefly occupy secondary foraging habitat during periods of high resource availability (i.e. flowering periods), the species is more likely to occupy larger stands of eucalypt such as those contained in Watta Wella Reserve and Joel Joel Nature Conservation Reserve (HVFH). Swift Parrot mitigation measures are summarised below (Table 8; Appendix B).

Turbine Curtailment

The WWREP is committed to developing a Collision Risk Model (CRM) for Swift Parrot, should the opportunity arise to collect site-specific data to inform it. Based on previous records, the Swift Parrot is located in the Stawell area every 1-2 years and the Project Area location every 6-7 years. In this context, the opportunity to collect data to inform a CRM may not arise for some time, if at all. In the absence of a CRM or site-specific data, curtailment will be implemented, with monitoring for species presence within proximity adjacent to and within the Project Area will continue throughout the life of the operation of the Project for the purposes of informing the curtailment requirements.

The Swift Parrot curtailment monitoring program will be undertaken for the life of the project. If the CRM is developed and is able to be prepared that adequately demonstrates the collision risk to the species is acceptable (i.e. reduction from 'high' to 'low' or 'medium' as per Section 2.3), curtailment of the selected turbines and associated monitoring requirements will be revisited, unless a Swift Parrot mortality event occurs that is attributed to turbine strike.

Curtailment (limited to 50% of rated maximum revolutions per minute [RPM]) of selected turbines (13 turbines within one kilometre of HVFH; Figure 2) will be implemented, on confirmation from continued monitoring that the Swift Parrot is present within five kilometres of a turbine. A letter will be sent to DCCEEW and DEECA confirming the date and commencement of curtailment actions within two business days of a trigger event.

A complete shutdown of turbines within one kilometre of HVFH will occur when Swift Parrot are recorded within the Project Area for the duration that the species is known to be present within the Project Area (Appendix B). A turbine can typically be shut down within 5 minutes without causing excessive strain on components or adversely affecting the operational life of the turbine.

Curtailment, including complete shutdown of turbines, will cease in the event that on-ground monitoring (see Section 4.1.1.) shows the species is likely absent of all areas within five kilometres of a turbine, and a letter confirming the survey effort, results and date of the trigger event has been sent to DCCEEW and DEECA within five business days of likely absence determination.

Table 8. Proposed Monitoring and Curtailment Measures for Swift Parrot.

Hierarchy of Actions	Trigger	Action	Duration
1	During the known over-wintering period (February – September)	Monitoring of birdata, ebird and other frequently updated ecological databases to be undertaken for Swift Parrot records in Victoria	Twice a week during the entirety of the over-wintering period
2	Occurrence of the species within 20km of the Project Area boundary	On-ground monitoring for the species within the Project Area and locality (within 5kms of a turbine)	Weekly visits to HVFH and the closest known location of the species until monitoring shows the species is likely absent of HVFH within 5km of turbines and locations within 20km where the species occurred

Hierarchy of Actions	Trigger	Action	Duration
3	Confirmed presence of Swift Parrot within 5kms of a turbine	Curtailment (i.e. reduction in speed by 50%) of all turbines within 1km of HVFH – Watta Wella Reserve (7 turbines) and Joel Joel Nature Conservation Reserve ; (6 turbines); On-ground monitoring for the species within the Project Area and locality (within 5kms of a turbine)	Weekly visits to HVFH and the closest known location of the species until on-ground monitoring shows the species is likely no longer present within 5kms of a turbine
4	Confirmed presence of Swift Parrot within the Project Area	Shutdown of all turbines within 1km of Watta Wella Reserve (7 turbines) and Joel Joel Nature Conservation Reserve (6 turbines) ; Flight behaviour surveys conducted over multiple days to collect site-specific Swift Parrot flight behaviour data and activity budgets Re-assess extent and location of foraging habitats within Project Area	Adequate site-specific flight data collected to inform preparation of a CRM. Turbine shutdown ceases when on-ground monitoring shows the species is likely no longer present within the Project Area. Turbine curtailment continues if Swift Parrot still recorded within 5kms of a turbine.
5	Likely absence of Swift Parrot within 5kmsof a turbine	End of curtailment measures (including turbine shutdown)	Monitoring to confirm the species is likely no longer present within 5kms of a turbine before curtailment measures are lifted. Notification letter to be submitted to DCCEEW/DEECA within five business days confirming likely absence of Swift Parrot within 5kms of a turbine after surveying HVFH.
6	Site specific CRM determines collision risk for Swift Parrot to be acceptable i.e. risk rating reduction to 'low or medium')	All monitoring activities for Swift Parrot to conclude; BAM Plan updated to reflect change in collision risk profile to species and management measures.	Unless Swift Parrot mortality event attributed to turbine strike occurs.
7	Swift Parrot mortality event attributed to turbine strike	Shutdown of all turbines within 1km of HVFH – Watta Wella Reserve (7 turbines) and Joel Joel Nature Conservation Reserve (6 turbines) ; On-ground monitoring for the species within the Project Area and locality (within 5kms of a turbine	Weekly on-ground monitoring and shutdown of all turbines within 1km of HVFH until on-ground monitoring confirms the species is likely no longer present within the Project Area. Turbine curtailment continues if Swift Parrot is still recorded within 5kms of a turbine.

3.3 Additional Mitigation Measures

The following additional measures are recommended:

- The WWREP Site Manager will consult with the landowners to ensure that any grain feeding is restricted to areas a minimum of 120 metres from the wind turbines to reduce the risk of bird turbine collision; and,

- Any on site lighting will be recessed using baffles and directed to avoid excessive light spillage using any lighting system capable of reducing lux levels.

3.4 Adaptive Management

An adaptive management approach is proposed for bird and bat management at the WWREP. This approach is designed to help achieve the environmental outcomes stated in this report (Section 2.4). Measures will be evaluated for their performance via the operational monitoring program, and alternative mitigation measures to be considered as monitoring results are known and technological advancement occurs across the industry.

There are three conservation listed species with a 'High' risk rating (Swift Parrot White-throated Needletail and Eastern Bent-wing Bat), nine species with a 'Medium' risk rating, and ten species with a 'Low' risk rating due to the WWREP (see Section 2.3 for full list of species). In the event that an impact trigger (see Section 5.1 for definition) occurs to a conservation or non-conservation listed species and the subsequent assessment identifies the potential for reoccurrence, a series of supplementary mitigation measures are to be considered for implementation (Section 5.3). Supplementary mitigation measures should not be confined to the list of measures provided in this report (Table 9). A literature review of potential mitigation measures will be conducted by a suitably qualified ecologist upon the occurrence of an impact trigger. This is intended to ensure that technological advancement and the ongoing evaluation of mitigation measures within the industry is considered, and any supplementary mitigation measures draw on the most up to date literature and reflect best practice.

In addition to bird and bat management, an adaptive management approach will be undertaken for species where turbine collision risk is not well understood (e.g. Swift Parrot). Upon completion of a CRM, should sufficient flight data be recorded, a literature review of potential species-specific mitigation measures will be conducted to ensure any proposed mitigation measures draw on the most up to date literature and reflect best practice.

The automatic bird identification system, IdentiFlight was assessed as a possible supplement for on ground-monitoring of the Swift Parrot. These units could be installed for species level identification and to collect accurate flight behaviour data for input into a CRM. Although IdentiFlight has shown to be successful in identifying similarly sized species there are numerous drawbacks preventing it from currently being implemented as a suitable solution. These drawbacks have been identified during consultation with IdentiFlight and operators of wind farms using the technology. The AI detection system, known as the "Neural Network" would need to be trained to accurately identify target species. Typically, this requires upwards of half a million confirmed images of the species to reliably and accurately identify species. Given the lack of sightings of the Swift Parrot, the system may not be able to learn to detect the species within the Project Area. Multiple units would need to be installed across the Project Area to get complete coverage and the system would need to be raised up high enough to record flights within bushland area above canopy height. Typically, reliable coverage requires a minimum of one unit per wind turbine. IdentiFlight cannot be used to trigger for individual turbine shutdown. It is not proven to be capable of detecting Swift Parrots early enough to trigger effective and timely turbine shutdown, due to the high speed of the species during flight.

4 OPERATIONAL MONITORING PROGRAM

Post-commissioning requirements for the WWREP include an operational monitoring program for target species within the Project Area, comprising species-specific and mortality monitoring.

4.1 Species Monitoring

Consistent with the Before and After Control-Impact (BACI) monitoring framework, as recommended in the *Onshore Wind Farms – interim guidance on bird and bat management* (DAWE 2021), avifauna site utilisation monitoring will be undertaken for species with an overall risk assessment rating of 'High' due to the WWREP (Section 2.3). The monitoring program is proposed below.

4.1.1 Swift Parrot

The Swift Parrot curtailment monitoring program will be undertaken for the life of the Project, with surveys for the species having been undertaken on several occasions since 2020 (Section 2.2.2), establishing a strong understanding of habitat type and habitat quality within the ROI.

Monitoring of ecological databases and stakeholder engagement

During the species migration and over-wintering period when the species is confirmed via ecological databases to be present on the mainland (generally, March – August, but can be from February – September), regular monitoring (twice a week) of ecological databases including Birdata, eBird, Birdlife Swift Parrot Search results and other frequently updated ecological databases will be undertaken by an ecologist or trained site personnel for Swift Parrot to determine the species' proximity to the Project Area. The results of ecological database checks are to be included in annual reporting to DELWP required as part of this BAM Plan.

Engagement with Birdlife Australia will be conducted to ensure 'Swift Parrot Search' Swift Parrot observations for the local region are obtained as soon as possible after completion of the state-wide annual 'Swift Parrot Search' (i.e., annually). Alerts will be established to monitor for the uploading of new Swift Parrot data and regular engagement with relevant stakeholders (e.g. Birdlife Australia, local Landcare groups) will be undertaken during the over-wintering period to fully understand the presence and location of the species.

Targeted surveys

<u>20 kilometre radius</u>

In the event that monitoring of ecological database and/or stakeholder engagement indicates that Swift Parrot are present within 20 kilometres of the Project Area, this will trigger a requirement to commence on-ground monitoring surveys for Swift Parrot within five kilometres of the Project Area and the closest known location of the species (Figure 3), subject to land accessibility in any private land. These surveys will focus on areas of HVFH. Monitoring is proposed to occur at a minimum on a weekly basis for 1-2 days at a time, for the duration that the species is known to be present within 20 kilometres of the Project Area. Swift Parrots tend to display sedentary behaviour when foraging for long-periods in flowering stands and often temporarily roost nearby (as per the findings of the flight behaviour data and activity budgets).

<u>Five kilometre radius</u>

monitoring for Swift Parrot individuals will be undertaken within the Project Area and locality (within five kilometres of a turbine), with a focus on HVFH. Monitoring will be undertaken at minimum on a weekly basis for 1-2 days at a time, until on-ground monitoring establishes that the species is likely to no longer be present within five kilometres of a turbine.

Within Project Area

If the species is confirmed to be present within or immediately adjacent to the Project Area (i.e. Joel Joel Nature Conservation Reserve, Watta Wella Bushland reserve), detailed site-specific flight behaviour studies will also be conducted over multiple days to gather flight behaviour data and activity budgets to inform the preparation of a CRM. To adequately inform a CRM, Swift Parrot flight paths within the Project Area will be recorded, including the height, distance, direction and time of day of flights, as well as the type of behaviour displayed and overall use of foraging habitat.

4.1.2 Migratory Birds

Annual surveys for migratory birds will be undertaken to target migratory birds that may occupy the Project Area (e.g. White-throated Needletail). The aim of the monitoring surveys for migratory birds is to determine with greater certainty the likelihood of occurrence, site utilisation, and collision risk of White-throated Needletail and other migratory birds. Migratory bird monitoring surveys will be undertaken for two-years from commencement of turbine operation, at which point DELCA will be consulted to determine whether further monitoring surveys are required.

Two zoologists, experienced in bird identification, will undertake a round of fixed-point counts and roaming surveys in Spring/early Summer (November-January) across eight fixed-point count survey sites within the Project Area. Surveys will adhere to the survey guidelines for all target species as outlined in "Survey Guidelines for Australia's Threatened Birds" (Commonwealth of Australia 2010).

The timing of the annual survey period in late Spring/early Summer will align with the optimal survey period for many of the migratory species that may occupy the Project Area. 10 × 42 binoculars will be used to identify the bird to species, or for some species, generic level (e.g. non-calling Raven species). Surveys will be conducted on foot.

Migratory bird surveys will broadly capture the following data:

- Name of observer, date, survey start/finish times;
- Location of observation;
- Weather conditions;
- All individual bird species observed, and distance and direction from observer;
- Habitat assessment.

Additionally, carcass monitoring will monitor for the presence of migratory species, including White-throated Needletail, and any impacts likely to occur (see Section 4.2.1). In the event that a flock of White-throated Needletails flies across the Project Area during carcass monitoring searches, a suitably qualified ecologist will conduct a survey to identify their height, movement and abundance.

Data collected on White-throated Needletail (and other migratory birds via operational monitoring) will inform understanding of the potential risk for these species due to the WWREP.

4.1.3 Eastern Bent-wing Bat

Post-construction microbat surveys will be undertaken to target Eastern Bent-wing Bat, in accordance with the Survey guidelines for Australia's threatened bats (DEWHA 2010b). The post-construction microbat surveys will specifically target Eastern Bent-wing Bat to determine with greater certainty the likelihood of occurrence, site utilisation, and collision risk of this species. The surveys are also intended to supplement data from post-construction mortality monitoring, as threatened species, and particularly small bat species, are far less likely to be recorded in mortality surveys due to comparatively smaller numbers of mortalities and because small bat species are scavenged very quickly.

Song Meter SM4 (Wildlife Acoustics™) sound recorders will be deployed at 12 sites within the Project Area, including sites where Eastern Bent-wing Bat was previously recorded. The post construction monitoring surveys will be undertaken over a minimum four-week period during the period of highest activity, and occur across two survey events – one in each of the two years of the BAM Plan from commencement of turbine operation. Bat detector locations will be chosen based on geography, habitat type and turbine configuration to capture the species' activity in proximity to turbines as well as a representative sample of the Project Area. Units will be placed in proximity to turbines, and in areas likely to be utilised by foraging bats, for example adjacent to farm dams, near native vegetation (e.g. along waterways) and planted windrows.

Song Meter SM4 (Wildlife Acoustics™) sound recorders record the high frequency calls or echolocation, produced by the bats when they are in flight, and save these calls directly to a memory card. It is important to note that although detectors may give an index of overall bat activity levels, they cannot be used to determine bat abundance, as the number of individuals making the calls is not known. The SM4's recorded audible sounds from 10kHz hz-55kHz which is the calling acoustic frequency for microbats.

Detection distances for Song Meter units vary enormously depending on the frequency and amplitude of each bat call. Based on the sensitivity settings of the microbat detectors, it is assumed that most bats within 30 metres will be detected under typical conditions, while some species which call at low frequencies will be detectable up to 100 metres.

Weller and Zabel (2002) found detectors placed at a height of 1.4 metres recorded 30% more calls than those placed on the ground. This method will be adopted at all locations within the Project Area.

Call Analysis

Identification of bat calls collected will be undertaken by recognised expert Rob Gration from EcoAerial Consulting Services. Rob has analysed over two million microbat calls and has collated an extensive microbat call reference library for Victorian bat species. All nights of data will be assessed for the calls of Eastern Bent-wing Bat, while bat calls belonging to any other significant bat species will also be captured. Call identification will be completed using Anabat Insight sound analysis software (Titley Scientific) with reference to the EcoAerial microbat call reference library for Victoria.

The microbat call analysis will be conducted in accordance with the Standards for reporting bat detector surveys (Australian Bat Society Incorporated undated). If one of the call complex cohorts (Little Forest Bat or Chocolate Wattled Bat) is positively identified it will be recorded as present once only. Call analysis will involve the allocation of data files to species, and then counting the number of call records.

4.2 Mortality Monitoring

The mortality monitoring program will aim to answer the following key questions through the completion of carcass searches, scavenger trials and detectability trials:

- Is operation of the wind farm resulting in bat or bird mortality, and if so:
    - What is the estimated annual mortality rate?
    - What species are being impacted?
    - Is there seasonal variation in the number of mortalities?

The mortality monitoring program will be undertaken for a minimum of two years, with the requirement for further monitoring determined in consultation with DEECA upon completion of the two-year program. Commencement of the monitoring program will occur upon commencement of operation of the first turbine, that is, when turbine blades are in motion and generating electricity. Generally, a minimum period of two years of data collection is required to ensure statistically robust results and to enable a valid estimate of both bird and bat mortality rates, together with an estimate of sampling precision.

All monitoring activities will be undertaken by a suitably qualified ecologist. Section 4.2 has been formulated for either humans or dogs to undertake the mortality searches. Evidence shows that both methods provide useful mortality detection when combined with scavenger and detectability trials. Searcher dogs are shown to be capable of more efficient and effective detections of small carcasses (i.e. microbats, birds) than humans (McKeague *et al.* 2024).

4.2.1 Carcass Searches

During the life of the two-year monitoring plan, monthly carcass searches will be undertaken at selected turbine sites in accordance with the selection criteria detailed in the section below (Turbine Selection). Site groupings will allow for impacts in proximity to large, forested areas to be monitored.

In order to reduce error and refine mortality estimates a second carcass search (pulse search) will be undertaken for at least two days following each primary search. During each primary event, all land within 120 metres of each sampled turbine will be searched for bat and bird carcasses (Hull and Muir 2010). Pulse survey events will adopt a search radius of 60 metres from each turbine.

The following steps will be undertaken during each event:

1. The Carcass Search Data Sheet will be completed for each event, whether carcasses are located or not (Appendix A).
2. Searches will commence in the morning once the sun is high enough to provide good ground visibility. A suitably qualified ecologist (or suitably qualified ecologist and conservation dog) will walk straight line 20 metre wide transects at approximately 30-60 metres per minute and search thoroughly for bat and bird carcasses. Survey tracks will be recorded and provided to the Responsible Authority and DEECA upon request.
3. If a carcass is found, the relevant sections of the Carcass Search Data Sheet will be completed (Appendix A). The carcass will be:
    - Removed to avoid re-counting;

- Handled by personnel wearing gloves, packed into a plastic bag, wrapped in newspaper and placed in a second plastic bag;
- Clearly labelled with the species name, turbine number and survey date; and,
- Transferred to a freezer for future use in scavenger/ detectability trials. Any specimens not used for subsequent monitoring will be stored for a minimum of 12 months and offered to DEECA prior to disposal.

4. Where the searcher is unable to identify the species of any carcass found, specialist advice will be sought to confirm the subject species (e.g. Museum of Victoria); and,
5. Reporting requirements associated with detection of carcasses of conservation-listed species are outlined in Section 6.

A permit is required under the Victoria's Wildlife Act 1975 to handle and keep native wildlife (even dead wildlife) as part of the monitoring program. An application for this permit will be submitted in a timely manner to ensure approval has been obtained prior to installation of turbines.

During monthly carcass searches, the occurrence of any raptors within the wind farm area will be recorded with the following information:

- Date, location and duration of observation period;
- Time and duration of observed flight;
- Species, number and age of birds;
- Flight height and behaviour; and,
- Habitat over which flight was observed.

The opportunistic sightings will be collated and incorporated into the annual monitoring reports (Section 6).

Turbine Selection

During the early construction period (up to 15 turbines operational i.e. generating electricity) monitoring will be conducted at all operational turbines. Monitoring will commence when the first turbine becomes operational, that is, when turbine blades are in motion and generating electricity. When between 16 and 45 (all) turbines are operational, monitoring will occur at a random selection of 15 turbines, which is approximately 33% of the entire turbine number will be monitored, which aligns with the proportion of turbines surveyed at similarly sized wind farms in Victoria.

The number of randomly selected turbines (15) will be chosen to allow for the logistics and OH&S considerations of searchers and is based on what will provide the most accurate mortality rate, given high variability shown on other wind farms, and to maximise reliability of searches.

The following selection process for the 15 randomly selected turbines will be undertaken outside the overwintering period for Swift Parrot (i.e. October – January):

- Five turbines will be randomly selected each of the three sub-section zones representing different sections of the wind farm. Zones are defined as north, central and south-east (Figure 5).

The following selection process will be undertaken for the 15 randomly selected turbines during the overwintering period for Swift Parrot (i.e. February – September):

- Six turbines will be randomly selected from within the one-kilometre buffer of HVFH (a total of 13 turbines are located within 1km buffer) for Swift Parrot (Figure 5).
- For the remaining nine randomly selected turbines, three turbines will be randomly selected from each of the three sub-section zones.
- In the event that a turbine is selected during the first (6) selected turbines and again in the remaining (9) selected turbines, the duplicate selection will become void and a redraw of that selection will occur.
- In the event that fewer than six wind turbines are operational within one kilometre of HVFH, the selection process will revert to that undertaken during October – January i.e. five turbines will be randomly selected from each of the three sub-section zones.

While turbines within one kilometre of HVFH have a greater chance of being selected, all other turbines have an equal chance of being selected. This will ensure areas with a perceived higher likelihood of collision (i.e. in proximity to forested areas) are monitored, while maintaining a relatively even representation of the wind farm site. Turbines for monitoring will not be changed, once selected.

Each turbine that is selected for the searches will have the following recorded:

- Turbine name/number
- location (easting, northing); and
- local vegetation, including the following information which will identify visibility limitations;
    - a general description of the vegetation, including vegetation type (e.g. box-ironbark forest, grazed pasture, cropping, etc);
    - estimated average height of the vegetation;
    - vegetation density; and,
    - distance to key habitat features, such as woody vegetation, wetlands, ridgelines, etc.

Searches will be undertaken by suitably qualified ecologists, trained site personnel experienced in mortality monitoring or on-site personnel/dogs trained in the required search methods. A training and quality assurance program will be developed and delivered, where necessary, to ensure that personnel concerned are implementing survey procedures and data collection methods appropriately.

Search Method

The search area beneath each turbine has been determined to maximise detection probability for bats and medium to large bird carcasses (Hull and Muir 2010). According to the Hull and Muir model (2010) 95% of bat carcasses are found within 65 metres of the turbine, while medium to large bird carcasses may be found out to 100 metres, and 95% of very large bird carcasses (Wedge-tailed Eagle *Aquila audax*, Brolga *Antigone rubicunda*) are found within 115 metres.

A 120-metre search radius is proposed in order to adequately detect mortalities under the proposed turbine sizes. Pulse survey events will adopt a search radius of 60 metres from each turbine.

Inner and outer circular search zones have been designated, corresponding to the probability for the sizing of birds and bat carcasses likely to occur. A search of the inner circle will be conducted using 6 metre transect widths, up to a 60-metre radius of the turbine. A search of the outer circle between 60-metre and 120-metre

radius of the turbine, will be conducted to ensure the adequate detection of carcasses of medium to larger sized birds.

4.2.2 *Scavenger Trials*

Throughout the life of the 2-year monitoring plan, scavenger trials will be undertaken to estimate the length of time bat and bird carcasses remain detectable before being taken by scavengers (Red Fox, Feral Cat etc.). The average carcass duration and confidence interval will be used to refine mortality estimates and account for the likely effects of scavengers on carcass detectability.

Each year, two one-month scavenger trials will be undertaken in April and October to capture Autumn and Spring variations in bird activity. The following steps will be undertaken during each event:

1. The trials will be conducted at eight randomly chosen turbines;
2. A total of eight carcasses or surrogates (i.e. mice) will be used during each trial, with two carcasses representing each of the following categories:
    - Microbats
    - Flying-foxes
    - Small birds
    - Medium Birds
    - Large Birds
3. At each turbine, one carcass or surrogate will be placed randomly within the 120-metre search area. Fresh ethically-sourced carcasses will be used where possible and all handling of carcasses will be undertaken with latex gloves;
4. A remote camera will be focussed on each carcass and set to record a photo each hour and when triggered by movement;
5. Weekly checks will be undertaken to record the state of carcasses and if any scavenged carcasses have been moved outside the 120-metre search area;
6. All remaining carcasses will be removed at the completion of the trial; and,
7. The mean persistence of carcasses and confidence interval at each turbine will be calculated and the results will be incorporated into the mortality estimate.

4.2.3 *Detectability Trials*

Throughout the life of the two-year monitoring program, detectability trials will be undertaken to estimate searcher efficiency and refine mortality estimates. Two detectability trials will be undertaken randomly during the monthly carcass search events (i.e. two randomly selected months of detectability trials over the two-year monitoring program). The detectability trials will use up to 30 deployed carcasses. The following steps will be undertaken during each event:

1. The detectability trials will be undertaken concurrently with the monthly carcass searches. The timing of the two detectability trials will be randomly selected (i.e. two randomly selected months) and carcasses will be deployed by personnel not performing the searches;

2. Carcasses will be placed in a variety of exposures to simulate a range of conditions;

    a. Any substitute carcasses used in these trials will closely match the size, colour, and form of the species being represented or of concern. For example, appropriately coloured mice may be substituted for bats instead of birds, as birds do not share the same body shape, colour, and appearance. If sufficient carcasses cannot be obtained, realistic-looking stuffed artificial substitutes may be used. Since humans inspect/search visually, it is not essential to use real carcasses if the substitutes appear similar once placed the ground. Artificial substitutes cannot be used for dogs. Ecologists will notify DEECA within five business days prior to the actual timeline of all experimental trials so that DEECA has the opportunity to observe the trials.

    b. Up to 30 carcasses or surrogates (for human detectability trials i.e. mice) will be used during each trial with this number varying between trials, and representing at least three of the four of the following categories, depending on the availability and restrictions to carcasses:

        - Microbats
        - Flying-foxes
        - Small birds
        - Medium Birds
        - Large Birds

3. The searcher will not know the trials are being undertaken, will not know the location of the carcasses and will apply the same search methods intended for normal carcass searches; and,
4. The mean proportion of placed carcasses found by the searcher and confidence interval will be calculated and incorporated into the mortality estimate.

One year of data will likely result in a reasonably precise detectability estimate, and optimal precision after two years.

4.2.4 *Incidental Finds Protocol*

During operation of the wind farm, carcasses may be discovered by personnel not engaged to implement this BAM Plan (e.g. ecologists, technicians, and landowners). All site users will be informed of their responsibilities regarding incidental finds, including the requirement to report any carcasses to the Site Manager or authorised person.

The Site Manager or authorised person will undertake the following tasks in the event that an incidental find is recorded:

- Carcases will be photographed where they are found and the Carcass Search Data Sheet will be completed (Appendix A);
- The carcass will be handled, removed and stored in accordance with the procedures outlined for carcasses searches (Section 4.2.1);
- Any injured animals will be treated in accordance with the Injured Bird and Bat Protocol (see below); and,

- Reporting requirements associated with detection of conservation-listed species are recorded are outlined in Section 6.

It is noted that the reporting protocol only applies where mortality is likely to have resulted from wind farm operations (i.e. blade strike or barotrauma) as determined by the Project Ecologist based on the injury profile. This protocol is valid for the operational life of the wind farm.

4.2.5 Injured Bat and Bird Protocol

All site users will be informed of their responsibilities regarding injured wildlife, including the requirement to report any finds to the Site Manager or authorised person. The Site Manager or authorised person will inform an appropriately trained and suitably qualified Project Ecologist, who will undertake the following tasks if notified of any injured wildlife:

- The animal will be handled as little as possible. Appropriate Personnel Protective Equipment (PPE) will be worn when handling any injured fauna, including a long-sleeved shirt, gloves and eye protection. Injured fauna will only be handled by those who have been vaccinated for species-specific viruses;
- Injured bats or birds will be placed in a box or cloth bag and kept in a warm, quiet and dark location;
- Wildlife Victoria (03 8400 7300) will be called to identify local carers and arrange pickup or delivery of the injured animal. Where required, injured animals may be transported directly to a licensed wildlife carer or shelter, for example: Stawell Veterinary Clinic – (03) 5358 1666.
- In event that any injured conservation-listed species are recorded, DEECA (and DCCEEW if EPBC Act-listed) will be notified within seven days of discovery. Records of non-conservation-listed species will be incorporated into annual reporting.

It is noted that the injured bird and bat protocol only applies where injury is likely to have resulted from wind farm operations (i.e. blade strike or barotrauma). This protocol is valid for the operational life of the wind farm.

4.2.6 Data Analysis

The methods for mortality monitoring outlined in this BAM Plan are in accordance with those previously used and approved by Symbolix Pty Ltd, a data analysis and science consultancy based in Victoria. The results of mortality monitoring will be analysed to provide the following information:

- The species, number, age and sex (if possible) of bats or birds struck by turbines (or effected by barotrauma in the case of bats);
- Any seasonal variation (autumn and spring) in the number of bat or bird strikes; and,
- An estimate of the annual number of bats and birds killed as a result of wind farm operations.

To compare impact levels with other facilities, the observed mortalities must be corrected for detectability, scavenger loss and incomplete coverage of the possible fall zone area. The estimated total mortality will be calculated for bats and birds and reported as (at least) an average (mean) loss and upper bound (upper 95% confidence level).

There are several statistical methods available to generate the mortality estimate for inclusion in annual reporting. The selected method will be statistically unbiased, able to generate the likely range of mortalities (not just an average) and be able to account for the uneven timing between surveys used in the pulse survey design. Simulation methods have been applied at other sites with similar survey designs.

5 SIGNIFICANT IMPACTS AND RESPONSES

This section provides a decision-making framework to be used if the monitoring program detects a significant impact on conservation-listed or non-conservation-listed species.

5.1 Conservation-listed Species

5.1.1 *Definition of Impact Trigger and Significant Impact*

An impact trigger for conservation-listed species will occur if any bat or bird species listed under the EPBC Act or FFG Act is found dead or injured (attributable to turbine collision) within the survey area during mortality searches or incidentally.

A significant impact occurs in the instance an impact leads to, or has the potential to lead to a long-term decrease in the size of a local population. There are three conservation listed species with a 'High' risk rating (Swift Parrot, White -throated Needletail, Eastern Bent-wing Bat) and nine species with a 'Medium' risk rating due to the WWREP.

A significant impact will be confirmed upon investigation of risk factors and cause of death as per Plate 1.

5.1.2 *Decision Making Framework*

If an impact trigger for conservation-listed species occurs, the process outlined in Plate 1 will be implemented to investigate the cause and identify measures, including potential curtailment, to further reduce the risk of reoccurrence.

5.2 Non-Conservation-listed Species

5.2.1 *Definition of Impact Trigger*

If a high number of collision events with a non-conservation species occur on an ongoing basis, an evaluation of impacts to that species will be undertaken. A 'high number' (i.e. the impact trigger) refers to:

- Two successive monthly carcass searches totalling four or more native bird or bat carcasses of the same species (or parts thereof) of non-threatened species (excluding introduced species) located at the same turbine; or,
- Five or more Wedge-tailed Eagle carcasses found across the fifteen monitoring sites during a single year of monitoring.
    - A threshold of five is considered appropriate given the high cumulative risk to the species from turbine collision relative to other non-conservation species.
    - Wedge-tailed Eagle carcass occurrence and removal will be recorded in a 'management log book' maintained by the Site Project Manager.
    - An annual summary of carcass removal, based on the 'management log book'log' will be provided at the end of each year of the monitoring program to DEECA. This should specifically address Wedge-tailed Eagle mortality. Carrion removal schedule or other mitigation measures may be refined in consultation with DEECA.

- We recognise the cultural significance of the Wedge-tailed Eagle in the context of impact assessments. Given the cultural significance related to the population health for this species, the additional monitoring procedures proposed here are designed to address management of this species.

Once a 'high number' of collision events is triggered (as per above criteria), an assessment of population effects relating to the impact will be conducted following agreement between DEECA and the proponent on an appropriate assessment scope.

5.2.2 Decision Making Framework

In the event that an impact trigger for non-conservation-listed species occurs, the process outlined in Plate 1 for conservation-listed species will be implemented to investigate the cause and identify measures to further reduce the risk of reoccurrence.

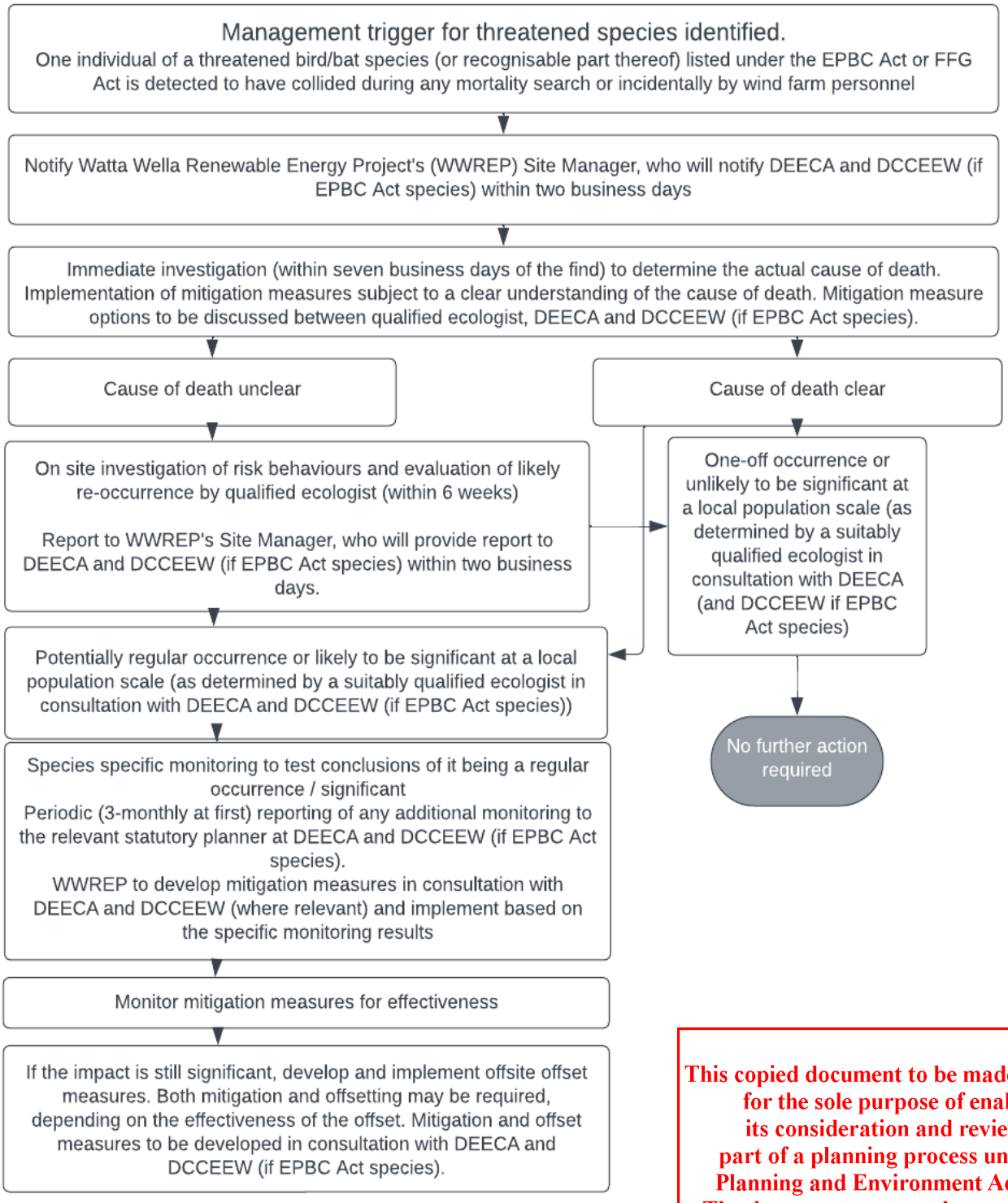

Plate 1. Decision Making Framework for Impacts on Conservation-listed Species

5.3 Supplementary Mitigation Measures

In the event that an impact trigger occurs to a conservation or non-conservation listed species and the subsequent assessment (as per the decision-making framework in Plate 1) identifies the potential for regular occurrence, corrective action (e.g. supplementary mitigation measures) are to be considered. While exact measures would be determined in the event of an impact trigger, several examples are provided below (Table 9).

Table 9. Potential Corrective Actions in response to Significant Impacts.

Cause of impact	Potential measures
Farming practices are identified to be attracting birds	Reinforce the Carrion Removal Protocol (Section 3.1) and additional measures provided in Section 3.2 and Section 3.3).
Lights are identified to be attracting bats	Ensure the measures relating to lighting described in Section 3.3 are implemented. Remove or relocate lights where feasible.
Vegetation or another resource is identified to be attracting bats and birds	- Improve habitat areas in the surrounding landscape to divert use away from the wind farm; and, - Investigate the removal of foraging habitat, subject to approval.
Turbines are causing significant impacts to birds and bats	Image sensing technology - Undertake a monitoring program to test the applicability of image sensing systems (IdentiFlight or similar) to detect and monitor bird flight for high-risk or impacted species; - Installation may be wind turbine specific (e.g. turbine where an impact trigger occurred) or applied more generally, and be informed by the recorded impact trigger/s; Offsetting impacts - Funding the management of key habitat for impacted species to improve breeding and conservation outcomes in offsite locations, in line with DCCEEW conservation advice and other relevant statutory documents. More frequent carcass searches - In order to gain a better understanding of the risk to birds and bats from turbine collision, carcass searches may be conducted more frequently and/or at additional turbines. Nighttime low wind speed curtailment Low windspeed curtailment at an appropriate cut-in speed when bats are active (i.e. nighttime, September to May) may be implemented to reduce collision risk and mortality for bats. The above and any other potential supplementary mitigation measures would be considered in consultation with DEECA.

6 REPORTING AND COMMUNICATION

An annual report will be submitted to the Responsible Authority (with copies provided to DEECA, DCCEEW and DTP) within two months of completing each year of the monitoring program. The report will detail the methods and results of monitoring. The contents of each year's report will include, but not be limited to the following:

- Detailed survey methods (including list of observers, dates and times of observations);
- Estimates of bat and bird mortality rates;
- Any other wind turbine related bat and bird mortality recorded on site but not during designated carcass searches (i.e. incidental records by site personnel, etc.);
- A discussion of the results, including:
    - Whether a significant impact has occurred;
    - Whether continuation of the monitoring program is warranted and, if so, in what form;
    - Any discernible differences in collision rates between lit and unlit turbines, where relevant; and,
    - Any recommendations for reducing mortality, if necessary.

Following review of Year 1's monitoring results DEECA and the Responsible Authority to determine whether changes to the monitoring and reporting is required. A copy of the annual reports will also be made readily available on the WWREP website for the life of the WWREP.

If any carcasses of conservation-listed species are recorded, DEECA (and DCCEEW if EPBC Act-listed) will be notified within seven business days of discovery. Records of non-conservation-listed species will be incorporated into annual reporting. If an impact trigger or significant impact is detected, as defined in Section 5, DEECA (and DCCEEW if EPBC Act-listed) will be informed immediately (i.e. within two business days) and discussions initiated to define the best approach to investigating the impact further to inform mitigation measures, if required. Any trigger or significant impact events will be documented and included in annual reporting.

In the event of a curtailment trigger event for Swift Parrot, a letter memo will be sent to DCCEEW and DEECA within five business days confirming the curtailment trigger event and timing of commencement, as well as the conditions under which curtailment would be lifted. A memo would additionally be sent once the trigger event for lifting curtailment occurs.

7 SUMMARY OF BAM PLAN MEASURES

A summary of required annual actions for the life of the 2-year monitoring plan directed by this BAM Plan is provided in Table 10.

Table 10. Summary of Annual Management Actions (2-years).

Action	Personnel Responsible	Timing
Ensure that all site personnel are aware of their responsibilities outlined in this plan.	- Site Manager - Project Owner	Prior to operation of the turbines.
Ensure that landowners are aware, or that landholder agreements entail, actions to mitigate potential collision, e.g., not stock feeding within 250m of a turbine.	- Site Manager - Project Owner	Prior to operation of the turbines.
Contact Wildlife Victoria to identify local wildlife carers.	- Site Manager - Project Owner	Prior to operation of the turbines.
Identify site lighting requirements and align with the recommended specifications provided in Section 3.3.	- Site Manager - Project Owner	Prior to operation of the turbines.
Ensure resources are available to commence the monitoring program (e.g. a freezer for collected carcasses).	- Project Ecologist - Project Owner	Prior to operation of the turbines.
Checks of biodiversity databases for verified Swift Parrot records	- Project Ecologist - Trained site personnel	Checks (twice weekly) during overwintering according to an databases alerts notification system
Species monitoring	- Project Ecologist	Annual. monitoring for Swift Parrot and White-throated Needletail according to monitoring trigger events.
Carcass searches	- Project Ecologist	Monthly checks undertaken at all turbine sites during the 2-year plan
Scavenger trials	- Project Ecologist -	Two one-month trials undertaken in April and October annually during the 2-year plan.
Detectability trials	- Project Ecologist -	Two trials undertaken randomly in conjunction with monthly carcass searches during the 2-year plan.
Notify DEECA and DCCEEW of EPBC Act-listed significant species carcass finds	- Project Ecologist - Project Owner	Within seven business days of discovering a carcass of a conservation-listed species.
Notify DEECA and DCCEEW of EPBC Act-listed impact triggers or significant impacts	- Project Ecologist - Project Owner	Immediately (i.e. within two business days) following event.
Submit annual report to the Responsible Authority (with copies provided to DCCEEW and DEECA)	- Project Ecologist - Project Owner	Within two months of the completion of each year of monitoring.

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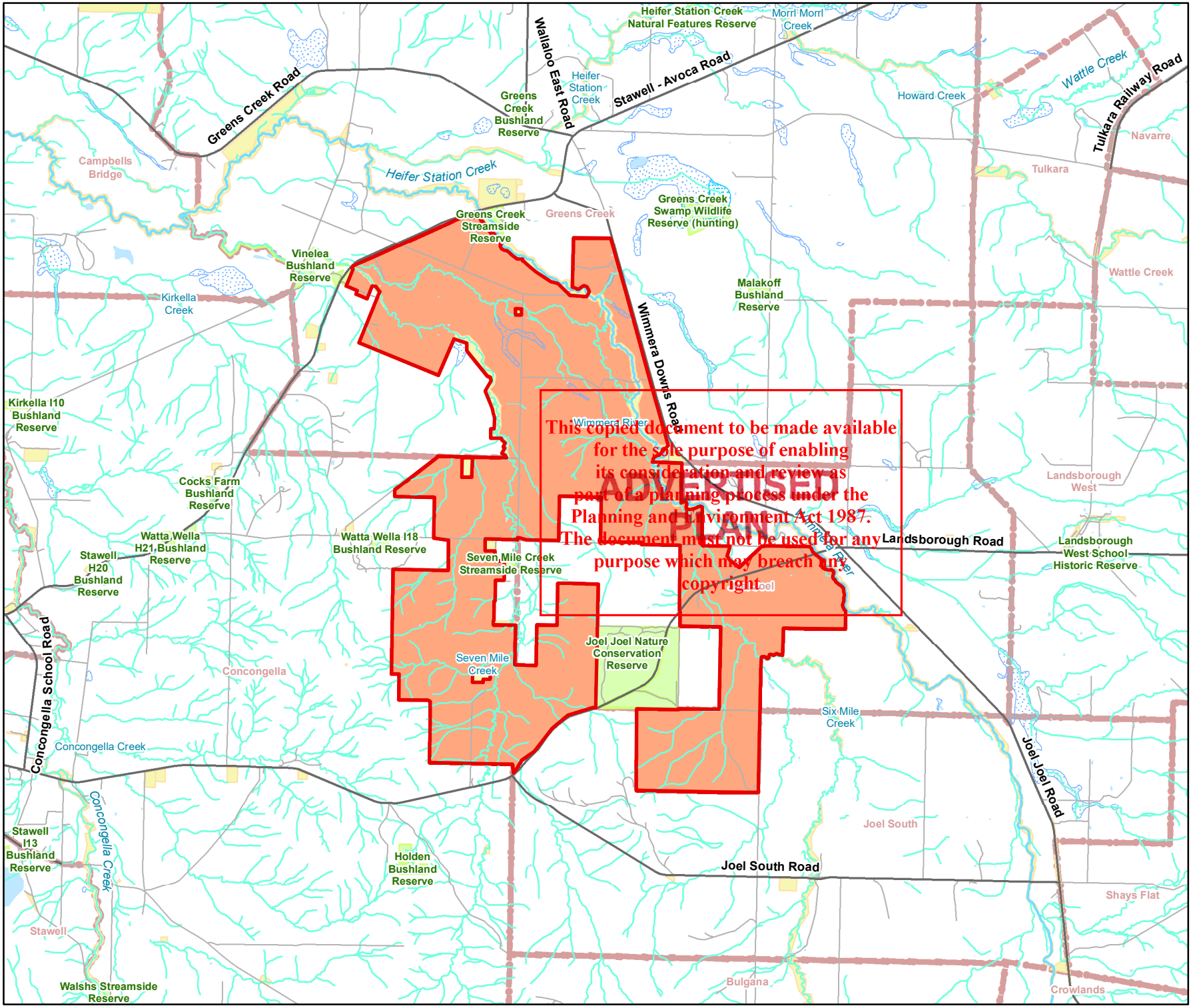
FIGURES



Legend

- Project Area
- Arterial road
- Local or minor road
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject To Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities

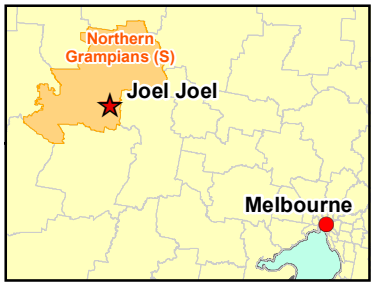


Figure 1

Location of the project area
Watta Wella Renewable Energy Project

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Kilometers

Map Scale: 1:100,000 @ A4
Coordinate System: GDA 1994 MGA Zone 54

ecology & heritage partners

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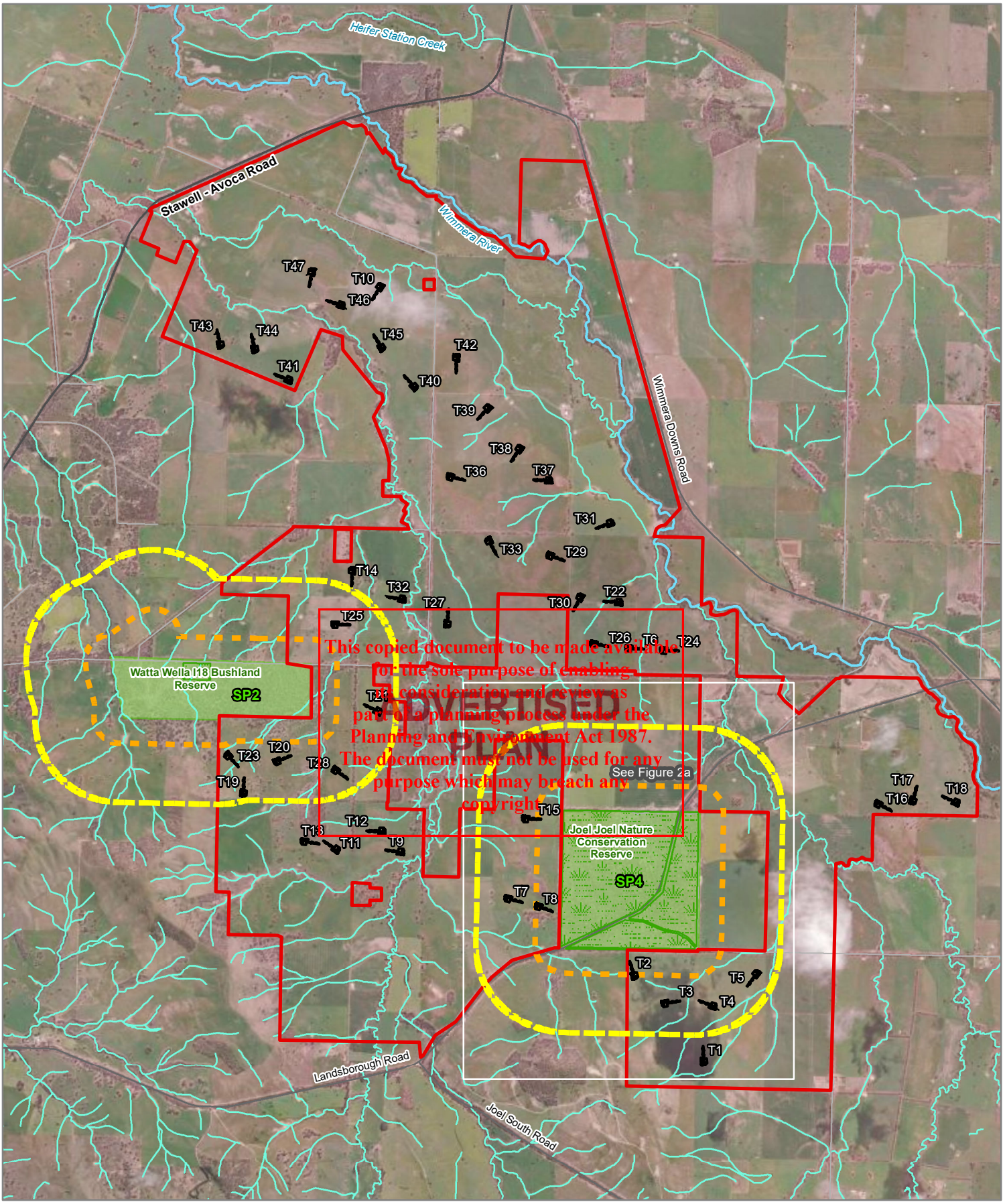


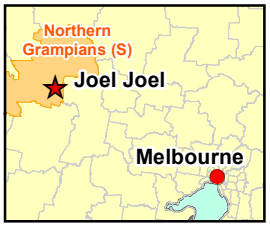
Figure 2 Overview

Swift Parrot Mitigation, Monitoring and Curtailment

Watta Wella Renewable Energy Project

Legend

- Project Area
- Hardstand with turbine number
- 300m turbine free buffer
- 1km turbine curtailment buffer
- Parks and Reserves
- Swift Parrot high-value foraging habitat



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Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

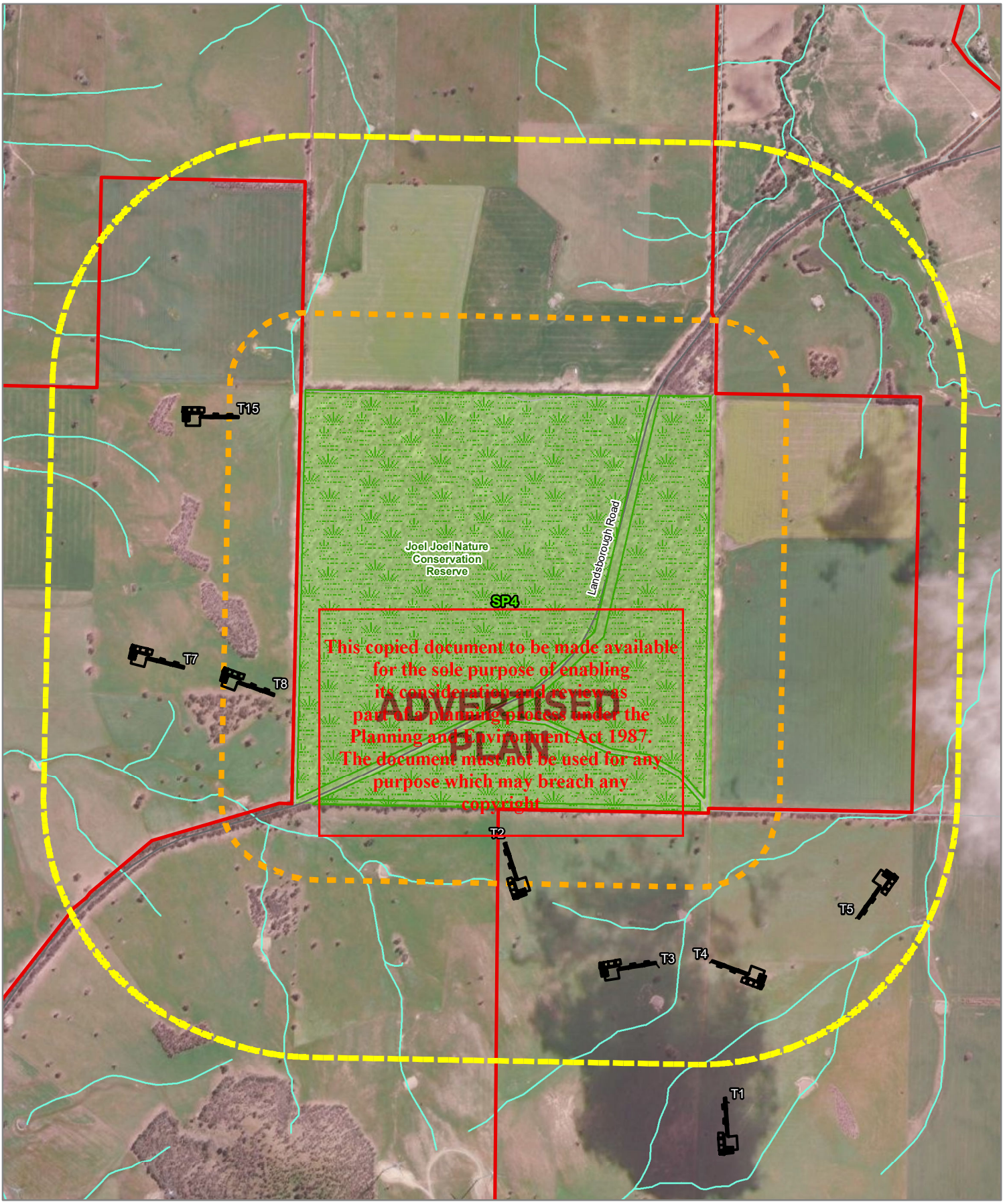
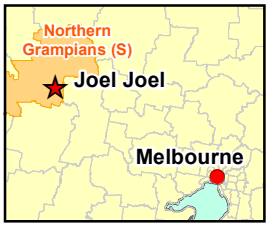


Figure 2a
Swift Parrot Mitigation, Monitoring and Curtailment
Watta Wella Renewable Energy Project

Legend

- Project Area
- Hardstand with turbine number
- 300m turbine free buffer
- 1km turbine curtailment buffer
- Parks and Reserves
- Swift Parrot high-value foraging habitat



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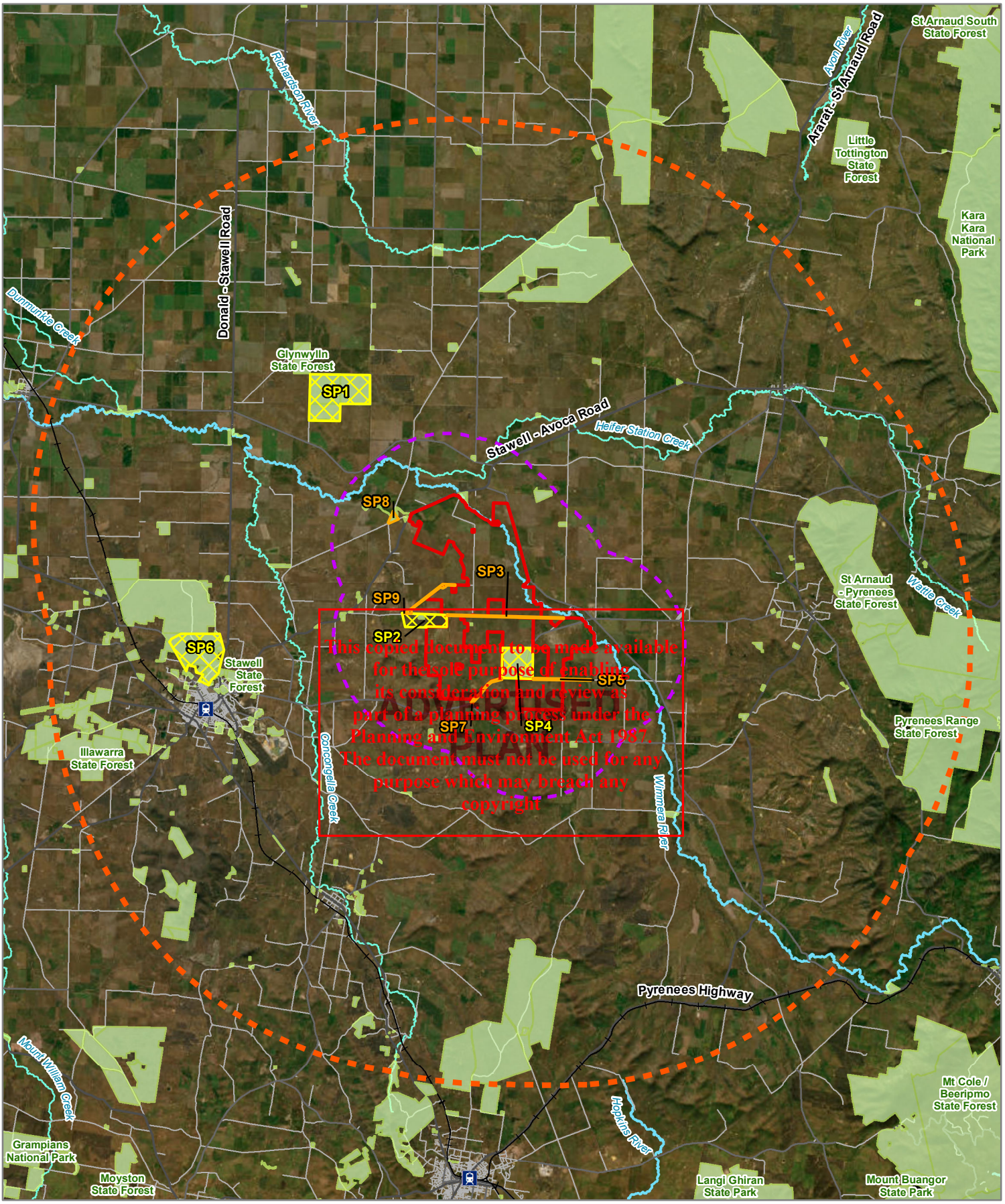
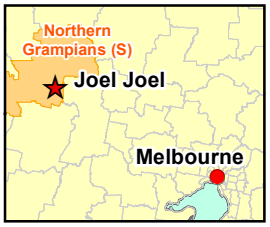


Figure 3
Swift Parrot Mitigation, Monitoring and Curtailment
Watta Wella Renewable Energy Project

Legend

- Project Area
- Swift Parrot monitoring 5km turbine radius
- Swift Parrot monitoring 20km project area radius
- High-value foraging habitat
- Secondary foraging habitat
- Parks, reserves and state forests



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Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

Project Area

Swift Parrot records (VBA 2025)

- 2020-22
- 2010s
- 2000s
- 1990s
- 1980s
- 1970s
- 1960s

Swift Parrot records (Birdlife 2023)

- 2020-23
- 2010s
- 2000s
- 1990s

ADVERTISED PLAN

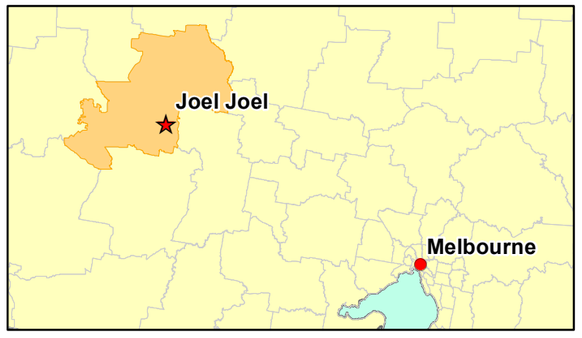

Figure 4

Previously documented Swift Parrot records within 50km of the project area

Watta Wella Renewable Energy Project

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Kilometres

Map Scale: 1:410,000 @ A3
Coordinate System: GDA2020 MGA Zone 54

ecology & heritage partners

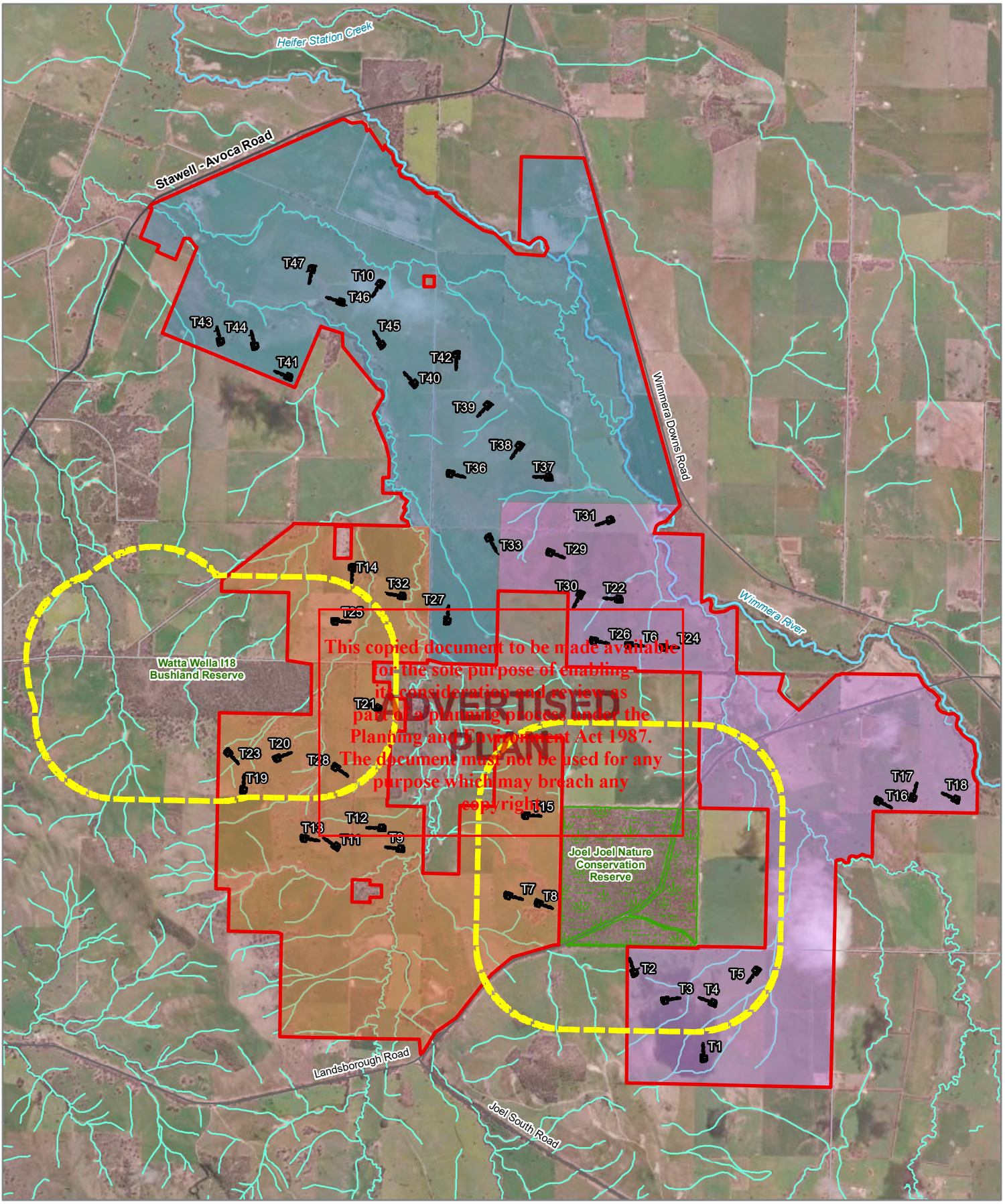


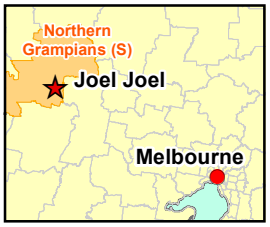
Figure 5
Mortality Monitoring Turbine Selection and Swift Parrot Mitigation
Watta Wella Renewable Energy Project

Legend

- Project Area
- Hardstand with turbine number
- 1km buffer from HVFH for Swift Parrot
- Parks and Reserves

Wind Farm turbine zones

- North
- Central
- South-east



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Map Scale: 1:60,000 @ A4
Coordinate System:
GDA 1994 MGA Zone 54

ecology & heritage partners

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

APPENDIX A - DATA SHEETS

Carcass Search Data Sheet

WATTA WELLA RENEWABLE ENERGY PROJECT – MORTALITY MONITORING PROGRAM: CARCASS DATA-SHEET					
Please fill out all details above the heavy line for each site searched. All details below the line are required if a carcass is found.					
Collector:		**Date:**	**Start Time:**	**Finish Time:**	
Turbine identifier (incl. lit/unlit):		**Turbine operational:**	Past 5 days / Past 30 days / Not within past 30 days		
Vegetation	**Description** (incl. veg type):				
	Ave. height:	**Density:**	Very Dense / Dense / Moderate / Sparse / Very Sparse		
Temperature:		**Wind direction/speed:**		**Humidity:**	
Search purpose (e.g. scavenger trial):		**If scheduled search; search completed: Yes / No**			
Onsite works in last 5 days:					
Weather conditions in last 5 days:					
Comments:					
Carcass details	**Time:**	**Coordinates:**		**Substrate:**	
Distance from Tower(m):		**Bearing from Tower (deg):**			
Species common name: **Scientific name:**			**Age/sex?:**		
Photo Taken	Yes / No				
Carcass condition: Intact, Scavenged, Feather spot:	**Describe:**				
Signs of injury:					
How old is carcass estimated to be (tick category):	<24 hrs	1-3 days	> 3 days	Other	
Other Notes: (incl. presence of stock or other factors affecting results)					

Post Find Actions:

1. Place carcass in sealable plastic bag then wrap it in newspaper and take to freezer at site office.
2. A copy of this completed form will be sent to the Regional Director, Grampians Region, DEECA, DCCEEW (if EPBC Act-listed) within seven days of the date of the carcass find if the subject species is conservation-listed.
3. One form should be completed for each carcass found

APPENDIX B - SWIFT PARROT MITIGATION FLOW CHART