Bodangora Wind Farm

Bird and Bat Adaptive Management Plan – Second Annual Report

Prepared for Infigen Pty Ltd

September 2021
Report No. 15124 (20.1)

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1 Introduction

The Bodangora Wind Farm (BODW1) project near Wellington in the Central West Slopes of New South Wales (NSW) received planning approval in August 2013 from the Minister for Planning and Infrastructure (Development Application MP10_0157) for a project comprising 33 wind turbines and associated infrastructure. The wind farm is approximately two kilometres north-east of Bodangora, 20 kilometres north-east of Wellington and 40 kilometres south-east of Dubbo.

As a condition of approval, the proponent prepared a 'Bird and Bat Adaptive Management Program' (BBAMP) for the wind farm, consistent with the requirements of condition of approval C6, presented below.

> *"Bird and Bat Monitoring – 06. Prior to the commencement of construction, the Proponent shall prepare and submit for the approval of the Secretary a Bird and Bat Adaptive Management Program, which takes into account bird and bat monitoring methods identified in the current editions of AusWEA Best Practice Guidelines for the Implementation of Wind Energy Projects in Australia and Wind Farms and Birds: Interim Standards for Risk Assessment. The Program shall be prepared and implemented by a suitably qualified expert, approved by the Secretary. The Program shall incorporate monitoring, and a decision matrix that clearly sets out how the Proponent will respond to the outcomes of monitoring."*

The BBAMP for Bodangora Wind Farm (BWF) was approved in June 2017. The BBAMP will operate for the life of the BWF. The first two years of operation of the BBAMP for BWF focused on monitoring to inform impacts and mortality estimates on birds and bats at the wind farm.

Section 3.5 of the BBAMP indicates that reports will be submitted to the Secretary and Biodiversity Conservation Division (BCD) as per the project approval conditions. Matters to be addressed in the report include, but will not be limited to the following:

- A description of BBAMP activities undertaken during the reporting year;
- A summary of search methodologies and searches undertaken;
- Details and results of mortality detection;
- Observations from Grey-crowned Babbler (GCB) monitoring;
- Observations from Superb Parrot surveys;
- Any identified impact triggers and/or recommended updates to the BBAMP risk assessment; and
- Any recommended changes to survey effort based on the results of the surveys.

This second annual report completes the initial two years of post-construction monitoring. This report provides an overall assessment of all the data obtained during the first two years of BBAMP implementation, including details of the management practices implemented, and recommended adjustments. Results of the review and associated implications will be reviewed with the BCD.

Bodangora Wind Farm Pty Ltd Engaged Nature Advisory Pty Ltd [formerly Brett Lane and Associates Pty Ltd (BL&A)] to implement the approved BBAMP for the BWF.

The mortality detection at BWF commenced in June 2019. This report covers the period of 24 months from June 2019 to 31 May 2021. Specifically, the implementation of the BBAMP included the following:

- Bird and bat mortality detection program;
- Monitoring 'at risk' groups of birds including the following:
    - Grey-crowned Babbler (GCB);
    - Superb Parrot;
    - Raptors (birds of prey); and
    - White-throated Needletail.

This report is divided into the following sections:

Section 2 provides methods and results of the mortality detection program.

Section 3 provides methods and results of the monitoring of 'at risk' bird species.

Section 4 discusses the conclusions of the two years of monitoring at BWF and provides recommendations for adaptive management.

This investigation was undertaken by a team from Nature Advisory, comprising Mick Callan (Zoologist), Eamon O'Meara (Zoologist), Michael Sebastian (Zoologist), Sarah Coutin (Zoologist), Curtis Doughty (Senior Zoologist), Gavin Thomas (Senior Zoologist), Bernard O'Callaghan (Senior Ecologist and Project Manager) and Brett Lane (Principal Ecologist).

2 Mortality detection program

The mortality detection program was implemented to determine the impact of the wind farm on birds and bats at the site. Birds and bats are known to collide with operating turbines and this program has been designed to monitor these impacts and provide a framework for understanding and mitigating the impacts.

2.1 Methods

2.1.1 Mortality detection

Section 3.2 of the BBAMP outlines the procedures for mortality detection at BWF. This report covers a two-year monitoring period from June 2019 to May 2021. In line with the approved BBAMP the mortality detection search was based on 16 turbines (representing almost half the turbines at the BWF) to ensure that a valid dataset was obtained for statistical analysis. Turbines were selected randomly to ensure representation. As per section 3.2.1 of the approved BBAMP, turbines were stratified into two classes (Wooded and Open) to ensure that an adequate sampling effort was executed across the site. Eight turbines were selected from each class and sampled turbines are presented in Table 1.

Mortality detection was undertaken at each of the 16 turbines twice every month during a five-day period. Turbines were searched to a radius of 100 metres once per month followed by a 60-metre radius "pulse" search two to three days after the first search in the same month (Figure 1). The process of undertaking the searches was as follows:

- The inner zone: walking transects spaced six metres apart and carried out up to 60 metres from the turbine tower; nearly all microbats and most of the small- to medium-bodied birds are expected to be found in this inner zone (based on Hull and Muir 2010); and
- The outer zone: between 60 and 100 metre radii from the turbine tower base to detect the medium- and larger-bodied birds; walking transects spaced 12 metres apart.

Table 1: List of randomly selected turbines stratified as either Woodland or Open/Cleared

Woodland		Open /Cleared	
T02	T14	T09	T24
T04	T15	T12	T30
T05	T19	T20	T31
T13	T25	T23	T33

When a dead bird or bat, or featherspot was recorded under a turbine, a report was completed and a photograph(s) of the carcass was taken. A feather-spot was recorded when only feathers were present and this likely represented a bird that collided with a turbine and was later scavenged.

Upon finding a dead bird, feather-spot or dead bat, the searcher undertook the following actions:

- Removed this from the site to avoid re-counting; and
- Transferred fresh carcasses to a freezer at the site office for storage for later identification, or the identity was verified and later used in observer efficiency and scavenger trials (see below).

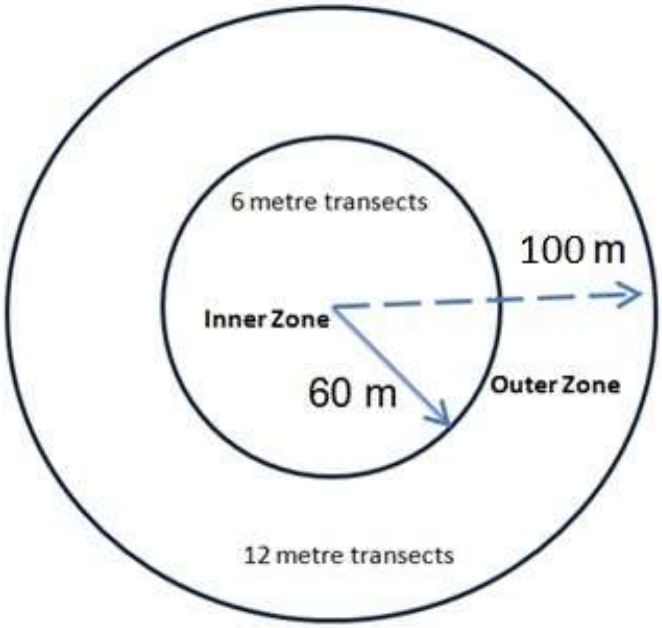

Figure 1: Diagram of inner and outer search zones at turbines

An incidental record is a carcass that was found under a turbine beyond the scope of the formal mortality detection program (e.g., by wind farm personnel during routine inspections of infrastructure or during turbine searches under a turbine not selected for monthly searches).

Locations of all turbines and turbines searched are shown in Figure 2.

2.1.2 Additional turbine searches

In addition, the BBAMP describes the requirement for a "selection of turbines to be included in the mortality detection program that should be revised periodically to ensure that all turbines are sampled for at least 12 months during the first two years of operation", i.e., 100% of turbines searched for at least 12 months (50% of the 24-month monitoring period).

All other turbines are searched to ensure that 100% of all turbines will be searched at least 12 times in the first 24 months of operation. These turbines have also been broadly classed into Woodland or Open categories (Table 2).

Table 2: List of alternating turbines searched

Woodland		Open/cleared	
T01	T08	T10	T18
T03	T22	T11	T21
T06	T26	T16	T28
T07	T27	T17	T29
			T32

2.1.3 Detectability trials

Detectability trials are implemented to determine the probability with which the searcher is likely to detect a carcass on the ground. These are subsequently used as a correction actor when determining statistical estimates (Section 2.2.6). The main carcass searchers who have carried out monthly mortality searches at BWF have undertaken detectability trials.

The searcher is referred to as the person who regularly undertakes the mortality detection. The carcass controller is the person who sets up the trials and assesses the searcher. As stipulated in the approved BBAMP for Bodangora Wind Farm, 10 carcasses were deployed during each trial. Trials were undertaken during the following periods:

- The week of 24 July 2020 (20 carcasses – two trials); and
- The week of 10 March 2021 (10 carcasses – one trial).

Carcasses detected during mortality searches were used in the detectability trials. The first trial was undertaken during July 2020 when grasses were long. This trial was delayed due to COVID-19 restrictions and combined with the second planned long grass trial.

Carcasses were placed under turbines that were selected to be searched each month. These were randomly placed on the ground within 60 metres of the turbine using the excel random number generator function to determine direction (degrees around the base from north) and distance (metres away from the turbine). The searcher conducted a search and recorded each species that was found as per usual. After the searcher completed searching each turbine, the assessor would check to see which carcasses may have been missed and subsequently checked to see if these were still on the ground or had already been taken by a scavenger.

The BBAMP (BL&A 2017) states that four searcher efficiency trials will be conducted over the two-year monitoring period, two trials when grasses are short and two when long. Three trials have been undertaken, including the number of carcasses used in the July 2020 trials. As attention was necessarily focused on the ongoing incident trigger involving Little Red Flying-fox (LRFF) (Section 2.2.1) and the formal search period ended during the intensive trigger investigations, the final short grass trial was not undertaken. There are however, sufficient data to provide reliable corrector factors in mortality estimates.

2.1.4 Scavenger trials

Scavenger trials ascertain the rate at which carcasses are removed by scavengers. This in turn indicates the likelihood that generally carcasses of birds and bats are removed before searchers can find these during formal searches each month. This is used to develop a 'correction factor' for the estimate of the number of birds and bat mortalities at the wind farm. Scavengers include ground-dwelling animals such as foxes and rats (more likely to detect carcasses by scent), and aerial scavengers such as birds of prey (raptors) and corvids (ravens and crows) (more likely to detect visually).

Section 3.2.4 of the BBAMP describes the process for scavenger trials. In this approach, a carcass is placed in the search area and an observer subsequently returns regularly to check on whether the carcass has been scavenged.

A modified method has been adopted for the scavenger trials in which a motion sensor camera is used to monitor scavenger activity taking place. This approach is currently widely used throughout Australia. Cameras were attached to a tree, fence post or sometimes part of the lower staircase of the wind turbine. The carcass was placed three to four metres away from the camera through which any scavenging activity was recorded.

Carcasses were left in position for 30 days after which the camera was collected and scavenging activity reviewed. If the carcass was still evident at day 30, this was recorded as being scavenged at day 30. The remotely-operated cameras recorded the exact time and date of activity, and provided a photograph of which scavenger, if any, had taken the carcass. This is an extension of the method described in the BBAMP and provides better quality information for the more detailed mortality analysis.

Trials were scheduled for the later portion of the first year as carcasses accumulated from the mortality detection. However, due to logistical constraints with the fires and later Covid-19 restrictions, these were delayed. Trials were initiated using motion detection cameras in July 2020 with the final round of trials being completed in April 2021. Results are presented in this report and used in the overall statistical analysis of mortality estimates for the site.

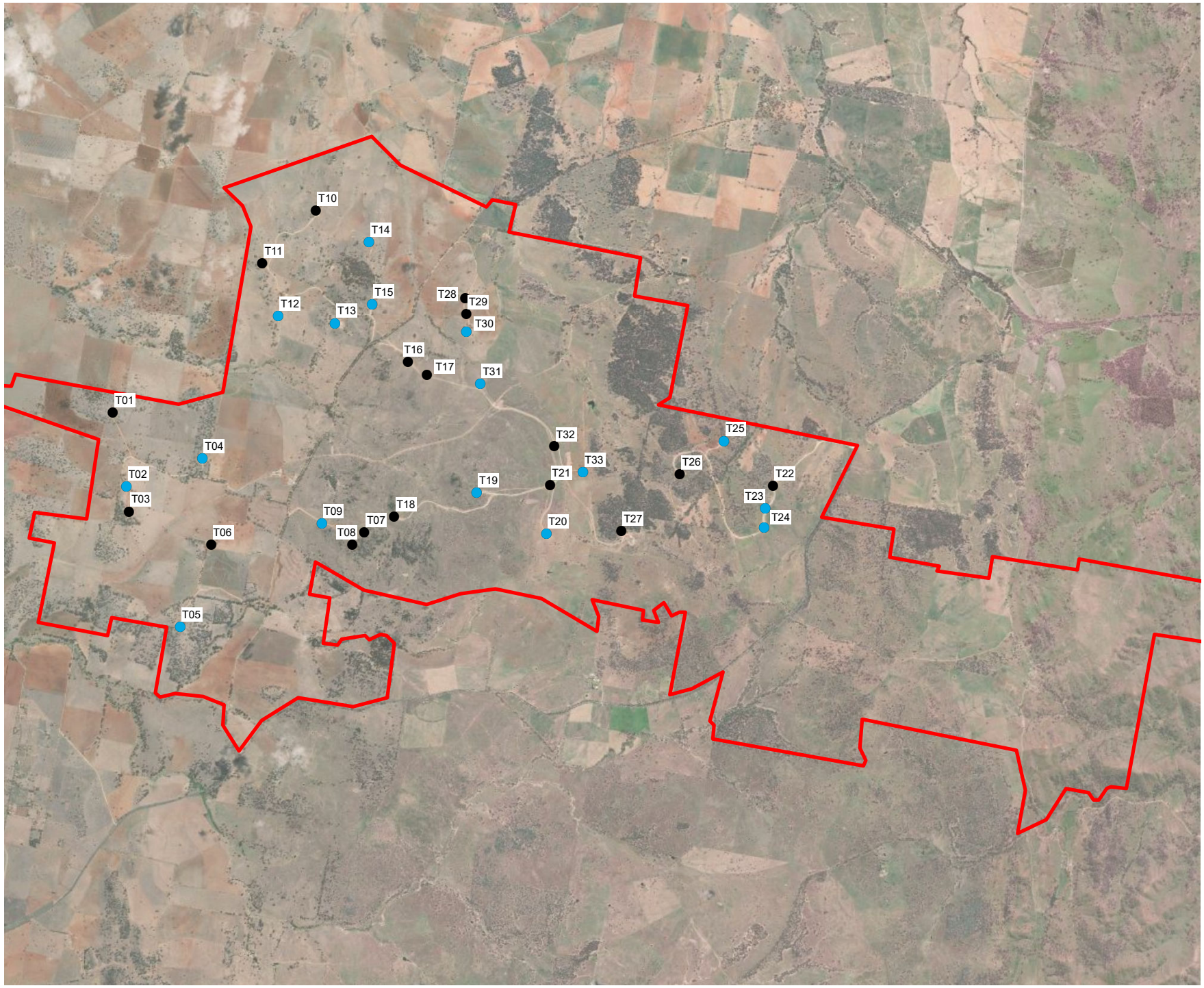

Figure 2: Survey locations for monthly carcass searches

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 31/07/2020

Wind Farm boundary
Turbines
Turbines searched

N

Metres
0 1,200

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2.2 Results

2.2.1 Mortality detection

A total of 485 mortalities was detected during all surveys undertaken at BWF. This included formal searches described in Section 2.1, mortalities found incidentally outside formal search periods (by BWF personnel) or in areas outside formal search radii and turbines, and finds observed during additional surveys undertaken as a result of incident triggers under the BBAMP (Section 4.2). Of these mortalities, 414 were recorded during standard searches and 71 were considered incidental. A total of 68 mortalities was microbats, including seven incidentals of 10 species. Another 141 mortalities were from birds, including 12 incidentals, comprising 26 species. Most of the mortalities were from Flying-foxes, totalling 276 mortalities from two species [seven Grey-headed Flying-foxes (GHFF) and 269 LRFF] including 219 formal finds and 50 incidentals. Detailed mortality results are included in Appendix 1.

Drastic environmental condition changes occurred during the monitoring program and this may provide insight into some of the variations in observations over the monitoring period. Table 3 below shows annual rainfall recorded in the nearby town of Wellington.

Annual rainfall fell sharply from 2016 and remained as such for several years, with the most severe conditions occurring during 2019. This resulted in severe drought conditions throughout northern NSW limiting water availability and food resources such as flowering duration in local vegetation. The drought broke in 2020, and food availability and vegetation increased in the region, culminating in a prolific flowering event in 2021 in local Iron-box Eucalypts.

Table 3: Annual rainfall in Wellington 2015 – 2020 (BOM 2021)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	93.1	21.6	14.4	92.8	52.4	54.8	67.7	37.4	10.8	37.3	72.6	83.9	638.8
2016	124.2	6	37	18.4	64.5	131.6	110	67.2	176.7	86	60.6	77.6	959.8
2017	14.4	6.2	115.2	24.7	15.5	6	3.2	31.5	8.8	60.4	41.7	84.5	412.1
2018	32.7	3.2	7.2	15.6	16.2	16.2	2.6	47.2	30.8	94.2	89.9	56.6	412.4
2019	62.3	23	71.4	0.4	41.8	13.4	3.6	13.1	28.8	28.8	12.9	4.7	304.2
2020	81.4	106.2	119	141.2	25.8	44.2	66.5	41.4	37.6	90.2	29.6	90.1	873.2

2.2.1.1 Bird mortality

Bird mortality is given in Figure 3 and Table 4 and the following applied:

- Monthly bird mortality included 0 –32 carcasses per month;
- In 15 of the 24 months, five or fewer bird mortalities were recorded; and
- Mortality appeared to fall steadily towards the second winter and subsequently rose thereafter until reaching the outlying month of highest mortality in the final survey of May 2021.

Some variation between seasons was apparent, notably during the first and second winters and the final autumn, and this was driven by Nankeen Kestrel mortality (see Section 4.1). The first monthly mortality surveys were undertaken during the initial winter and were relatively high in mortality compared with other seasons, particularly the second winter that had almost no mortalities.

In relation to seasonality:

- Winter (June to August) –Year 1 mortality included 29 records; Year 2 included only one record.
- Spring (September to November) –Year 1 mortality included 15 records; Year 2 mortality 10 records.
- Summer (December to January) –Year 1 mortality included 4 records; Year 2 included 8 records.
- Autumn (March to May) –Year 1 mortality included 9 records; Year 2 included 54 records.

The reasons for the potential variation in seasonality may include but are not limited to changes in foraging resources due to weather patterns influencing the abundance of birdlife on site. This included the following:

- The NSW drought continued from 2019 to 2020 and was characterised by low rainfall and low availability of water;
- The drought broke in August to September 2020 and was followed by spring rains. This resulted in rapid growth of vegetation as observed during habitat assessment related to trigger investigations (Nature Advisory 2021c) (Section 4.2) and an influx of birds to feed on the flowering event, followed by a mouse plague in early 2021 extending into June 2021; and
- A mouse plague occurred across Qld and NSW during Autumn 2021 (Nature Advisory 2021a), coinciding with the Nankeen Kestrel mortality spike (See Section 4.1).

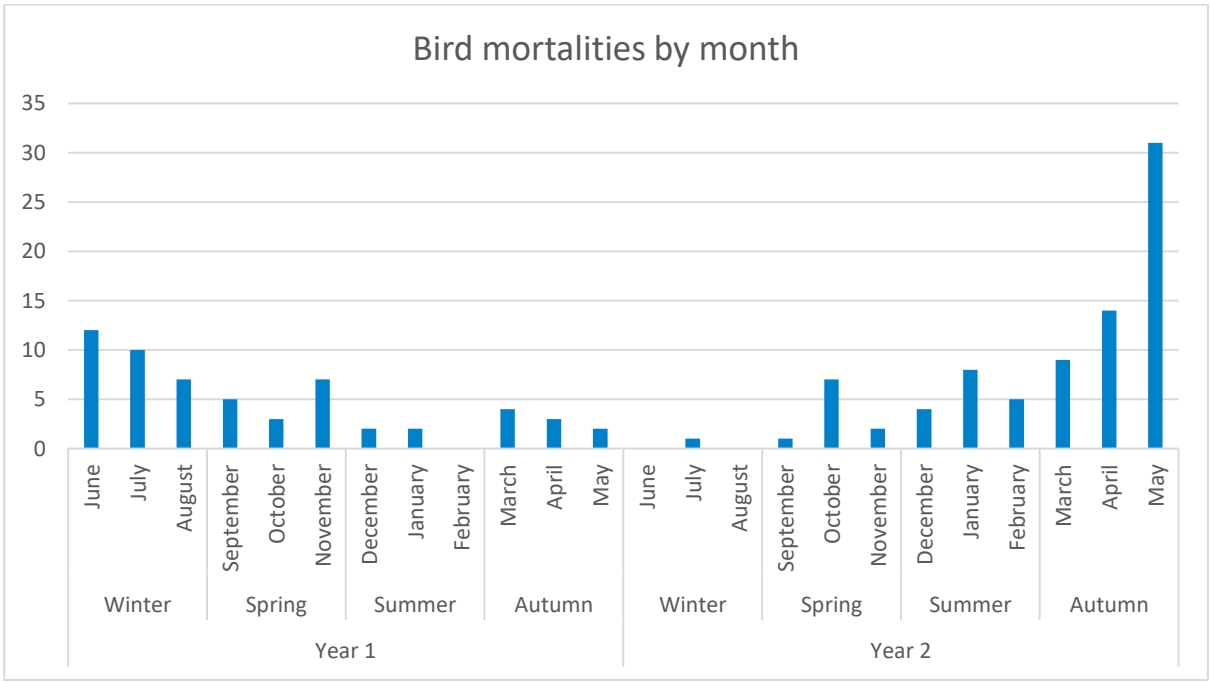


Figure 3: Total bird mortalities detected by month

Observations of bird species impacted at BWF were typical of those made by Nature Advisory (unpublished data) at other wind farms in NSW, consisting of common farmland species and raptors. The highest species mortality occurred in Nankeen Kestrel (Section 4.1), followed by Galah and Raven species (including a positively identified Australian Raven), two very common and prolific species across Australia. Brown Falcon and Wedge-tailed Eagle also had relatively high mortalities due to the adaptability to farmland habitats and foraging habits (Table 4). Raptor impacts are addressed further in Section 4.1.

Table 4: Bird species mortality at BWF

Common name	Total mortalities
Nankeen Kestrel	45
Galah	15
Australian Magpie	12
Raven spp.	11
Brown Falcon	10
Wedge-tailed Eagle	8
Unknown bird spp.	7
Noisy Miner	5
Pied Currawong	4
Magpie-lark	3
Apostlebird	2
Australian Wood Duck	2
Crested Pigeon	2
Eastern Rosella	2
Red-rumped Parrot	2
Australian Hobby	1
Australian Raven	1
Black Falcon	1
Feral Pigeon	1
Grey Butcherbird	1
Grey Fantail	1
Musk Lorikeet	1
Rufous Songlark	1
Sacred Kingfisher	1
Striated Pardalote	1
Willie Wagtail	1

2.2.1.2 Bat mortality

In total, 68 microbat carcasses were recorded. The following is noted from the distribution of mortality over the 24-month survey period (Figure 4):

- Mortality was typically six or less per month with several months at zero (Figure 4);
- Higher period of mortality was generally summer-autumn in both years;
- In Year 1 winter-spring mortality was two to six carcasses per month. This is an interesting observation as bat activity is often lower in winter. The reasons for this are not understood;

- The pattern of a higher level of mortality (therefore inferred bat activity) is a common observation at wind farms monitored by Nature Advisory (unpublished data), showing that the highest level of bat activity occurs during the warmest months of summer and autumn; and
- Bat mortality varied by season more than by month. The highest monthly mortality occurred in March during the first year of monitoring.

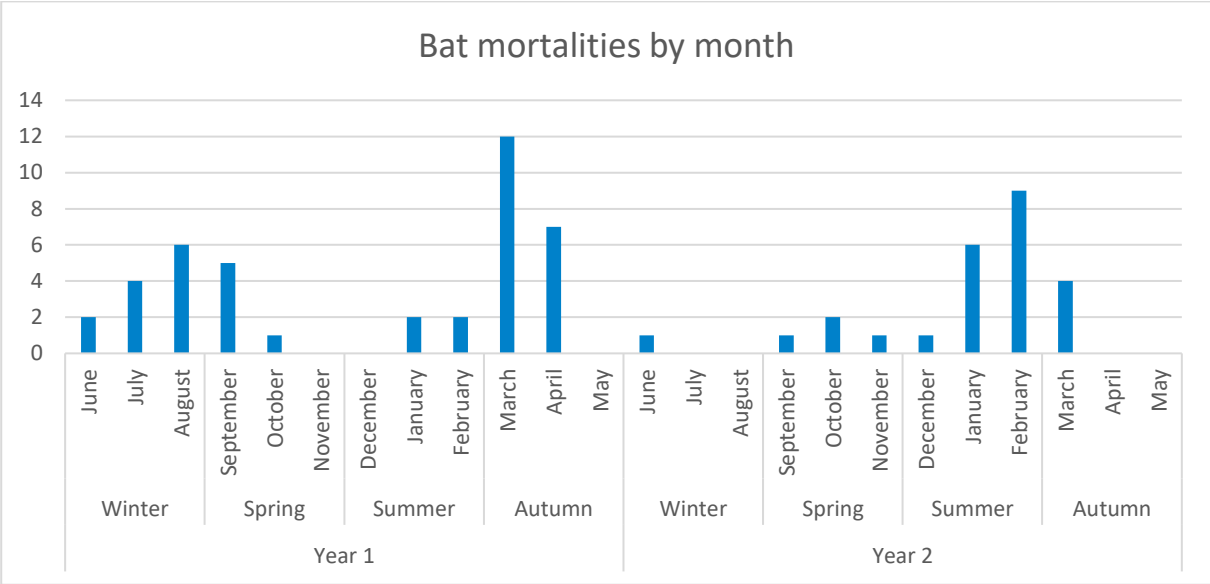


Figure 4: Total number of bat mortalities detected by month (excluding Flying-foxes)

Species of microbat impacted

Table 4 lists the species of microbats impacted at BWF. The following is noted:

- Gould's Wattled Bat was the most impacted bat species at BWF. This is a high-flying species often observed as having one of the highest mortalities at wind farms in NSW and Victoria (Nature Advisory unpublished data, Symbolix 2020). This is related to the foraging habits that typically take these high above tree canopies. This species is secure and not listed as threatened at the state or Commonwealth level.
- Southern Freetail and White-striped Freetail Bat were the second and third most commonly impacted species. These two species are also known as high-flying species that are often observed as having the highest mortalities at wind farms in NSW and Victoria (Nature Advisory unpublished data, Symbolix 2020). These species are secure and not listed as threatened at the state or Commonwealth level.
- Four other species recorded belonged to the forest bat group of species with mortalities from 1 – 7. These species tend to associate more with forests and are not known as high-flying species. These species are secure and not listed as threatened at the state or Commonwealth level.
- Two fatalities of the Yellow-bellied Sheathtail Bat were recorded. This species is listed as Vulnerable in NSW. These fatalities triggered a management response that is described in Section 4.2.

A bat utilisation survey was undertaken in 2021 (Nature Advisory 2021d) that identified, when combined with previous surveys, up to 17 bat species inhabiting the site (some identified only to complex level). All bats impacted by mortalities have been previously identified in utilisation surveys.

Bats identified during utilisation surveys that were not identified as mortalities included Long-eared Bat sp., Inland Forest Bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Inland Broad-nosed Bat, Eastern Broad-nosed Bat, Large Bent-winged Bat and Eastern Freetail Bat.

Table 5:Micro Bat species mortality at BWF

Common name	Total mortalities
Gould's Wattled Bat	20
Southern Freetail Bat	17
White-striped Freetail Bat	10
Little Forest Bat	8
Southern Forest Bat	6
Large Forest Bat	2
Lesser Long-eared Bat	2
Yellow-bellied Sheathtail Bat	2
Chocolate Wattled Bat	1

Flying-foxes

Flying-fox mortality was separated from other bat mortality given the high mortalities observed during the final season of autumn (Figure 5). This resulted in an incident trigger that is discussed further in Section 4.2.

The Flying-fox mortality was as follows:

- Year 1 – three GHFF; and
- Year 2 – March to April 2021 predominantly LRFF with 269 mortalities and four GHFF.

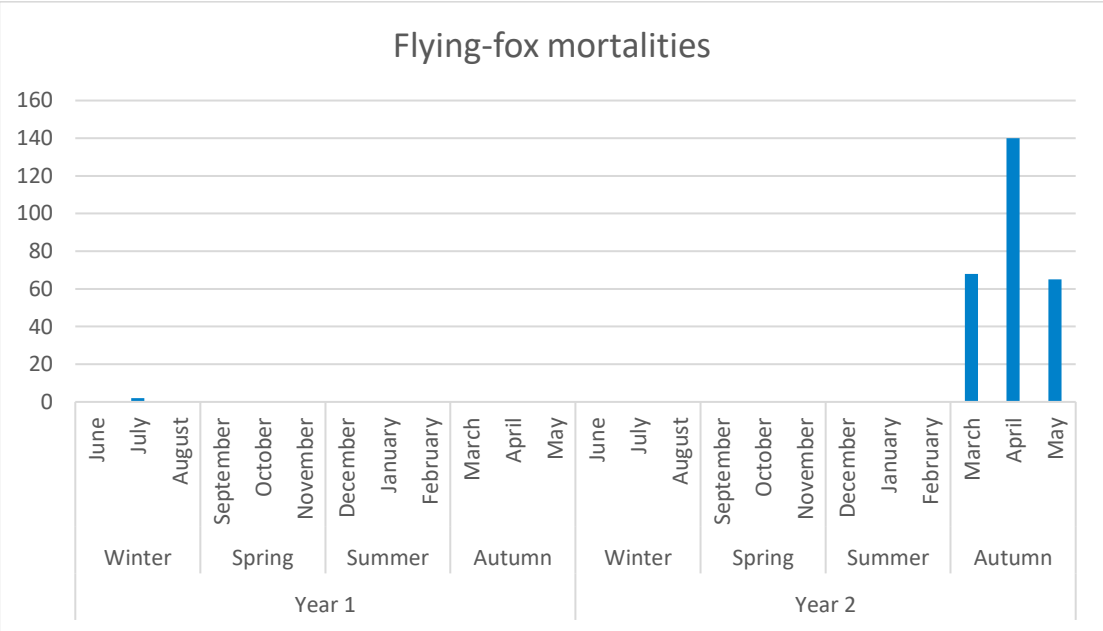


Figure 5: Total Flying-fox mortalities detected by month

2.2.2 *Spatial distribution of mortality*

The turbines with the highest mortalities varied between birds and bats (excluding Flying-foxes) with the highest mortalities occurring at Turbine 33 for birds with 17 birds in total, and the highest mortalities overall (Table 6). Turbine 33 was classified as an Open/cleared turbine, as were the eight highest bird-impacting turbines. This correlates with the highest impacted bird species that predominantly showed species that prefer open habitats such as Galahs, Magpies and Raptors.

The highest turbine mortalities for bats occurred at Turbine 4 that had the third highest mortality overall for birds and bats combined, equal to turbine 13 (Table 6). This was classed as a Woodland turbine, as was Turbine 19 that had the second highest mortalities for bats. The third highest mortalities for bats occurred at Turbine 13 that was classified as Open and Turbine 27, classified as Woodland. The next eight highest impact turbines for bats were classified as Open/cleared.

Overall, higher mortality occurred at Open/cleared turbines than at Woodland turbines.

Table 6: Mortality by turbine at BWF

Turbine number	Bird mortalities	Bat mortalities	Total
33	17	4	21
20	10	4	14
13	8	5	13
4	4	9	13
21	9	3	12
15	8	4	12
9	8	3	11
2	7	3	10
19	4	6	10
12	8	1	9
31	4	4	8
22	5	1	6
8	4	2	6
14	4	2	6
27	1	5	6
30	5	0	5
25	3	2	5
23	2	3	5
17	4	0	4
7	3	1	4
24	2	2	4
29	3	0	3
5	3	0	3
18	3	0	3
11	3	0	3
1	3	0	3
6	2	1	3
16	2	0	2
10	0	2	2
3	1	0	1
26	1	0	1
28	0	1	1
32	0	0	0

2.2.3 Listed species impacted

Three species of bird and bat impacted by BWF were listed under the BC Act and the EPBC Act (Table 7).

Table 7: Listed species found as mortalities at BWF

Date	Common name	Scientific name	Threatened status	Turbine number
18/04/2019	Black Falcon	*Falconidae subniger*	Vulnerable - BC Act	33
24/05/2019	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	14
11/07/2019	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	16
12/07/2019	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	31
16/04/2020	Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	Vulnerable - BC Act	4
15/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	19
17/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	18
17/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	30
20/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable - EPBC Act	20
03/06/2021	Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	Vulnerable - BC Act	28

2.2.4 Detectability trial

Detectability trials were undertaken primarily by two zoologists from Nature Advisory. Three detectability trials were undertaken by different searchers due to logistical constraints.

The groundcover at the time of the first trial was long grass and for the second in March 2021, short grass. Sites used in both trials were generally grazed pasture, some with scattered trees or woodland areas.

Searchers detected 75% of carcasses after the initial placement of carcasses during the long grass trial (Table 8). Searchers detected 50% of the placed carcasses during periods of short grass and results are presented in Table 9. Based on analysis of these results by Symbolix (2021), efficiency of the human searcher to detect bat carcasses and bird carcasses was 56 and 86 percent respectively overall.

Table 8: Detectability results during periods of long grass

Turbine	Carcass	Long grass
27	Australian Magpie	✓
27	Grey-headed Flying-fox	✓
27	Yellow-bellied Sheathtail Bat	X
27	White-striped Freetail Bat	X
18	Australian Magpie-lark	\
18	Brown Falcon	✓
18	White-striped Freetail Bat	\
18	Gould's Wattled Bat	\
21	Australian Raven	X
21	Brown Falcon	✓
21	Grey Fantail	✓
21	Gould's Wattled Bat	✓
32	Nankeen Kestrel	✓
32	Australian Magpie	✓
32	White-striped Freetail Bat	✓
32	Gould's Wattled Bat	X
17	Nankeen Kestrel	✓
17	Nankeen Kestrel	\
17	Eastern Rosella	✓
17	White-striped Freetail Bat	✓
Total detection %		75

Table 9: Detectability results during periods of short grass

Turbine	Carcass	Short grass
03	Nankeen Kestrel	✓
05	Gould's Wattled Bat	X
05	Australian Magpie	X
17	Gould's Wattled Bat	✓
17	Little Red Flying-fox	X
27	Unidentified microbat	✓
27	Little Red Flying-fox	✓
29	Gould's Wattled Bat	X
29	White-striped Freetail Bat	X
32	Australian Wood Duck	✓
Total detection %		50

Notes: ✓= Carcass found; X = Carcass missed; \ = Carcass scavenged before searcher could search the area.

2.2.5 Scavenger trials

A total of 37 carcasses was deployed primarily during winter and summer periods to reflect contrasting seasonal conditions. Nine bat carcasses were deployed and scavenged after 1.4 days on average, indicating that this type of carcass is scavenged quickly. Medium to large birds consisted of 10 carcasses and were scavenged after 9.1 days on average while small birds (eight carcasses) stayed in the field for the longest period of time with an average of 11.1 days. Ten Flying-foxes were also deployed and remained in the field for 4.9 days on average. Overall, carcasses were scavenged after 6.5 days on average (Table 10).

Based on analysis of these results by Symbolix (2021), median scavenging time was 0.8 days for bats and 2.3 days for birds (excluding Flying-fox).

Nature Advisory has compiled data on the scavenging rate of WTEs throughout SE Australia. In documented scavenger trails of 21 Wedge-tailed Eagle carcasses, in 20 of 21 trails the WTE carcasses were not scavenged, with only one being moved before the trial was terminated after 30 days. This appears to be a common occurrence, as trials conducted by Nature Advisory at other wind farms in NSW and Victoria using only Wedge-tailed Eagle carcasses have shown that these carcasses are typically not scavenged and remain in the field until completely decomposed (Nature Advisory unpublished data). Therefore, the assumption is that the carcasses of Wedge-tailed Eagles typically remain on site and are not scavenged, with the size making these readily detectible by searchers. Therefore, only data on Wedge-tailed Eagles are used to estimate the mortality rate for this species.

Table 10: Scavenger trial results

Trial date	Turbine no.	Common name	Carcass type	Days before scavenging
24/07/2020	31	Yellow-bellied Sheathtail Bat	Bat	0
14/10/2020	21	Southern Freetail Bat	Bat	0
23/01/2021	7	Southern Freetail Bat	Bat	2
23/01/2021	33	Gould's Wattled Bat	Bat	1
02/12/2020	12	Gould's Wattled Bat	Bat	2
03/12/2020	24	Gould's Wattled Bat	Bat	1
02/12/2020	14	Gould's Wattled Bat	Bat	3
21/05/2021	9	Southern Freetail Bat	Bat	3
21/05/2021	19	Gould's Wattled Bat	Bat	1
24/07/2020	27	Grey-headed Flying-fox	Flying-fox	30
24/07/2020	7	Grey-headed Flying-fox	Flying-fox	2
21/05/2021	27	Little Red Flying-fox	Flying-fox	2
19/04/2021	21	Little Red Flying-fox	Flying-fox	1
19/04/2021	5	Little Red Flying-fox	Flying-fox	2
19/04/2021	17	Little Red Flying-fox	Flying-fox	4
19/04/2021	6	Little Red Flying-fox	Flying-fox	1
19/04/2021	28	Little Red Flying-fox	Flying-fox	2
21/05/2021	7	Little Red Flying-fox	Flying-fox	4
21/05/2021	16	Little Red Flying-fox	Flying-fox	1
24/07/2020	19	Australian Magpie	Medium-large bird	1
24/07/2020	11	Brown Falcon	Medium-large bird	30
24/07/2020	32	Australian Raven	Medium-large bird	12
24/07/2020	28	Nankeen Kestrel	Medium-large bird	0
18/09/2020	13	Nankeen Kestrel	Medium-large bird	30
15/09/2020	30	Magpie	Medium-large bird	2
13/10/2020	8	Magpie	Medium-large bird	4
14/10/2020	16	Brown Falcon	Medium-large bird	11
14/10/2020	2	Nankeen Kestrel	Medium-large bird	0
29/05/2021	26	Australian Wood Duck	Medium-large bird	1
24/07/2020	4	Crested Pigeon	Small bird	1
24/07/2020	15	Red-rumped Parrot	Small bird	3
23/01/2021	27	Crested Pigeon	Small bird	14
23/01/2021	9	Rufous Songlark	Small bird	9
23/01/2021	31	Noisy Miner	Small bird	1
21/05/2021	18	Apostlebird	Small bird	1
10/02/2021	1	Apostlebird	Small bird	30
10/02/2021	25	Apostlebird	Small bird	30

2.2.6 Mortality estimates

Mortality estimates were undertaken by Symbolix (2021) using data provided by Nature Advisory. The full analysis, including methods and results, is provided in a report in Appendix 2.

2.2.6.1 Bats

Based on the number of detected carcasses and the detectability and scavenging rate, a total site loss (all turbines combined) of approximately 1,307 bats was estimated over 24 months of the BBAMP Implementation, averaging 653.5 birds per year.

During the first year of searches, statistical analyses indicated an expected average mortality of 771 bats. By comparison, in the second year of searches, the resulting estimate of total mortality was 628 bats.

There was not a significant difference in the mortality numbers for bats between the two years.

2.2.6.2 Birds

Based on the detected carcasses and feather-spots, and detectability and scavenging rate, there was an estimated loss of 627 birds with 95% confidence that fewer than 1,075 individuals were lost (excluding Nankeen Kestrels).

Based on results from the first year of searches, there was an estimate of average total mortality of 327 birds (excluding Nankeen Kestrels). By comparison, in the second year of searches, the resulting estimate of average total mortality was 330 birds (excluding Nankeen Kestrels).

There was not a significant difference in the mortality numbers for birds between the two years.

Nankeen Kestrels are discussed below.

2.2.6.3 Limitations

In evaluating the potential impact of the wind farm, an important consideration is that all mortality estimators have an inherent assumption that there is an unlimited supply of carcasses to be found. In particular, an upper limit was not applied on the number of bats and birds that could be on site, and the assumption was made that bats and birds were present all year round. The ecological feasibility of this assumption must be accounted for when using these results to evaluate overall ecological impact.

The ecological considerations of individual species, including movement patterns, flight habits, habitat usage, social habits and territories must be considered when using these estimations to evaluate impacts. This is explored further where relevant in Section 4.

3 Monitoring 'at risk' groups

3.1 Introduction

The BBAMP outlines key 'at risk' groups that have been identified through the risk assessment (see Section 2) and discussions with BCD. The groups highlighted for monitoring included the following:

- Woodland birds – two species, GCB and Superb Parrot;
- Birds of Prey (Raptors) – the risk assessment considered raptors to be at moderate (Wedge-tailed Eagle) and low (others) risk; and
- White-throated Needletail, a migratory species that demonstrates a flight behaviour risking collision with turbines.

Specific methods were adopted for monitoring the presence of these species at BWF. Any mortality of these species has been identified through monthly mortality detection undertaken during the first two years of operation.

The monitoring of each of these species is outlined below.

3.2 Grey-crowned Babbler

GCB is a ground-dwelling bird that inhabits open woodlands and forest. The species is communal, with birds living together in small family groups. Pre-construction surveys in July 2017 recorded GCB in four locations within BWF. One location was away from turbines and associated wind farm infrastructure (the Old Railway group), the other two groups were located along the ridge near proposed turbines T7, T8 and T9, and the other group occurred at T19 in a White Cypress Pine woodland habitat on a granite outcrop.

Impacts on the GCB could result from the following sources:

- Direct impact through fatal collision with operating turbines; and
- Indirect impact through displacement due to disturbance, particularly during the construction phase of the wind farm project.

The study provided an indication of the range of the group of GCBs in the vicinity of T9. This group was monitored post-construction to determine the status during operation of BWF.

The findings of the pre-construction surveys are as follows:

- Given that the home range of the GCB varies form 1 – 50 hectares (Higgins and Peter 2002) and was estimated to be approximately 50 hectares for the group inhabiting the T7, T8, and T9 ridge, determining the 'indirect' disturbance during the construction and operational phases of BWF may be difficult to determine as there would be ample space for dispersal within the home range to avoid disturbance.
- Breeding activity was not observed during the initial survey, though old nests were found within the territory, and these can be monitored to determine future use of these nests; and
- Literature emphasised the importance of habitat clearance to the decline of the GCB population, however this does not provide data on the impact of direct disturbance on the population. Therefore the operational surveys will provide an insight into impacts during wind farm operation to determine whether adverse effects may have occurred.

The approved BBAMP required monthly surveys for the GCB for a 12-month period during operation of the wind farm to determine whether any changes in GCB numbers, behaviour or occurrence took place in the group around T8 after construction of the turbines.

3.2.1 Methods

Post-construction surveys were undertaken for the GCB. Monthly targeted surveys were conducted for a period of 12 months from August 2019 to July 2020 (the monitoring period). Monitoring consisting of walking transects through remnant vegetation in the vicinity of Turbine 8 where nesting populations of GCB had previously been recorded. The total distance covered during the survey was 0.6 kilometres over a period of 20 minutes. Any incidental sightings were also recorded during other monitoring activities. Information recorded included the following:

- Date, time and location;
- Number of birds;
- Flight height above ground, distance and direction flown;
- Other occasional behaviours included feeding, territorial displays, fighting and perching;
- Habitat and terrain; and
- Other behaviour including foraging or breeding.

3.2.2 Results

Seven observations, consisting of between five and nine individuals, were recorded during the first year of formal surveys and incidentally across the site (Table 11). Five of these observations were adjacent to Turbine 8, where previous surveys had found that this species had multiple nests, and the two observations were incidental observations in Cypress Pine, in one of which the birds were observed constructing a nest.

Nesting behaviour was observed in November 2019 at Turbine 8, with seven individuals within proximity (Figure 6). However, at one of the nests observed in December 2020, a Grey Butcherbird was observed at the entrance, indicating potential nest predation.

In addition, six GCB were recorded opportunistically adjacent to Gillinghall Road on the morning of 15 December 2019, demonstrating that there was at least one additional group of birds on site.

Table 11: Grey-crowned Babbler records for 2019 – 2020

Date	Time	Number	Height	Distance	Direction	Habitat flown from	Habitat flown to	Habitat crossed	Behaviour
12/08/2019	10:20	5	0-30	50	SW	Woodland edge	Woodland edge	Open paddock	Foraging
12/10/2019	8:05	9	10	25	SW	Callitris woodland	Boxthorn	Open paddock	Foraging
14/11/2019	16:05	7	8	10	SW	Ground	Cypress Pine	N/A	Moving up tree to nest
9/01/2020	8:08	7	0	40	SW	Ground	Tree	Rocky outcrop	Foraging
3/12/2020	9:16	6	5	15	W	Cypress Pine	Cypress Pine	Cypress Pine	Nest construction
29/03/2020	11:05	6	4	10	N	Cypress Pine	Cypress Pine	Cypress Pine	Foraging
17/04/2020	9:05	6	8	40	N	Ground	Tree	N/A	Socialising

Notes: GR denotes Gillinghall Road, T denotes Turbine

In summary, GCB appears to continue to utilise the site around Turbine 8 with GCB recorded at the site in over 5 of the 12 months of survey and active nest building being recorded.

The GCB continued to be recorded from December 2020 through to May 2021. Notable sightings continued to be made around Turbines 7, 8 and 9. Records also came from T19, the main entrance to the site on Gillinghall Road. The widely dispersed nature of the records suggested that multiple groups of birds continued to occupy the site.

No GCB were detected as mortalities during two years of carcass monitoring. There is no evidence of 'indirect' impact on this species by the operation of the turbines around T7.

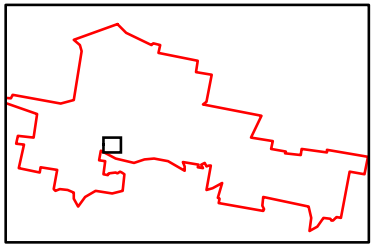
Figure 4: Grey-crowned Babbler nests and observations

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 31/07/2020

Wind Farm boundary
Turbines

Pre-construction
Active nest
Observation

Post-construction
Active nest
Inactive nest
Observation



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3.3 Superb Parrot

Section 3.1.1 of the BBAMP outlines the requirements for the pre-construction surveys for the Superb Parrot for BWF.

These surveys were undertaken to build upon information already obtained from pre-approval surveys undertaken by BL&A (mid-October 2015) and KMA (mid-July 2011) that confirmed limited numbers of Superb Parrots on both occasions.

The definition for the Superb Parrot of 'Risk' behaviour is defined for the purpose of the BBAMP as "consistent observations of ten or more flights of flocks of ten or more birds between turbines per day at a height that would result in levels of collision of potential consequence for the regional and wider population of the species" (BL&A 2017).

Pre-construction surveys were conducted in Spring 2017 and Summer/Autumn 2018. Results of the surveys are described in Bodangora Wind Farm, targeted Superb Parrot survey, Report No. 15124 (6.3), May 2018 (BL&A 2018).

The BBAMP states that "*an initial one year of monitoring is proposed for the Superb Parrot"* and includes a number of specific approaches for the following:

- Summer – Autumn migration (1 February to 30 April 2017); and
- Spring migration (1 September to30 October 2017).

The 2017 preconstruction study provided additional insights into the movement of the Superb Parrot in and around BWF. The study confirmed the following:

- Except for a few individuals, there was no evidence from the weekly surveys in the spring of 2017 that the Superb Parrot moved through or in the vicinity of the BWF during the southward migration;
- There is evidence that the vicinity of the BWF is used during the northward migration of the Superb Parrot and that there is possibly maybe a pulse of Superb Parrot moving though the area;
- Evidence suggests that Superb Parrot moves through the area in groups at and around tree canopy height. This was evident from observations being made primarily at survey sites four and five situated south-east of the wind farm area and not close to where turbines will be installed;
- There was no evidence of any flights higher than 30 metres during the periods of observation; and
- In summary, observations from the pre-construction study did not meet the definition of risk behaviour, i.e., consistent observations of ten or more flights of flocks of ten or more birds per day between turbines at a height that would result in levels of collision of potential consequence for the regional and wider population of the species. Thus, the BBAMP definition of risk behaviour as outlined above was not triggered.

3.3.1 Methods

Incidental reporting of all Superb Parrots observed was conducted across the entirety of each field visit. Incidental monitoring includes observations made by a zoologist while traversing the site, between turbines and while conducting mortality detection. This amounted to at least 30 hours per month over the first 12 months of operation of the BWF. All Superb Parrot observed were recorded. Information recorded included the following:

- Date, time and location;
- Number of birds;
- Flight height above ground, distance and direction flown;
- Other occasional behaviours included feeding, territorial displays, fighting and perching;
- Habitat and terrain; and
- Other behaviour including foraging or breeding.

3.3.2 Results

A total of 21 observations, consisting of between 2 – 10 individuals were recorded during the first-year monitoring period across the site. Most of these observations were in the western section of the wind farm, in association with flowering eucalypt trees. Observations are provided in Appendix 3.

Nineteen of the 21 observations occurred between June and August 2019 and this is considered to be towards the southward migration of the Superb Parrot. Details include the following

- Observations between June and August 2019 were of small groups of Superb Parrot with up to 10 per flock;
- There were two observations in January of 2020; and
- There were no observations of Superb Parrot between September and December 2019 during the breeding season.

There was a single observation of a group of 10 Superb Parrots on 15 July 2019 at a height of 50 metres, at 17:15 pm. The location of the observation was approximately two kilometres south south-east of Turbine 5 with the Superb Parrot recorded flying across open paddocks. This did not meet the definition of risk behaviour as this was approximately two kilometres from the nearest turbine and was not considered flying between turbines.

There were no records of Superb Parrot engaging in 'risk behaviour' at the BWF during the first-year monitoring period.

Following the year one results from the Superb Parrot survey, survey for the species was recommended to continue across the next 12 months of the implementation of the BBAMP to the end of April 2021 (coinciding with the end of the northern migration). Incidental observations were made of Superb Parrot during key periods of the year during the northward and southward migration periods.

The monitoring period from February 2020 to April 2021 had a higher number observations in comparison to year one. Zoologists were on-site for longer periods in early 2021 due to surveys for other species, thereby increasing the time for incidental observations. Key results from the survey include the following:

- 339 individuals recorded between February 2020 and April 2021;
- 33 individuals recorded during summer migration season from 1 February to 30 April 2020;
- 306 individuals recorded during summer migration season from 1 February to 30 April 2021;
- The largest flock of birds recorded was 70;
- There were eight records of flocks with more than 10 birds;
- All flight observations were of birds flying at or below 25 metres;

- No incidental observations from this period represent 'risk' behaviour by Superb Parrot as defined in the approved BBAMP;
- Six incidental records of Superb Parrot were recorded during April 2021; and
- No mortality of Superb Parrot occurred during the period of two years of monitoring.

The marked rise in the activity of Superb Parrot during the 2021 northern migration period has been attributed to a regional mass flowering event taking place at and around BWF. Mugga Ironbark (*Eucalyptus sideroxylon*) was observed flowering from February to May 2021 providing abundant foraging resources for many nectivorous bird guilds. Superb Parrot were observed taking advantage of these resources onsite and in the surrounding area. Towards the end of May most flowering of Mugga Ironbark had ceased. Records of Superb Parrot had reduced markedly by the end of April with only six incidental records for the month.

No behaviours that meet the definition of Superb Parrot 'risk' behaviour were recorded during the surveys at Bodangora Wind Farm. No mortalities of Superb Parrots were recorded during the two-year monitoring period. The risk posed to Superb Parrot from the BWF is assessed as low. Detailed results are provided in Appendix 3.

3.4 Raptors

Monthly monitoring of raptor flights and breeding activity was required for the first 12 months of operation to determine the utilisation of BWF by raptors. Raptor monitoring was incorporated into the monthly mortality detection monitoring. Following the results of the first year of monitoring, the conclusion was made that monitoring should be continued through the second year of the BBAMP to gain further understanding of the movement patterns and potential breeding sites of raptors in the area.

3.4.1 Methods

Incidental reporting of all raptors observed is conducted across the entirety of each field visit. Documentation of all raptor flights observed was plotted on a map. The following data were documented for each flight observed during the monitoring program:

- Species name;
- Number of birds;
- Time first observed;
- Time the bird/s flew out of sight or landed;
- Distance and bearing from observer;
- The location of the bird (either air, perched or on ground);
- Height of bird when first observed;
- Height range of bird (minimum and maximum heights);
- Elevation of the fixed point;
- Landscape the bird was observed in (either valley, slope or ridge);
- Flight direction (either toward, away from, parallel to ridge or circling); and
- Flight behaviour (either soaring, gliding, hovering, flapping, display, resting, mobbing or foraging).

3.4.2 Results

Nine raptor species were observed flying at the BWF site during the first-year monitoring period (Table 12). A total of 51 movements from 57 individuals was recorded from the BWF site during the first-year monitoring period from June 2019 to May 2020 (Figure 7). There were 146 observations of six species (Figure 8) for the period from June 2020 to May 2021.

Raw data for raptor observations is presented in Appendix 4. Flight paths are plotted in Figure 7: Raptor flight paths Year 1 and Figure 8: Raptor flight paths Year 2.

Table 12: Summary of raptor flights observed at BWF

Species	Number of raptors	
	Year One monitoring	Year Two monitoring
Wedge-tailed Eagle	22	4
Nankeen Kestrel	17	101
Brown Falcon	10	17
Australian Hobby	2	1
Black-shouldered Kite	2	12
Peregrine Falcon	2	0
Black Falcon	1	0
Whistling Kite	1	0
Square-tailed Kite	0	1
Grand Total	**57**	**146**

The Wedge-tailed Eagle, Nankeen Kestrel and Brown Falcon are the three most abundant raptor species observed in farmland across BWF. During the two years of monitoring these three species along with the Black-shouldered Kite constituted most raptor observations during the period from 2019 to 2021. A sharp increase in the number of Nankeen Kestrel was recorded during the second year of monitoring and flight paths are provided separately in Appendix 5: Nankeen Kestrel flight paths due to the volume of observations. Mortalities of Nankeen Kestrel rose from seven in the first year to 30 in the second year, reflecting a higher number of observations onsite.

During the first year of monitoring the Wedge-tailed Eagle was the most recorded raptor species at BWF. A total of 22 Wedge-tailed Eagle individuals were observed. The Wedge-tailed eagle was observed flying along ridges, valleys and across open country. Typical behaviour of Wedge-tailed Eagle included soaring at height using thermals, gliding and flapping, and territorial display. No breeding activity of the Wedge-tailed Eagle was observed at the site. During the second year of monitoring, WTE observations decreased and the number of observations of smaller raptors such as Nankeen Kestrel and Black-shouldered Kite increased.

Five raptor species were observed as exhibiting risk behaviour, in that these were observed flying at Rotor Swept Area (RSA) height. This behaviour is likely to bring these species into the region where there is a risk of collision with turbines. Brown Falcon was observed five times, Nankeen Kestrel 17, Square-tailed Kite once, Black-shouldered Kite once and Wedge-tailed Eagle 26 times.

As mentioned previously, the higher numbers of both Nankeen Kestrel and Black-shouldered Kite in 2021 are attributed to increased breeding success of these species as a result of the regional rodent plague that occurred during late 2020 and 2021. Nankeen Kestrel observations increased from 17 in year one to 101 in year two. Black-shouldered Kite rose from two to 12 observations from year one to two.

A trigger investigation for Nankeen Kestrel occurred during May 2021 after a high number of mortalities occurred during April and May 2021 (Nature Advisory 2021a).

One individual of Black Falcon was recorded in 2019 and likely moving through the area. The Black Falcon is listed as vulnerable under the BC Act. There was one strike of Black Falcon in April 2019. Due to this species being a listed threatened species, a response was triggered and formal raptor surveys were initiated to determine the status of this species at the BWF site.

Other raptor species were observed over the two years of monitoring at the BWF in low densities and included the following:

- Australian Hobby;
- Peregrine Falcon;
- Whistling Kite; and
- Square-tailed Kite.

The reporting period coincided with drought, regional fires, heavy summer rains and a regional rodent plague. Highly mobile raptor species such as the Black Falcon, Whistling Kite and Square-tailed Kite were likely responding in part to regional weather events and will continue to occupy and/or abandon the BWF area in future when conditions change.

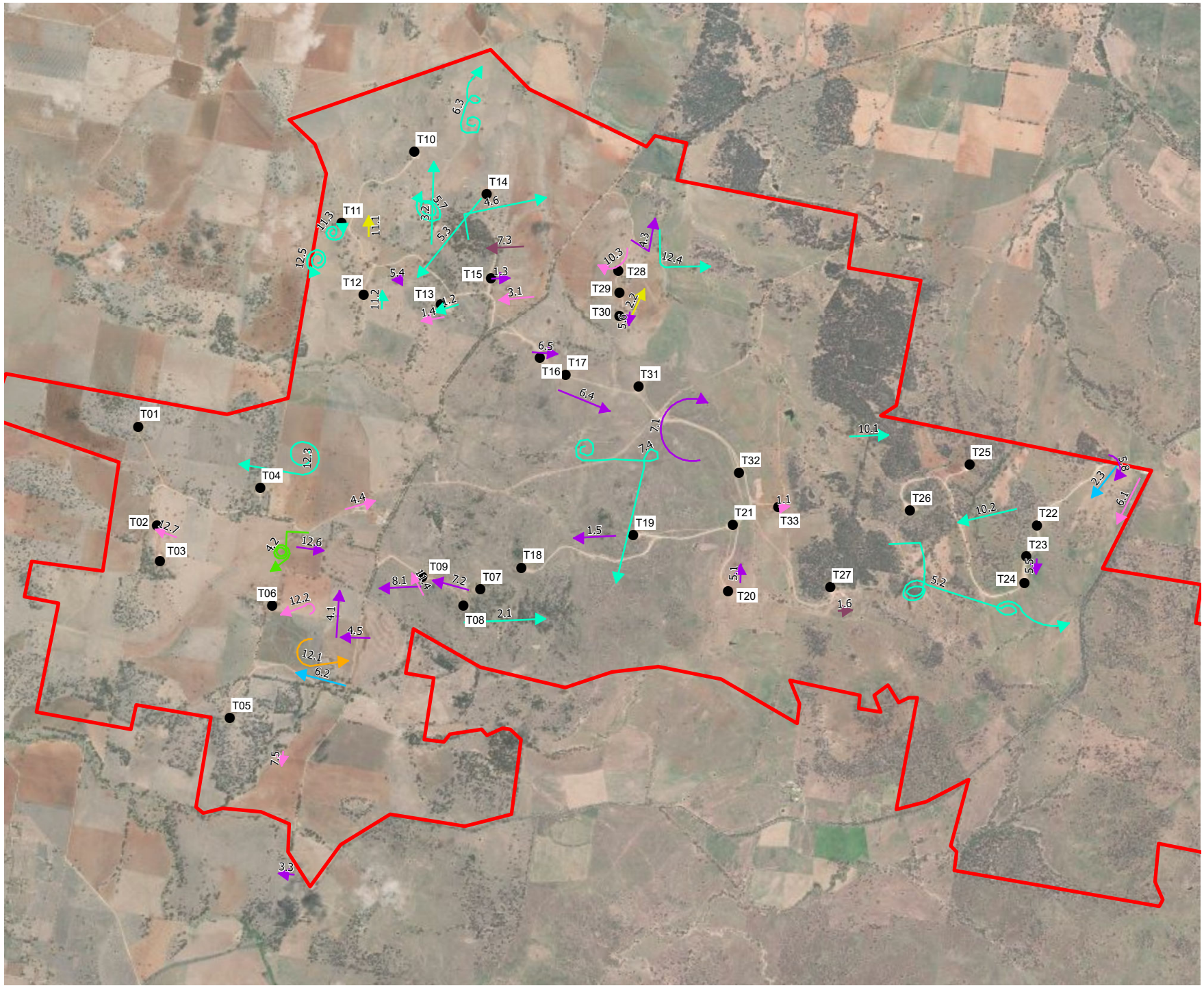

Figure 5: Raptor flight paths

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 31/07/2020

- Wind Farm boundary
- Turbines

Species

- Australian Hobby
- Black Falcon
- Black-shouldered Kite
- Brown Falcon
- Nankeen Kestrel
- Peregrine Falcon
- Wedge-tailed Eagle
- Whistling Kite

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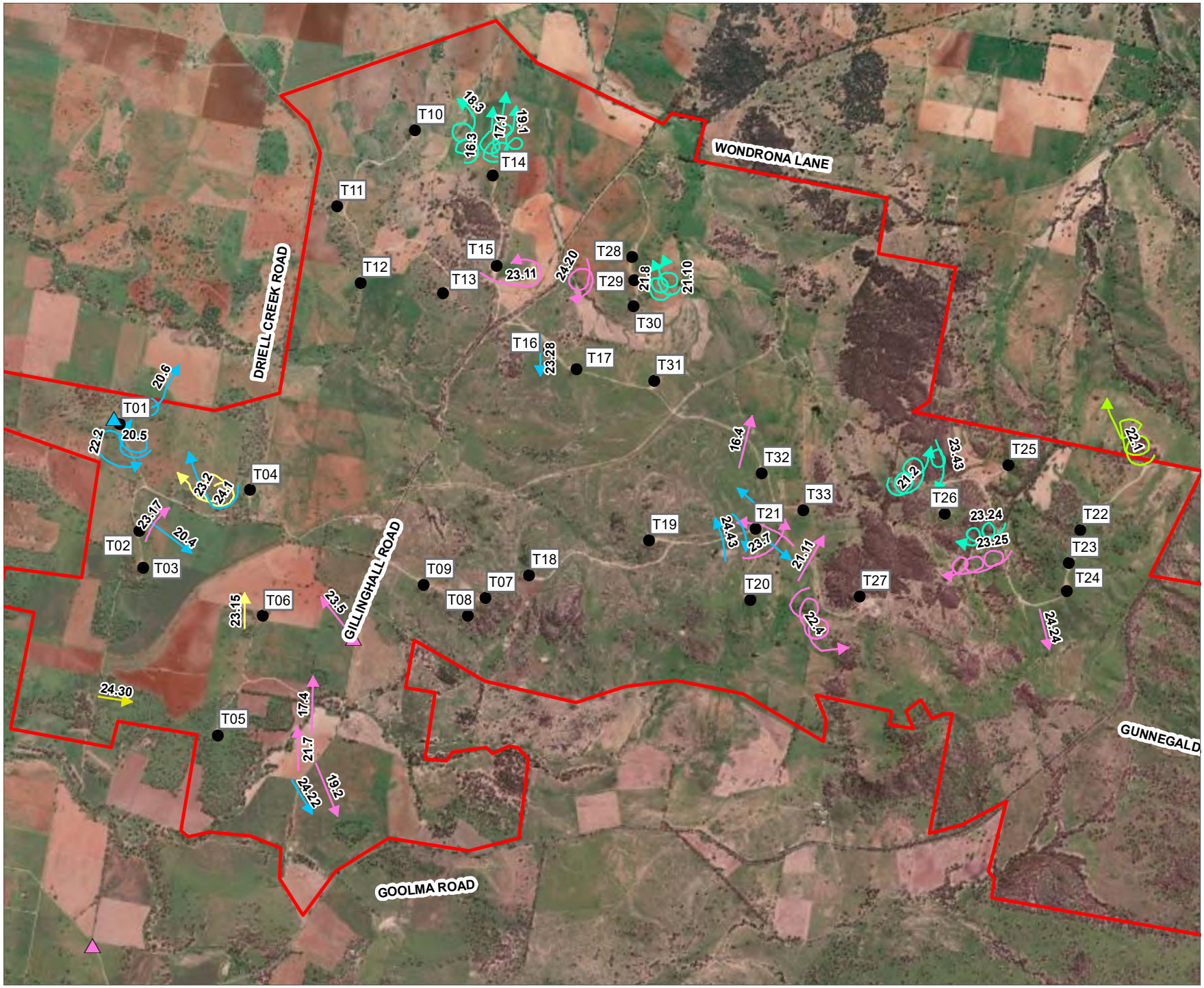

Figure 1: Raptor flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

Wind Farm boundary
Turbines

Species - Perched

Black-shouldered Kite
Brown Falcon

Species - Flight path

Australian Hobby
Black-shouldered Kite
Brown Falcon
Square-tailed Kite
Unknown bird spp.
Wedge-tailed Eagle

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Metres
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3.5 White-throated Needletails

The White-throated Needletail was identified as a species at risk of collision with turbines at BWF due to the flight behaviour and flying within the range of RSA heights. An incidental monitoring program was initiated at BWF during the first-year monitoring period.

3.5.1 Methods

Incidental reporting of White-throated Needletail observed is conducted across the entirety of each field visit. Documentation of all White-throated Needletail observed was plotted on a map. The following data were documented for each flight observed during the monitoring program:

- Date, time and location;
- Number of birds;
- Flight height above ground, distance and direction flown;
- Other occasional behaviours including feeding, territorial displays, fighting and perching;
- Habitat and terrain; and
- Other behaviour including foraging or breeding.

3.5.2 Results

No observations were made of White-throated Needletail during the first-year monitoring period at BWF.

One incidental observation of White-throated Needletail was made in 2021 when a flock of 10 birds was recorded on 12 March. These were observed flying between T4 and T1 at a height of between 10 and 50 metres. The birds were only visible for less than two minutes as these transited from south to north beyond the view of the observer.

No White-throated Needletail mortality was recorded over the two years of monitoring.

With only one observation of a flock during the monitoring period and no mortalities identified, the risk posed to the species from BWF remains low.

4 Discussion and recommendations

4.1 Bird impacts

A total of 141 bird mortalities was recorded within the BWF site during the two-year monitoring period. Key results included the following:

- 119 birds found during formal surveys;
- 12 additional records were incidental finds;
- 42 of the records from formal searches were recorded as a feather-spot;
- Mortality estimates predict that approximately 627 individuals were likely lost across the entire site over two years;
- One threatened species incident trigger occurred; and
- One non-threatened species incident trigger occurred.

The diversity of species observed to have been impacted as mortalities during the monitoring program was primarily species common to farmland habitats in eastern Australia including open paddock, scattered trees, farm dams and limited patches of woodland. Habitats common across BWF. The most impacted of these were of some of Australia's most common and widespread species, Galah, Australian Magpie and Raven. These species tend to utilise open habitats, where turbines are typically constructed at BWF and fly relatively high when traversing the landscape, placing these at high risk of collision.

Common raptors also represented some of the highest mortalities across the wind farm during the two-year period with Nankeen Kestrel, Brown Falcon and Wedge-tailed Eagle recording 45 (the highest bird mortality), 10 and eight mortalities respectively. These species are commonly occurring birds in farmland and the typical foraging habitats often bring these species into turbine blade height, increasing the risk relative to other species.

The lower proportion of mortalities, with one to three each, predominantly comprised woodland species that tend to spend most time in or below the tree canopy. Though evidently, these can occasionally fly at turbine blade height.

Two impact triggers occurred during the monitoring period. One threatened species trigger, a Black Falcon, was found under a turbine prior to the commencement of the first-year monitoring period, and one non-threatened species trigger in relation to a surge in Nankeen Kestrel mortalities in the second year of monitoring. This initiated impact triggers and immediate investigation for both.

- Black Falcon

An investigation (BL&A 2019) into the mortality of a single Black Falcon, listed under the BC Act, was undertaken in April 2019 prior to the formal implementation of the BBAMP and findings were presented to BCD and BWF. The investigation concluded that the mortality was likely a one-off occurrence and the risk of re-occurrence was very low. Results from the mortality monitoring and raptor surveys support this conclusion.

- Nankeen Kestrel

After a large number of fatalities of Nankeen Kestrel occurred during the autumn of 2021, an investigation was undertaken to establish impacts and likelihood of reoccurrence. The investigation (Nature Advisory 2021a) concluded that a high number of fatalities was directly attributed to increased breeding success following a regional mouse plague. Large numbers of juvenile birds were recorded

amongst the fatalities during March, April and May 2021. The report also concluded that as mouse numbers wane, the local Nankeen Kestrel population will likely return to pre-plague levels. The event is unlikely to have a significant impact on regional or local populations.

Assuming that the mortality estimates are reflected by the proportion of each species impacted, BWF is unlikely having a significant impact on any of the species' populations identified as mortalities, regionally or even locally. The exception to this may be some raptor species impacted and this is addressed further below.

4.1.1 'At risk' species

Discussion of the potential impacts on 'at-risk' species as identified in the BAMP and Section 4 of this report is provided below.

4.1.1.1 Grey-crowned Babbler

GCB was recorded at the BWF prior to construction and there was concern that the turbines may impact the local population through indirect disturbance. Surveys were undertaken pre-construction, and observations of individuals and nesting sites of GCB were made. Post-construction surveys recorded GCB regularly and consistently utilising the same areas near Turbine 8 at BWF. There is no evidence that the turbine operation has disturbed the local population as this has continued to be observed in the area under turbines and nest-building over two years of BWF operation. Incidental observations of GCB continued to be made near turbine locations and in adjacent habitat during 2020 and 2021.

No observed fatalities of GCB were associated with the wind farm and collision is not expected for this species as these birds do not typically fly at RSA heights. The risk of BWF to GCB is considered very low.

No further surveys are recommended.

4.1.1.2 Superb Parrot

The Superb Parrot is known to occur in the BWF. There were concerns that the BWF may impact this species by turbine collision as these birds can fly at RSA heights, particularly when migrating from breeding grounds to non-breeding grounds and *vice versa*. Surveys were undertaken to identify whether the Superb Parrot engaged in risk behaviour. Incidental observations of Superb Parrot were made during the first-year monitoring period.

Superb Parrot was observed from June to August of 2019 and not again until January of 2020. As the breeding season is from September to December this suggests that this species utilises the area for foraging resources and does not breed in the area. Superb Parrot was seen across a variety of habitats within the study area and was associated primarily with flowering eucalypts. Flight heights observed were usually at tree height. There was one observation at heights of 50 meters though this was away from turbines and did not meet the definition of risk behaviour. No collisions between turbines and Superb Parrot were recorded.

The risk posed by BWF to Superb Parrot is considered low. No further surveys are recommended.

4.1.1.3 Raptors

During formal surveys, 65 raptors from five species were recorded as colliding with turbines at BWF. Most of these were of Nankeen Kestrel with 45 mortalities, eight Wedge-tailed Eagles, ten Brown Falcons, one Black Falcon and one Australian Hobby. Raptor collisions are related to soaring habits and preference for habitat type (windy with uplifting air currents) at the wind farm.

Raptor surveys demonstrate a correlation in observations with the three highest species mortalities, with Wedge-tailed Eagle, Brown Falcon and Nankeen Kestrel being observed most in surveys and in mortalities

(raptors only). Nankeen Kestrel is addressed in the previous section and Wedge-tailed Eagle and Brown Falcon are considered further below.

Brown Falcon

Brown Falcon is a widespread generalist raptor that occurs throughout Australia, Tasmania and most of New Guinea (Marchant and Higgins 1993; Birdlife International 2021). Higher population densities occur in the south-east of the country (Marchant and Higgins 1993, Birdlife Australia 2020). The population is stable or possibly declining slightly although local declines have been reported in some agricultural areas due to poisoning and lack of breeding sites (Marchant and Higgins 1993; Ferguson-Lees and Christie 2001). The total Australian breeding population is estimated at 225,000 pairs (Marchant and Higgins 1993).

This species is sexually active from two years of age and different parameters such as rainfall and sexual maturity can influence success rate (Debus *et al*. 2019). In a study undertaken in an area west of Melbourne, the species had an average success of 2.2 fledglings per clutch (Marchant and Higgins 1993). Brown Falcon have been recorded living to 18 years old (Debus *et al*. 2019) in the wild. Assuming that an average Brown Falcon lives for nine years, the species will have eight breeding attempts in the life cycle and successfully raise 17.6 young to fledgling for each breeding pair.

Multiple pairs of Brown Falcon are likely to occupy territories that overlap the BWF footprint, together with dispersing young birds that may be transitory and present for part of the year. Mortality should likely vary across the seasons depending on prey availability, dispersal patterns of young Brown Falcons and behaviours such as breeding.

While there is the likelihood that further Brown Falcon fatalities will occur at BWF, given the species' successful breeding rates and a stable population, such fatalities are unlikely to have a significant impact on the species at a local, regional or national scale.

Wedge-tailed Eagle

The relatively high Wedge-tailed Eagle mortalities compared with other species, is reflected in raptor monitoring results, where this was one of the most frequently observed species. These observations declined markedly in the second year and this may potentially be related to mortalities experienced by the species. Wedge-tailed Eagle foraging habits are likely the main reason why this species was a frequent mortality. The species tends to soar from close to the ground to many hundreds of metres aboveground while searching for foraging opportunities (Marchant and Higgins 1993), and this unfortunately brings the species into RSA height and increases the risk of collision compared with other species.

While this level of mortality is not likely to be significant for the species on a regional or population scale, the local population is likely to have been impacted to some extent. Mitigation opportunities that can further reduce mortality risk for the 'at-risk' species are presented in Section 4.3.

Additional raptor surveys are not recommended, as the current mortality data give an indication of impacts that are likely to continue. Bat surveys may be implemented based on incidental data collected by BWF, as recommended in Section 4.3.5.

4.1.1.4 White-throated Needletail

One incidental observation of a flock of 10 White-throated Needletail occurred in March 2021. This was observed transiting through BWF near T4 and was the only observation of this species made from May 2019 to May 2021. No White-throated Needletail were recorded as fatalities under turbines during the same period.

There is potential for the very occasional mortality of this species that has been observed at other wind farms in eastern Australia (Nature Advisory unpublished data), evident from the aforementioned flock observation. Loss of the occasional individual is unlikely to have a significant impact on the species population overall.

Additional surveys would provide limited useful data for such a mobile and unpredictable species, and are not recommended.

4.2 Bat impacts

A total of 344 bats were identified as mortalities during the two-year monitoring period at BWF. Key findings are summarised below:

- 68 microbat mortalities were identified;
- Seven carcasses were recorded as incidental finds;
- Approximately 1,307 bats were estimated to be lost over two years;
- 276 Flying-fox mortalities were recorded;
- One non-threatened species trigger occurred; and
- Two threatened species triggers occurred.

Three species; Gould's Wattled, Southern Freetail and White-striped Freetail Bats constituted most of the mortalities, followed by Little Forest Bat and Southern Forest Bat. A number of studies (Symbolix 2020, Moloney *et al*. 2019, Smales 2012) have identified that these species are commonly impacted by wind farm operation as mortalities and that particularly White-striped Freetail and Gould's Wattled Bat are over-represented as mortalities across many wind farms. Observations by Nature Advisory (unpublished data) at various wind farms in other parts of these species' range are consistent with these findings. This is related to the foraging habits of many species in which these will fly many times the height of the tree canopy in pursuit of high-flying insects. This unfortunately brings the species into collision with turbines.

Interestingly Southern Freetail Bat was recorded in relatively high mortalities at BWF, the second highest mortality rate for bats, and this is inconsistent with Nature Advisory (unpublished data) observations at other wind farms across NSW. This species typically has relatively lower mortality rates compared to other bats. This may indicate a large population of the species present in and around BWF. This was reflected in bat utilisation surveys (Nature Advisory 2021d) that recorded high numbers of calls, representing high activity levels from the species at every survey site.

Regional and national populations are unlikely to be affected by the operation of BWF alone, given the widespread and common occurrence of these bats in Australia. As such, risks to most species impacted are considered low. Mitigation measures to potentially minimise mortality of bat species in general are provided in Section 4.3.4

Five threatened bat species were detected as utilising the BWF site (Nature Advisory 2021d) and these included Eastern False Pipistrelle, Greater Broad-nosed Bat, Large Bent-wing Bat, Inland Forest Bat and Yellow-bellied Sheathtail Bat. Only Yellow-bellied Sheathtail Bat occurred as a mortality during surveys and is discussed further below. BWF likely poses a low risk to the other threatened species identified.

The bat utilisation survey shows that there is a wide diversity of bats using the habitats at BWF but bat acoustic surveys provide limited information in general, beyond presence and activity levels of species on site. Further utilisation surveys are not recommended.

Exceptions to the above are considered further below. During the implementation of the BBAMP, investigations were launched into three species of bats following collision with turbines. These species include the following:

- Grey-headed Flying-fox

A trigger investigation was launched into the fatalities of the GHFF in July 2019 after several fatalities occurred during May and June of that year. The findings of the investigation were recorded in a report provided to BCD and BWF in August 2019 (Nature Advisory 2019) that concluded that GHFF utilising the wind farm site are attracted to the area due to flowering White Box (*Eucalyptus albens*). Any individuals utilising the wind farm were likely travelling from the Flying-fox camp in Wellington to BWF given the proximity and numbers observed at the Wellington camp. GHFF generally travel as individuals and disperse over a wide area, and the risk of further collisions by this species is considered to be possible, in particular while there is food in the area. This is likely to be a seasonal occurrence when the White Box flowers and a camp is located at Wellington.

Four further fatalities have since been recorded during the BBAMP monitoring program, in March and April 2021. GHFF mortalities were identified during intensive monitoring of LRFF impacts in 2021 (Nature Advisory 2021c). This allowed for simultaneous GHFF monitoring as methods for both species are the same and as such, additional targeted investigation was not required for GHFF.

Up to 2,500 individual GHFF were found to be inhabiting the colony in Wellington during April 2021. The colony tended to disperse during flyout counts rather than in single directions, such as towards the wind farm, though individuals and small groups were sighted as travelling in that direction.

Seven GHFF mortalities have been detected at BWF to date. These individuals were likely travelling from the persistent camp located near Wellington that was abandoned in May 2021. The species will likely return to the camp at some stage, given historic annual records (DAWE 2021) and mortalities are also likely to reoccur, albeit in low numbers.

Referral guidelines for impacts on GHFF are only available from the Federal Government in terms of management actions involving impacts on camps and colonies. Therefore, an assessment of the significance of impacts on the species from BWF is considered under the broader significant impact guidelines for vulnerable species (DoE 2013).

These guidelines also describe 'important populations' as necessary for the long-term survival and recovery of a species. This may include populations identified as such in recovery plans, and/or that have the following characteristics:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species range.

The population of GHFF at Wellington is approximately 2,500 of a total national population of 600,000. Wellington is one of many camps throughout the region such as at Dubbo, Bathurst, Cowra and Mudgee that regularly record similar numbers and is situated centrally to the species range. The Wellington camp does not meet the above criteria of being an 'important population'.

Therefore, the significance of the impacts is assessed against the entire population below. A significant impact in this case is taken from referral guidelines for migratory species (DoE 2015) wherein a development (i.e., wind turbines) has had an impact on 0.1% of the total population and this would

constitute a significant impact. This would be the mortality of approximately 60 individuals occurring on an annual basis.

Under the significant impact criteria of these guidelines and assuming the 'action' is the operation of BWF, an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that this will have the following effect:

- *Lead to a long-term decrease in the size of an important population of a species.*

Seven individual mortalities were identified (three incidentally) over two years of monitoring, including the additional intensive LRFF monitoring.

Mortality estimations were not undertaken for GHFF as specific detectability was not determined for this species. If this species was to be included as 'bats' generally, the detectability would have been considered relatively low and this would not be accurate, based on the large size. This would have heavily skewed estimated mortality to be higher than this likely was. The report on the GHFF mortality concluded that the species was likely using the White Box as a foraging resource which flowered between May to July on site. Therefore, the species is unlikely to be attracted to site outside of this flowering period. It unlikely that up to 60 individuals would be impacted annually given that they would likely only be attracted to site for three months a year, and that only seven individuals were detected across 24 months, including in three months of intensive turbine monitoring undertaken as part of the LRFF investigation.

While it is likely that annual mortality during the first 24 months of operation may well have been more than three or four individuals annually, it is highly unlikely that this would have been anywhere near 60 individuals without additional mortalities detected during formal and intensive searches, and by BWF staff undertaking regular maintenance at turbines.

- *reduce the area of occupancy of an important population*

BWF would have no effect on area of occupancy.

- *fragment an existing important population into two or more populations*

BWF operation is unlikely to have a barrier effect on the species. LRFF were observed passing through the wind farm to access foraging resources on the other side of the site (Nature Advisory 2021b), while GHFF were not directly observed doing this and the assumption is made that GHFF would behave similarly.

- *adversely affect habitat critical to the survival of a species.*

As BWF has already been constructed, it is not impacting upon habitat for GHFF.

- *disrupt the breeding cycle of an important population.*

Breeding takes place at the camp, BWF would be unlikely to have any effect on this cycle.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

As BWF has already been constructed, it is not impacting upon habitat for GHFF.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

The operation or construction of BWF would be highly unlikely to introduce any pests that would directly affect the species or the habitat utilised.

- *introduce disease that may cause the species to decline, or*

The operation or construction of BWF would be highly unlikely to introduce disease to the existing population.

- *interfere substantially with the recovery of the species*

Potential ongoing mortality may have some impact on the species recovery, however such low mortality numbers observed at BWF would be unlikely to be substantial.

BWF poses an ongoing risk to GHFF due to the persistent camp at Wellington, when occupied, though impacts from reoccurring mortalities are unlikely to be significant. Further mortality of this species may potentially occur, however the loss of seven individuals over 24 months from a total population of over 600,000 does not indicate a significant impact on this species population.

The risk to this species is therefore considered low. Additional monitoring is proposed in conjunction with LRFF recommendations below.

- Yellow-bellied Sheathtail Bat

A Yellow-bellied Sheathtail Bat was found during formal searches on 16 April 2020 and 6 March 2021, initiating two separate trigger investigations (Nature Advisory 2020, 2021b). Investigations were submitted and provided to BCD and BWF. The findings of both investigations concluded that the collision was deemed to be an irregular occurrence and is unlikely to be significant at a population scale (Nature Advisory 2020, 2021).

This species was not recorded during the 2011 survey but was recorded during both of the 2021 surveys (Nature Advisory 2021d). During the summer 2021 survey one call was recorded at woodland site T7. During the autumn 2021 survey there were 50 calls across the survey period, averaging 6.25 calls per night across four locations. These calls were recorded at both open pasture and woodland habitat sites.

Records on site to date, including mortalities indicate that the species mortality may occur annually between January to April. Considering a lack of adequate large remnant patches of woodland on site to accommodate a large population of the species (Nature Advisory 2021b&c), there is unlikely to be a large population of the species inhabiting the site. Therefore, mortality is considered likely to reoccur irregularly and in low numbers. The mortality of one to two bats per year, as detected to date is unlikely to have a significant impact on the species population. As such the ongoing risk posed to the species by BWF is considered to be low. Potential mitigation measures are considered below.

- Little Red Flying-fox

A number of LRFF were recorded as mortalities under turbines at BWF during the monthly monitoring regime on 4 March 2021. This resulted in a non-threatened species impact trigger investigation consisting of extensive monitoring and mitigation measure trials during March to May 2021 and is described in a separate report (Nature Advisory 2021c).

In summary, surveys showed that LRFF were occupying the same camp as GHFF in Wellington in numbers of up to 50,000 individuals. Habitat assessments identified that LRFF were utilising large remnant patches of Red Ironbark (*Eucalyptus sideroxylon*) to the north-east of BWF. Flight path assessments of the species indicated that up to several thousand individuals were traversing the BWF wind farm on a nightly basis to access these areas and subsequently return to the camp.

To date, including additional mortalities detected during trials undertaken outside of the formal mortality monitoring program (Nature Advisory 2021c), a total of 299 LRFF mortalities have been detected.

Surveys of the camp indicated that this dispersed during early May 2021 and LHFF vacated the region. This is likely related to the decline in food availability.

Occurrence of the species in the region of BWF is patchy and sporadic, and highly dependent on food resource availability. The same flowering event that attracted LRFF to the region in 2021 may not necessarily occur consecutively across two years and is influenced by environmental conditions that are difficult to predict. LRFF will move and form camps as local foraging resources permit and typically coinhabit camps with other species.

The Wellington camp will unlikely be reoccupied at least by GHFF in late 2021 or in coming years, given the historic records of GHFF presence at the camp, but the potential for LRFF to return and at which future date is unknown. Flying-foxes using the camp in Wellington could potentially take advantage of floral resources in or close to BWF and mortality impacts could occur if the species does this.

While impacts on LRFF are not technically considered significant based on the BBAMP criteria, efforts will be undertaken to monitor for the return of the species at Wellington, and should this occur, further surveys and mitigation measures will be implemented to further understand impacts and minimise these.

A lighting trial was undertaken at BWF, which was subject to a permit amendment prior to having permission to be implemented, with the aim of deterring LRFF from approaching turbines and reducing mortality. The concept involved lighting the base and surrounding hardstand of turbines with flood lights to see if LRFF flying through the wind farm would be deterred from the turbine. Unfortunately, the LRFF had vacated the region before the efficacy of the measure could be tested, however this is planned to be trialled again, much sooner, in the event that the species returns.

Additional monitoring to determine the presence of LRHH in the region again is proposed in the impact assessment (Nature Advisory 2021c) and summarised in Section 4.3.

4.3 Recommendations

4.3.1 Carrion removal

As Wedge-tailed Eagle is one of the highest impacted bird species on the site, undertaking the carrion removal program and maintaining records remains important. The program is outlined in Section 4.1 of the BBAMP.

Carcass occurrence and removal, and the times and dates of each monthly search should be recorded in the operational tracking system maintained by the BWF asset manager. This information will be provided to BCD as part of each annual report.

4.3.2 Restrict lambing and feeding near turbines

Lambing is restricted in paddocks at least 200 metres away from turbines, in consultation with land holders, to reduce the risk that raptors (Wedge-tailed Eagles in particular) are attracted close to the turbines. This practice should continue.

The practice of no feeding of any stock with grain within 200 metres of turbines should be continued. Any feeding of stock close to turbines may increase the risk for unnecessary bird impacts. Feeding of grain within a 200-metre radius of turbines may attract parrots and cockatoos that could collide with turbines.

BWF should continue to work with land holders over the life of the project to minimise the “attractiveness of the site to raptors, parrots and other species of birds”.

4.3.3 Carcass search program

Two years of mortality search data have provided a useful baseline set of data to gain an understanding of the impact that the wind farm is having on bird and bat species in the region.

Extension of the formal carcass monitoring program is not recommended.

4.3.4 Further research into potential mitigation measures

The following are proposed, in the case that these are considered necessary, as potential mitigation options in addition to those recommended above. These are examples from international experimental trials that have yet to be implemented in Australia or trailed to test efficacy on Australian native species.

In-depth research and discussion with BWF and BCD would be required to understand how any such further measure might apply in modern Australian wind farm settings and whether these would be viable.

4.3.4.1 Wedge-tailed Eagles

A recent study by May *et al.* (2020) found that painting one turbine blade black on each turbine in a control group at a wind farm in Norway had the effect of reducing raptor mortalities by up to 70%. The study claims that the added visibility of a black blade decreases motion blur and allows for increased visibility, causing birds to take evasive action. The efficacy of this approach has not been tested on WTE or in Australia but remains a possibility of reducing impacts.

Should continued impacts on WTE be recorded at an increasing level (Section 4.3.5), the options for this mitigating measure could be investigated in line with permit conditions.

4.3.4.2 Microbats

A number of international studies have shown that slowing the rotation of turbine blades below the cut-in speed may reduce bat fatalities that have been found to be higher at low wind speeds (Horn *et al*. 2008, Rydell *et al*. 2010, Wellig *et al*. 2018). This work has the potential to be expanded in Australia and the application could be used to reduce bat mortality rates in general while minimising impacts on production output at wind farm facilities.

A recent paper by Romano *et al*. (2019) showed reduction in bat mortalities by up to 32.5% at a wind farm in the USA where Ultrasonic Acoustic Devices (UADs) were deployed. The devices work by emitting ultrasonic frequencies that disrupt bat echolocation, causing the species to avoid an area. When deployed at turbines, the entire RSA can be covered, preventing bats from entering the RSA space. These devices are not commercially available yet and are yet to be trialled in Australia. Once the technology becomes available, BWF should consider trialling the system to target high impact species.

4.3.5 Incidental monitoring

Incidental reporting of carcasses by BWF staff will continue. BWF should continue to photograph and store any carcasses found by staff under turbines as per the BBAMP. These data can be provided to Nature Advisory remotely for identification. This will continue to provide some indication of ongoing impacts to birds and bats at the wind farm, particularly for Wedge-tailed Eagle that is easily identifiable and visible from a distance and Flying-fox species.

It is recommended that incidental finds continue to be reported as part of annual reporting (Section 4.3.7).

4.3.6 Little Red Flying-fox monitoring

While not a significant impact under the BBAMP, due to the potential for impacts on LRFF to reoccur, species-specific monitoring is recommended in accordance with section 5.2.2 of the BBAMP. The proposed continuation of monitoring is outlined below:

- Complete weekly daytime inspections of the camp in Wellington from August to November (the remaining Red Ironbark flowering period) 2021 to determine to presence of LRFF;

    - These surveys are proposed to be conducted by a BWF staff member proven competent in Flying-fox identification. Results must be maintained in a log book or database for submission to as part of the annual reporting.
- Conduct fortnightly daytime inspections from March to November annually to determine LRFF presence;
- In the event that LRFF are observed to return, the following actions will need to be undertaken:
    - BCD will be notified within two business days of presence and estimated numbers at the Wellington camp;
    - Carry out nocturnal surveys within the wind farm to access presence, flight paths and occupation by Flying-foxes;
    - Assessment of the floral resources onsite and in the surrounding areas; and
    - Undertake additional carcass searches to determine high risk turbines.

The survey methods described above will also apply to GHFF. Final methods of these surveys will be determined in conjunction with BCD and BWF.

Further LRFF-specific mitigation measures, in the event that the impacts reoccur, are explored further in the Nature Advisory (2021c) report.

4.3.7 Reporting

These recommendations should continue to be reported to the regulator in an annual report. The continued annual reporting to BCD will provide an opportunity to monitor impacts on 'at-risk' species, particularly LRHH, GHFF and Wedge-tailed Eagle, and adaptive management in reviewing carrion removal or potential additional survey requirements.

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Appendix 1: All detailed mortality results from April 2019 to June 2021

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
18/04/2019	Black Falcon	*Falconidae subniger*	Bird	33	34 - 48	W	INC 1904-1	Carcass found in two pieces, relatively intact
24/05/2019	Little Forest Bat	*Vespadelus vulturnus*	Bat	33	5	E	INC 1905-1	Intact
24/05/2019	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	14	25	E	INC 1905-2	Intact, adult
14/06/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	13	22	NNE	INC 1906-1	Carcass intact
18/06/2019	Australian Magpie	*Cracticus tibicen*	Bird	2	71	350	FS 1906-1	Ten feathers
18/06/2019	Australian Magpie	*Cracticus tibicen*	Bird	2	71	S	FS 1906-1	Feather spot
19/06/2019	Raven spp.	*Corvid* spp.	Bird	20	52	NW	R 1906-2	Wing only
19/06/2019	Raven spp.	*Corvid* spp.	Bird	33	30	S	FS 1906-3	Top of batter
19/06/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	33	55	W	R 1906-4	Wing
19/06/2019	Raven spp.	*Corvid* spp.	Bird	20	52	NW	R 1906-2	Wing only
19/06/2019	Raven spp.	*Corvid* spp.	Bird	33	30	S	FS 1906-3	Featherspot
19/06/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	33	55	W	R 1906-4	Wing
20/06/2019	Brown Falcon	*Falco berigora*	Bird	7	67	S	FS 1906-5	Three feather clumps
20/06/2019	Feral Pigeon	*Columba livia*	Bird	9	41	15	FS 1906-6	Feather spot, possibly raptor kill
20/06/2019	Brown Falcon	*Falco berigora*	Bird	7	67	S	FS 1906-5	3 feather clumps
20/06/2019	Noisy Miner	*Manorina melanocephala*	Bird	9	41	NNE	FS 1906-6	Feather spot - suspected raptor kill
21/06/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	27	41	135	L1906-1	Abdominal injury, adult male
21/06/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	27	41	SE	R 1906-1	Full carcass - abdominal injury
11/07/2019	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	16	40	E	INC 1907 - 1	Partially scavenged
12/07/2019	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	31	40	SE	INC 1907 - 2	Intact, adult
15/07/2019	Magpie-lark	*Grallina cyanoleuca*	Bird	19	98	30	FS 1907-1	Featherspot
15/07/2019	Apostlebird	*Struthidea cinerea*	Bird	20	19 - 82	83 - 281	FS 1907-2 and 3	Featherspot in two patches
15/07/2019	Pied Currawong	*Strepera graculina*	Bird	33	25	172	FS 1907-4	Featherspot located on steep bank
15/07/2019	Raven spp.	*Corvid* spp.	Bird	33	70	250	R 1907-5	Wing
15/07/2019	Unknown bird spp.	*NA*	Bird	2	98 - 103	220 - 320	FS 1907-6 and 7	Scattered feathers
15/07/2019	Magpie-lark	*Grallina cyanoleuca*	Bird	19	98	NE	FS 1907-1	Featherspot
15/07/2019	Apostlebird	*Struthidea cinerea*	Bird	20	82	W	FS 1907-2 and 3	Featherspot - may be associated with 1907-3
15/07/2019	Pied Currawong	*Strepera graculina*	Bird	33	25	S	FS 1907-4	Featherspot - located on steep bank
15/07/2019	Raven spp.	*Corvid* spp.	Bird	33	70	W	R 1907-5	Wing
15/07/2019	Grey Butcherbird	*Cracticus torquatus*	Bird	2	98	SW	FS 1907-6 and 7	Featherspot - may be associated with 1907-7
18/07/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	4	30	190	R 1907-8	Intact
18/07/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	4	12	180	INC 1907-3	Intact
18/07/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	4	30	S	R 1907-8	Intact, adult
18/07/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	7	12	S	INC 1907-3	Intact, found by WF personnel
8/08/2019	Raven spp.	*Corvid* spp.	Bird	30	98	N	FS 1908-1	Featherspot

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
8/08/2019	Eastern Rosella	*Platycercus eximius*	Bird	13	102	SW	FS 1908-3	Featherspot
8/08/2019	Noisy Miner	*Manorina melanocephala*	Bird	15	86	NW	FS 1908-4	Featherspot
8/08/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	13	6	E	R 1908-2	Intact, adult
8/08/2019	Southern Forest Bat	*Vespadelus regulus*	Bat	15	27	SE	R 1908-5	Intact, adult
9/08/2019	Noisy Miner	*Manorina melanocephala*	Bird	4	26	W	R 1908-7	Wing only
9/08/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	4	24	SW	R 1908-8	Intact
9/08/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	4	28	NW	R 1908-6	Intact - abdominal injury
9/08/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	23	55	SW	R 1908-9	Intact, adult
10/08/2019	Pied Currawong	*Strepera graculina*	Bird	33	59	W	R 1908-10	Wing only
10/08/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	31	25	SW	R 1908-11	Intact
11/08/2019	Australian Magpie	*Cracticus tibicen*	Bird	9	55	S	FS 1908-12	Feather spot - many feathers intact
11/08/2019	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	19	24	NW	R 1908-13	Intact
16/09/2019	Red-rumped Parrot	*Psephotus haematonotus*	Bird	2	4	237	R 1909-1	Intact, juvenile
16/09/2019	Galah	*Eolophus roseicapilla*	Bird	15	85	272	FS 1909-4	Feather spot x 2
16/09/2019	Australian Magpie	*Cracticus tibicen*	Bird	12	10	28	R 1909-5	Intact
16/09/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	12	68	145	R 1909-6	Intact, significant injury to back
16/09/2019	Southern Freetail Bat	*Mormopterus planiceps*	Bat	4	5	172	R 1909-2	Intact - broken wing
16/09/2019	Southern Freetail Bat	*Mormopterus planiceps*	Bat	13	19	55	R1909-3	Intact - injury to head
17/09/2019	Australian Magpie	*Cracticus tibicen*	Bird	20	50	55	R 1909-7	Carcass found in several pieces, mainly intact
17/09/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	31	30	180	R1909-8	Intact
19/09/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	13	42	148	R1909-9	Intact
19/09/2019	White-striped Freetail Bat	*Tadarida australis*	Bat	20	10	112	R1909-10	Half carcass - scavenged
10/10/2019	Australian Hobby	*Falco longipennis*	Bird	33	25	70	R1910-1	Damage to back of neck
10/10/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	30	72	356	R1910-2	Head almost completely removed
13/10/2019	Wedge-tailed Eagle	*Aquila audax*	Bird	14	35	44	R1910-6	Intact, adult
14/10/2019	Southern Forest Bat	*Vespadelus regulus*	Bat	24	59	145	R1910-07	Intact but internals consumed by insects
10/11/2019	Australian Magpie	*Cracticus tibicen*	Bird	14	62	170	R1910-3	Both wings present - has been scavenged
10/11/2019	Red-rumped Parrot	*Psephotus haematonotus*	Bird	15	3	117	R1910-4	Wing and some connected bones
10/11/2019	Galah	*Eolophus roseicapilla*	Bird	15	58	151	R1910-5	Wing only
14/11/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	25	44	21	R1911-1	Wing only
16/11/2019	Noisy Miner	*Manorina melanocephala*	Bird	20	70	333	FS 1911-1	Featherspot
16/11/2019	Brown Falcon	*Falco berigora*	Bird	5	49	330	R1911-2	Intact - damage to head
18/11/2019	Wedge-tailed Eagle	*Aquila audax*	Bird	21	40	79	INC 1911-1	Carcass found in two pieces, relatively intact
12/12/2019	Nankeen Kestrel	*Falco cenchroides*	Bird	19	72	301	R1912-1	Largely intact minus head

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
12/12/2019	Australian Magpie	*Cracticus tibicen*	Bird	33	36	135	FS1912-1	Feather spot - head remaining
6/01/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	14	13	145	R2012-2	Intact, not desiccated. Fresh, <24 hours old
6/01/2020	Large Forest Bat	*Vespadelus darlingtoni*	Bat	15	24	358	R2012-3	Intact. Skin over abdomen torn open, exposing peritoneal membrane
9/01/2020	Nankeen Kestrel	*Falco cenchroides*	Bird	23	60	72	R2001-1	Wing only
11/01/2020	Noisy Miner	*Manorina melanocephala*	Bird	9	69	317	FS2001-1	Featherspot
3/02/2020	Chocolate Wattled Bat	*Chalinolobus morio*	Bat	2	24	320	R2002-2	Intact carcass
4/02/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	20	43	350	R2002-4	Intact carcass
2/03/2020	Wedge-tailed Eagle	*Aquila audax*	Bird	25	63	296	R2002-1	Carcass in 3 separate distinct pieces
2/03/2020	Brown Falcon	*Falco berigora*	Bird	20	43	350	R2002-3	Right wing only
11/03/2020	Wedge-tailed Eagle	*Aquila audax*	Bird	22	50	324	R2003-1	Intact - not collected due to advanced decay
12/03/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	31	46	204	R2003-02	Intact
14/03/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	9	28	102	R2003-03	Intact
14/03/2020	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	9	5	189	R2003-04	Intact
14/03/2020	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	19	28	111	R2003-05	Intact
14/03/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	19	31	76	R2003-06	Intact
14/03/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	19	43	97	R2003-07	Intact
14/03/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	20	19	84	R2003-08	Intact
14/03/2020	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	33	32	266	R2003-09	Intact
14/03/2020	Little Forest Bat	*Vespadelus vulturnus*	Bat	33	26	263	R2003-10	Intact - broken wing
14/03/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	21	31	262	INC 2003-01	Intact
14/03/2020	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	31	19	181	R2003-11	Intact
29/03/2020	Wedge-tailed Eagle	*Aquila audax*	Bird	29	45	208	R2003-12	Intact - at least 2 weeks old
29/03/2020	Little Forest Bat	*Vespadelus vulturnus*	Bat	27	47	187	R2003-13	Intact - broken wing
15/04/2020	Southern Forest Bat	*Vespadelus regulus*	Bat	14	14	252	R2004-1	Intact
15/04/2020	Southern Forest Bat	*Vespadelus regulus*	Bat	15	36	324	R2004-2	Intact
16/04/2020	Lesser Long-eared Bat	*Nyctophilus geoffroyi*	Bat	19	6	206	R2004-3	Intact - some blood
16/04/2020	Inland Forest Bat	*Vespadelus baverstocki*	Bat	4	35	177	R2004-4	Intact
16/04/2020	Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	Bat	4	0	320	R2004-5	Intact
17/04/2020	Crested Pigeon	*Ocyphaps lophotes*	Bird	24	4	164	INC 2004-1	Intact but highly decomposed
17/04/2020	White-striped Freetail Bat	*Tadarida australis*	Bat	9	52	19	R2004-6	Damage to chest - open wound - lots of beetles recorded on turbine door
19/04/2020	Grey Fantail	*Rhipidura albiscapa*	Bird	22	69	3	R2004-7	Intact
20/04/2020	Australian Magpie	*Cracticus tibicen*	Bird	17	5	N	INC 2004-2	Intact
24/04/2020	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	21	7	145	R2004-8	Intact

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16/05/2020	Australian Magpie	*Cracticus tibicen*	Bird	30	0	192	R2005-1	Intact adult male. Bleeding from bill
29/05/2020	Eastern Rosella	*Platycercus eximius*	Bird	14	31	249	R2005-2	Juvenile, intact. Damage to tail and right wing
12/06/2020	White-striped Freetail Bat	*Tadarida australis*	Bat	2	21	20	R2006-1	Intact
9/07/2020	Magpie-lark	*Grallina cyanoleuca*	Bird	33	35	8	R2007-1	Intact, damage to left wing
12/09/2020	Galah	*Eolophus roseicapilla*	Bird	19	58	50	R2008-1	Partially scavenged. Beak, wings, feathers found.
14/09/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	23	11	40	R.20.08.2	Intact
5/10/2020	Little Forest Bat	*Vespadelus vulturnus*	Bat	4	54	100	R2009-1	Partially scavenged. Bilaterally symmetrical half of bat found.
6/10/2020	Large Forest Bat	*Vespadelus darlingtoni*	Bat	12	4	285	R2009-2	Intact, but desiccated
8/10/2020	Raven spp.	*Corvid spp*	Bird	9	17	315	R2009-3	Heavily scavenged, found only distal part of wing
8/10/2020	Willie Wagtail	*Rhipidura leucophrys*	Bird	9	16	10	R2009-4	Scavenged and likely run over by vehicles as well. Found crushed skull, crushed body, wings that were non-extendable, and feathers
9/10/2020	Australian Magpie	*Cracticus tibicen*	Bird	23	9	270	R2009-5	Very desiccated but intact
10/10/2020	Raven spp.	*Corvid spp*	Bird	13	29	310	R2009-6	Heavily scavenged, found only bones of one wing with a few feathers attached
11/10/2020	Galah	*Eolophus roseicapilla*	Bird	9	49	210	FS2009-1	Feather spots. Found in likely fox-hole. Carcass likely moved and scavenged by fox
11/10/2020	Galah	*Eolophus roseicapilla*	Bird	9	35	359	FS2009-2	Feather spots. Found in likely fox-hole. Carcass likely moved and scavenged by fox
12/10/2020	Galah	*Eolophus roseicapilla*	Bird	8	58	250	FS2009-3	Feather spots. Found in likely fox-hole. Carcass likely moved and scavenged by fox
3/11/2020	Raven spp.	*Corvid spp*	Bird	4	74	320	R2010-1	Skeleton that was feathered
26/11/2020	White-striped Freetail Bat	*Tadarida australis*	Bat	10	32	195	R2011-1	Whole carcass, but desiccated
27/11/2020	Galah	*Eolophus roseicapilla*	Bird	11	14, 21	0, 100	R2011-2A+B	Same bird but in two halves roughly 25 - 30m apart
2/12/2020	Striated Pardalote	*Pardalotus striatus*	Bird	4	54	145	R2011-3	Intact, desiccated carcass
9/12/2020	Galah	*Eolophus roseicapilla*	Bird	1	Unknown	Unknown	INC2012-3	Found and collected by wind farm personnel whilst the zoologist was not on site
29/12/2020	Australian Wood Duck	*Chenonetta jubata*	Bird	21	8	60	INC2012-1	Intact, whole carcass. Fresh, <24 hours old
31/12/2020	Australian Magpie	*Cracticus tibicen*	Bird	12	142	0	INC2012-2	Heavily scavenged – some primary feathers on the bones at the end of one wing. Rest of carcass was missing. >3 days old
31/12/2020	Southern Freetail Bat	*Mormopterus planiceps*	Bat	13	15	240	R2012-1	Scavenged by ants, large wound in the back the ants scavenge from
7/01/2021	Australian Wood Duck	*Chenonetta jubata*	Bird	30	5	135	R2012-4	Scavenged. Coelom torn open at base of neck, intestines falling out
8/01/2021	Brown Falcon	*Falco berigora*	Bird	17	26	345	FS2012-1	Featherspot
9/01/2021	Crested Pigeon	*Ocyphaps lophotes*	Bird	1	8	200	R2012-5	Scavenged. Head reduced to skull.
9/01/2021	Rufous Songlark	*Megalurus mathewsi*	Bird	3	23	18	R2012-6	Intact, but coelom leaking fluid and viscera exposed.
16/01/2021	Little Forest Bat	*Vespadelus vulturnus*	Bat	2	35	320	R2101-1	Intact, wings dried. <24 hours since death. Male.
18/01/2021	Wedge-tailed Eagle	*Aquila audax*	Bird	11	16	45	INC2101-1	Scavenged – anterior half, wings, torso, head missing. No viscera present in body. Mature adult. Likely >3 days since death

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18/01/2021	Galah	*Eolophus roseicapilla*	Bird	15	56	230	R2101-2	Heavily scavenged. End of one wing, clumps of feathers. Likely >3 days since death.
20/01/2021	Wedge-tailed Eagle	*Aquila audax*	Bird	29	71	120	R2101-3	Intact, fresh. Likely <24 hours since death. Immature bird. Neck seemed broken, injury and body fluids leaking from the ventral side of the torso.
20/01/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	10	37	215	R2101-4	Intact, desiccated. One finger-wing bone possibly broken. Likely >3 days since death.
21/01/2021	Southern Freetail Bat	*Mormopterus planiceps*	Bat	25	33	240	R2101-5	Heavily scavenged, ripped open and viscera missing. Wings, limbs, head, skin remain. Likely 1-3 days since death.
21/01/2021	Southern Freetail Bat	*Mormopterus planiceps*	Bat	6	9	75	R2101-6	Intact, desiccated. Large wound around right leg. Likely adult. Probably 1-3 days since death.
21/01/2021	Galah	*Eolophus roseicapilla*	Bird	5	31	120	FS2101-1	Featherspot
22/01/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	4	5	255	R2101-7	Intact, fresh. Blood around nostrils and mouth, possibly indicating barotrauma. Adult male. Likely <24 hours since death.
27/01/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	23	1	?	INC2102-1	Incidental find by wind farm staff. Intact, decomposing, large abdominal wound.
9/02/2021	Southern Forest Bat	*Vespadelus regulus*	Bat	27	2	165	INC2102-2	Incidental find whilst installing songmeters. Desiccated, and heavily scavenged ventral surface.
10/02/2021	Australian Magpie	*Cracticus tibicen*	Bird	17	87	203	R2102-1	No waypoint, GPS did not allow it. Intact, large wound on ventral surface.
11/02/2021	Musk Lorikeet	*Glossopsitta concinna*	Bird	22	22	60	INC2102-3	Incidental find by wind farm staff. GPS did not allow waypoint. Intact, desiccated.
11/02/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	22	35	320	R2102-2	No waypoint, GPS did not allow it. Intact.
13/02/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	21	73	300	R2102-3	Intact, very desiccated
14/02/2021	Southern Freetail Bat	*Mormopterus planiceps*	Bat	33	54	310	R2102-4	Intact, fresh, open abdominal wound.
14/02/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	20	20	330	R2102-5	Heavily scavenged. Head and viscera missing, one wing almost detached.
14/02/2021	Lesser Long-eared Bat	*Nyctophilus geoffroyi*	Bat	15	21	340	R2102-6	Intact, desiccated, large abdominal wound.
14/02/2021	Galah	*Eolophus roseicapilla*	Bird	15	41	310	R2102-7	End of wing, feathers. Heavily scavenged.
15/02/2021	Wedge-tailed Eagle	*Aquila audax*	Bird	11	41	240	R2102-8	1 wing. Likely another piece of another wedge-tailed eagle found in January 2021.
17/02/2021	Galah	*Eolophus roseicapilla*	Bird	15	28	120	R2102-9	Wing, beak. Heavily scavenged. Likely same individual as R.21.02.7.
18/02/2021	Little Forest Bat	*Vespadelus vulturnus*	Bat	25	12	230	R2102-10	Could be Inland Forest Bat. Identified as Little Forest Bat after consultation with people who worked with both species, although the colour is intermediate between both species. Intact carcass.
18/02/2021	Southern Freetail Bat	*Mormopterus planiceps*	Bat	8	5	150	R2102-11	Unusual colour – sandier brown than normal. Intact, desiccated.
18/02/2021	Southern Freetail Bat	*Mormopterus planiceps*	Bat	8	11	35	R.21.02.12	Desiccated, scavenged by ants. Posterior ends of winds reduced to skeleton.
4/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	24	270	INC2103-1	1-2 weeks, sex unknown
4/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	3	125	INC2103-2	1-3 days, male
4/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	47	30	R2103-1	2-3 weeks, sex unknown

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4/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	67	342	R2103-2	2-3 weeks, female
4/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	53	30	R2103-3	>3 days, female
5/03/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	8	50	150	R2103-3	>3 days old. Piece of torso and wing.
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	13	45	INC2101-3	Sex and age unknown
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	23	35	R2103-4	2 weeks, sex unknown
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	55	110	R2103-5	2 weeks, sex unknown
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	51	359	R2103-6	1-2 weeks, sex unknown
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	61	18	R2103-7	1-3 days, female
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	76	110	R2103-8	1-3 days, sex unknown
5/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	60	340	INC2101-4	1-3 days, female
6/03/2021	Raven spp.	*Corvid spp*	Bird	30	60	320	FS2103-1	Feather spot.
6/03/2021	Brown Falcon	*Falco berigora*	Bird	31	11	175	R2103-13	>3 days old. Scavenged - face, legs missing. Juvenile.
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	33	93	INC2101-6	<24 hours, male
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	19	63	50	R2103-15	1-3 days, male
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	42	50	R2103-9	<24 hours, male
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	30	210	R2103-11	1-2 weeks, male
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	32	215	R2103-12	1 week, sex unknown
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	19	140	INC2101-5	<24 hours, male
6/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	33	0	R2103-14	1-2 weeks, sex unknown
7/03/2021	Sacred Kingfisher	*Todiramphus sanctus*	Bird	12	95	45	R2103-16	>3 days old. Scavenged - head, torso, and a wing present.
7/03/2021	Unknown bird spp.	*NA*	Bird	13	12	125	R2103-18	Likely same individual as R2103-20
7/03/2021	Unknown bird spp.	*NA*	Bird	13	36	15	R2103-20	Likely same individual as R2103-18
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	3	21	359	INC2103-7	Heavily scavenged. Only head and some skin remained. >3 days old, sex unknown.
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	71	125	R2103-22	Heavily scavenged. 1 week, sex unknown.
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	33	340	INC2103-8	1-3 days old, male. Intact.
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	16	87	R2103-23	>3 days old, sex unknown. Heavily scavenged - wings and feet remain.
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	47	50	R2103-24	1-2 weeks, sex unknown. Intact.
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	63	330	R2103-25	1 week, female
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	40	130	R2103-17	1-3 days, female
7/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	14	11	340	R2103-21	<24 hours, male
7/03/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	13	31	220	R2103-19	
8/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	76	245	R2103-27	1-2 weeks, sex unknown
8/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	30	150	R2103-28	1 week, sex unknown
8/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	42	230	R2103-29	1 week, female
8/03/2021	Little Forest Bat	*Vespadelus vulturnus*	Bat	24	44	340	R2103-26	>3 days old. Viscera missing, ventral surface damaged.
9/03/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	16	24	45	INC2103-9	1-3 days old. Face missing. Juvenile
9/03/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	12	10	110	R2103-32	More pieces found on 11/03/2021. Juvenile.

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
9/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	64	115	INC2103-10	1-2 weeks, sex unknown
9/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	19	45	89	INC2103-11	1-3 days, sex unknown
9/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	19	55	135	R2103-31	1-3 days, sex unknown
9/03/2021	Gould's Wattled Bat	*Chalinolobus gouldii*	Bat	19	56	183	R2103-30	
10/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	3	30	105	R2103-34	Intact. 1-3 days old, female
10/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	33	345	INC2103-12	<24 hours old, male. Obvious trauma - hand missing.
10/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	47	315	R2103-33	1-3 days old, sex unknown. Intact.
10/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	67	300	INC2103-13	GPS did not allow waypoint. <24 hours, sex unknown
10/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	25	195	R2103-35	GPS did not allow waypoint. 1-3 days, female
10/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	72	210	R2103-36	GPS did not allow waypoint. 1-2 weeks, sex unknown
11/03/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	14	32	270	R2103-41	1-3 days old. One wing missing. Juvenile.
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	94	285	R2103-50	<24 hours since death. Heavily scavanged
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	96	280	R2103-51	<24 hours since death. Fully intact. No signs of physical trauma
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	76	165	R2103-52	<24 hours since death. Fully intact. No signs of physical trauma
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	87	158	R2103-53	<24 hours since death. Intact but scavenging has occurred
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	96	45	R2103-54	<24 hours since death. No scavenging of carcass. Clear signs of physical trauma. Open chest cavity.
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	108	60	R2103-55	<24 hours since death. Clear signs of physical trauma. Carcass cut in half
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	60	60	R2103-56	Old. Great than 14 days. Wings only. Bones exposed in wings
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	8	21	198	R2103-49	1-3 days old. Intact
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	24	120	R2103-43	1-3 days old. Intact
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	30	45	R2103-44	1-3 days old. Intact
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	28	165	R2103-45	More than three days old. Decomposing but intact
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	37	90	R2103-46	<24 hours since death. Intact no signs of physical trauma
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	42	105	R2103-47	1-3 days old. Intact
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	46	240	R2103-48	1-3 days old. Intact
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	14	49	210	R2103-42	<24 hours, sex unknown
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	107	279	INC2103-14	<24 hours, male
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	43	315	R2103-39	<24 hours, sex unknown
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	47	30	R2103-40	1-2 weeks, sex unknown
11/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	69	130	R2103-38	1-3 days, sex unknown
11/03/2021	Southern Forest Bat	*Vespadelus regulus*	Bat	27	99	50	R2103-37	>3 days old. Viscera missing, ventral surface damaged.
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	44	200	R2103-57	<24 hours since death. Fully intact. No signs of physical trauma
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	58	300	R2103-58	1-3 days old. Heavily decomposing. Appears to be intact
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	57	300	R2103-59	<24 hours since death. Clear signs of physical trauma. Radius sheared in two on right wing.
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	57	245	INC2103-15	<24 hours, male

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	55	250	INC2103-16	1-3 days, male
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	51	125	INC2103-21	1 week, sex unknown
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	27	150	INC2103-18	1-3 days, sex unknown
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	56	267	INC2103-19	1-3 days, sex unknown
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	19	40	54	INC2103-17	1-3 days, sex unknown
12/03/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	38	220	INC2103-20	<24 hours old, sexable. Intact.
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	26			INC2105-3	1 week, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	26			INC2105-4	Female, 1-3 days
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	26			INC2105-5	2-4 weeks, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16			INC2105-6	1-3 days, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31			INC2105-7	1 week, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31			INC2105-8	1 week, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31			INC2105-9	Female, 1-3 days
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31			INC2105-10	4+ weeks, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31			INC2105-11	4+ weeks, sex unknown
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18			INC2105-12	Female, 1-3 days
5/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4			INC2105-13	Male, 1-3 days
14/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	1	41	135	R2104-115	>3 days. Carcass intact but heavily skeletonised. Large feather spot associated with carcass.
14/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	7	24	45	R2104-116	1-3 days old. Intact, surrounded by large mass of feathers.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	3	30	45	R2104-1	Sheared and broken limb bones. >3 days, sex unknown.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	3	35	45	R2104-2	Sheared and broken limb bones. >3 days, sex unknown.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	63	330	R2104-3	>3 days, sex unknown. Carcass intact but skeletonised by ants.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	9	90	R2104-4	2-3 weeks, sex unknown. Hollowed out, signs of physical trauma.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	16	270	R2104-5	2-3 weeks, sex unknown. Hollowed out, signs of physical trauma.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	52	135	R2104-6	1-3 days, female. Intact.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	54	180	R2104-7	<24 hours, female. Left forearm cleaved.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	54	0	R2104-8	>3 days, sex unknown. Intact, lodged in rock crevice.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	54	270	R2104-9	1-3 days, male. Intact.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	57	195	R2104-10	2-3 weeks, sex unknown. Broken forearm, hollowed out, possibly driven over.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	8	66	320	R2104-11	2-3 weeks, sex unknown. Intact, hollowed out.
14/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	42	165	INC2104-1	> 3 days, sex unknown. Dismembered, highly desiccated, scavenged. Spray-painted for future ID.
15/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	16	46	210	R2104-117	>1 week. Intact, no feather loss, hollowed out.
15/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	21	51	150	R2104-119	2-3 weeks, intact. Skeletonised.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	28	345	R2104-12	2-3 weeks, sex unknown. Intact, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	34	315	R2104-13	2-3 weeks, sex unknown. Decomposed, hollowed out, broken right forearm.

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	49	195	R2104-14	2-3 weeks, sex unknown. Broken bones, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	50	120	R2104-15	2-3 weeks, sex unknown. Intact, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	52	255	R2104-16	2-3 weeks, sex unknown. Dismembered, possibly scavenged.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	57	345	R2104-17	2-3 weeks, sex unknown. Sheared forearm, dismembered wings and feet. Possibly scavenged.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	26	210	R2104-18	2-3 weeks, sex unknown. Intact, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	32	180	R2104-19	2-3 weeks, sex unknown. Intact, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	33	210	R2104-20	<24 hours, female. Broken forearm.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	35	135	R2104-21	2-3 weeks, sex unknown. Skeletonised, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	38	240	R2104-22	2-3 weeks, broken forearm.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	45	195	R2104-23	2-3 weeks, sex unknown. Broken bones.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	46	210	R2104-24	2-3 weeks, sex unknown. Intact, hollowed out. Losing fur.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	58	225	R2104-25	2-3 weeks, sex unknown. Broken bones, hollowed out.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	70	180	R2104-26	2-3 weeks, sex unknown. Intact, hollowed out.
15/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	19	45	180	R2104-27	1-3 days, male. Torn right wing membrane.
15/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	49	345	R2104-28	>3 weeks, sex unknown. Broken bones, scavenged, highly weathered.
15/04/2021	Brown Falcon	*Falco berigora*	Bird	21	50	195	R2104-118	2-4 weeks, intact. Fully feathered, skeletonised.
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	27	8	135	R2104-29	>3 weeks, sex unknown. Decomposed, skeletonised.
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	30	202	R2104-30	4+ weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	47	146	R2104-31	4+ weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	55	206	R2104-32	1 week, male
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	58	208	R2104-33	4+ weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	64	15	R2104-34	3-4 weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	64	220	R2104-35	4+ weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	55	2	INC2103-4	3-4 weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	46	8	INC2104-2	1-2 weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	52	345	INC2104-3	1-2 weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	85	12	INC2104-5	2-3 weeks, sex unknown
16/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	76	23	INC2104-6	2-3 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	4	60	R2104-36	4+ weeks, sex unknown
17/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	18	22	220	R2104-37	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	36	220	R2104-38	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	41	252	R2104-39	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	46	255	R2104-40	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	51	230	R2104-41	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	22	310	R2104-43	<24 hours, male
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	22	77	R2104-44	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	17	223	R2104-45	2-3 weeks, sex unknown

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	22	238	R2104-46	1-2 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	22	239	R2104-47	1-2 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	27	221	R2104-48	1-2 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	29	271	R2104-49	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	36	248	R2104-50	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	42	257	R2104-51	<24 hours, male
17/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	30	52	30	R2104-52	2 weeks, female?
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	16	75	R2104-53	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	39	45	R2104-54	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	19	67	R2104-55	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	29	70	R2104-56	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	31	55	R2104-57	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	32	54	R2104-58	2-3 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	69	343	INC2104-10	2-3 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	61	208	INC2104-11	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	42	205	INC2104-12	4+ weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	16	20	INC2104-13	<24 hours, male. Still alive and responsive, injuries recoverable - rescued and given to wildlife carer and vet. GPS point CT10.
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	65	280	INC2104-14	1-2 weeks, sex unknown. Caught in barbed wire - possibly not a turbine-related mortality. No GPS point.
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	41	343	INC2104-7	3-4 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	41	117	INC2104-8	2-3 weeks, sex unknown
17/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	27	101	INC2104-9	4+ weeks, sex unknown
17/04/2021	Brown Falcon	*Falco berigora*	Bird	31	19	132	R2104-120	Half carcass missing, 3-4 weeks old, unknown age.
17/04/2021	Unknown bird spp.	*NA*	Bird	20	30	153	R2104-121	Tail and rump, 4+ weeks old
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	2	33	305	R2104-59	1-2 weeks, sex unknown
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	19	193	R2104-60	3-4 weeks, sex unknown
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	54	260	R2104-61	1-2 weeks, sex unknown
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	55	223	R2104-62	1-2 weeks, sex unknown
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	71	145	R2104-63	1 week, sex unknown
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	11	37	225	R2104-64	3-4 weeks, sex unknown
18/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	15	9	10	R2104-65	<24 hours, female
18/04/2021	Unknown bird spp.	*NA*	Bird	13	40	250	FS2104-1	Feather spot
19/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	15	178	R2104-66	<24 hours, male
19/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	83	114	INC2104-15	1-2 weeks
19/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	24	40	117	R2104-122	<48 hours, intact. Juvenile.
20/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	18	45	25	R2104-123	1-2 weeks old, juvenile
20/04/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	18	40	69	R2104-124	<48 hours, intact, juvenile. Tail missing

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	24	110	R2104-67	2-3 weeks, sex unknown. Missing one wing, broken bones.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	27	310	R2104-68	<24 hours, female. Broken left forearm, leg, open wound on nape.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	37	300	R2104-69	1 week, male. Intact.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	39	300	R2104-70	1 week, female. Intact, decomposing.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	41	0	R2104-71	2-4 weeks, sex unknown. Intact, skeletonised.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	43	0	R2104-72	>4 weeks, sex unknown. Skeletonised but intact.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	51	135	R2104-73	>4 weeks, sex unknown. Intact, old.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	63	225	R2104-74	1 week, female, intact.
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	63	74	R2104-75	2-3 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	69	60	R2104-76	4+ weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	9	295	R2104-77	1-3 days, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	27	196	R2104-78	4+ weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	42	125	R2104-79	2-3 weeks, sex unknown
20/04/2021	Grey-headed Flying-fox	*Pteropus poliocephalus*	Flying-fox	20	46	170	R2104-80	1-2 weeks, male
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	47	243	R2104-81	2-3 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	52	75	R2104-82	1-3 days, male
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	64	308	R2104-83	1-2 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	69	108	R2104-84	3-4 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	79	190	R2104-85	1-2 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	89	62	R2104-86	1-2 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	93	64	R2104-87	4+ weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	97	109	R2104-88	2-3 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	80	103	R2104-89	1-2 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	47	15	R2104-90	2-3 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	35	91	R2104-91	1-3 days, male
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	32	41	226	R2104-92	4+ weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	61	202	R2104-93	1-2 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	62	202	R2104-94	2-3 weeks, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	16	115	INC2104-16	<24 hours, sex unknown
20/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	111	21	INC2104-17	4+ weeks, sex unknown
21/04/2021	Unknown bird spp.	*NA*	Bird	13	31	338	FS2104-2	Feather spot
21/04/2021	Galah	*Eolophus roseicapilla*	Bird	12	9	4	R212104-125	Feathers and wingtip
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	43	209	R2104-97	3-4 weeks, sex unknown
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	45	145	R2104-98	1-2 weeks, sex unknown
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	56	191	R2104-99	3-4 weeks, sex unknown
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	59	286	R2104-100	3-4 weeks, sex unknown
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	50	172	R2104-101	4+ weeks, sex unknown
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	15	26	144	R2104-102	1-3 days, female

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
21/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	31	265	R2104-103	2-3 weeks, sex unknown
22/04/2021	Brown Falcon	*Falco berigora*	Bird	29	47	30	R2104-126	1-3 days old, juvenile
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	2	6	275	R2104-104	<24 hours, female
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	2	54	15	R2104-105	1-3 days, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	79	235	R2104-106	4+ weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	84	315	R2104-107	2-3 weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	84	125	R2104-108	1-2 weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	80	3	R2104-109	2-3 weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	67	297	R2104-110	4+ weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	61	210	R2104-111	4+ weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	83	2	R2104-112	2-3 weeks, sex unknown
22/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	30	14	162	R2104-113	<24 hours, male
23/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	24	18	69	R2104-114	1-3 days, female
30/04/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	15			INC2104-18	Male, <24 hours
15/05/2021	Australian Raven	*Corvus coronoides*	Bird	17	17	36	R2105-8	>3 days old, adult.
15/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	31	7	330	FS2105-1	Feather spot.
15/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	21	25	144	R2105-13	1-3 days old, adult female
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	8	185	R2105-1	3-4 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	29	210	R2105-2	2-3 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	34	315	R2105-3	4-5 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	43	310	R2105-4	3-4 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	46	260	R2105-5	3-4 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	4	58	225	R2105-6	4-5 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	16	48	115	R2105-7	8-9 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	32	342	R2105-9	1-2 days, male
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	38	13	R2105-10	6-7 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	37	45	R2105-11	9-10 days, sex unknown
15/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	31	48	324	R2105-12	1-2 days, male
16/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	33	4	234	FS2105-2	Feather spot.
16/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	33	55	42	R2105-19	>1 week, juvenile
16/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	20	27	45	R2105-22	8-9 days, juvenile
16/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	8	56	140	R2105-27	2 weeks, juvenile
16/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	8	41	108	R2105-28	5-6 days, juevnile
16/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	21	36	240	INC2105-1	<24 hours old, juvenile
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	5	270	R2105-14	6-7 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	13	126	R2105-15	2-3 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	11	235	R2105-16	2-3 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	6	182	R2105-17	3-4 days, sex unknown

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	12	85	R2105-18	5-6 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	26	54	R2105-20	6-7 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	29	130	R2105-21	5-6 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	20	24	55	R2105-23	12-14 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	30	20	350	R2105-24	4-5 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	30	10	240	R2105-25	3-4 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	7	15	140	R2105-26	1-2 days, sex unknown
16/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	8	42	120	R2105-29	3-4 days, sex unknown
17/05/2021	Brown Falcon	*Falco berigora*	Bird	2	18	205	R2105-30	1-2 days, juvenile
17/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	22	23	85	R2105-34	9-10 days, juvenile
17/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	25	59	315	FS2105-3	Feather spot.
17/05/2021	Pied Currawong	*Strepera graculina*	Bird	26	10	85	R2105-35	Adult, 5-6 days
17/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	5	47	115	R2105-38	Juvenile, 1-2 days
17/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	6	38	295	FS2105-4	Feather spot.
17/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	6	58	315	R2105-41	Juvenile, 3-4 days
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	2	50	345	R2105-31	5-6 days, sex unknown
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	2	53	315	R2105-32	7-8 days, sex unknown
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	3	14	120	R2105-33	2-3 days, sex unknown
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	2	293	R2105-36	4-5 days, sex unknown
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	23	285	R2105-37	6-7 days, sex unknown
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	40	135	R2105-39	7-8 days, sex unknown
17/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	64	255	R2105-40	5-6 days, sex unknown
18/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	13	14	45	R2105-44	Unknown age, 5-6 days
18/05/2021	Galah	*Eolophus roseicapilla*	Bird	12	19	220	R2105-46	Adult, 4-5 days
18/05/2021	Galah	*Eolophus roseicapilla*	Bird	12	47	50	FS2105-5	Feather spot.
18/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	31	12	12	R2105-49	Unknown age, 5-6 days
18/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	33	44	225	FS2105-6	Feather spot.
18/05/2021	Unknown bird spp.	*NA*	Bird	33	48	225	FS2105-7	Feather spot.
18/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	35	215	R2105-42	8-9 days, sex unknown
18/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	15	30	60	R2105-43	3-4 days, sex unknown
18/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	13	38	178	R2105-45	5-6 days, sex unknown
18/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	57	80	R2105-47	4-5 days, male
18/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	12	48	85	R2105-48	5-6 days, sex unknown
18/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	33	54	145	R2105-50	6-7 days, sex unknown
19/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	2	43	324	FS2105-8	Feather spot
19/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	20	97	40	R2105-51	Unknown age, 6-7 days
19/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	19	38	30	R2105-52	2-3 days, sex unknown
20/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	15	96	23	R2105-62	Juvenile, 8-9 days

Date	Common name	Scientific name	Carcass type	Turbine number	Distance (m)	Bearing (°)	*ID ref.	Notes
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	56	320	R2105-53	3-4 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	75	48	R2105-54	3-4 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	9	73	45	R2105-55	5-6 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	41	230	R2105-56	4-5 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	39	315	R2105-57	4-5 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	57	35	R2105-58	5-6 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	69	305	R2105-59	2-3 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	83	280	R2105-60	4-5 days, sex unknown
20/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	5	40	165	R2105-61	5-6 days, sex unknown
21/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	30	72	350	R2105-62	6-7 days, sex unknown
21/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	30	69	348	R2105-63	6-7 days, sex unknown
28/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	21	27	295	FS2105-9	Feather spot
28/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	21	47	145	R2105-65	Unknown age, 5-6 days
28/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	27	52	120	FS2105-10	Feather spot
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	36	88	R2105-64	4-5 days, sex unknown
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	61	70	R2105-66	8-9 days, sex unknown
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	34	205	R2105-67	6-7 days, male
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	36	212	R2105-68	8-9 days, sex unknown
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	61	80	R2105-69	7-8 days, sex unknown
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	27	95	245	R2105-70	9-10 days, sex unknown
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	96	220	R2105-71	5-6 days, sex unknown
28/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	17	94	208	R2105-72	9-10 days, sex unknown
29/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	22	53	175	R2105-74	Adult, 5-6 days
29/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	3	42	305	R2105-73	8-9 days, sex unknown
30/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	21	60	310	R2105-75	Unknown age, 3-4 days
30/05/2021	Nankeen Kestrel	*Falco cenchroides*	Bird	18	41	140	R2105-78	Juvenile, 1-2 days
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	21	43	72	R2105-76	7-8 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	36	45	R2105-77	7-8 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	63	108	R2105-79	7-8 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	18	36	99	INC2105-2	7-8 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	28	79	315	R2105-80	4-5 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	18	310	R2105-81	8-9 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	29	70	222	R2105-82	4-5 days, sex unknown
30/05/2021	Little Red Flying-fox	*Pteropus scapulatus*	Flying-fox	6	85	245	R2105-83	6-7 days, sex unknown
3/06/2021	Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	Bat	28	56	290	R2103-10	Scavenged - posterior third reduced to skeleton. Very desiccated, viscera missing. Almost skin on a skeleton.

***C=Carcass, FS= Feather Spot, INC=Incidental**

Appendix 2: Symbolix Bodangora Wind Farm Mortality Estimate – Years 1 and 2

symbolix

Bodangora Wind Farm Mortality Estimate - Years 1 and 2

Prepared for Nature Advisory, 17 September 2021, Ver. 1.0

This report outlines an analysis of the mortality data collected at the Bodangora Wind Farm from 2019-06-18 to 2021-05-30. The analysis is broken into the three related components below:

- Searcher efficiency / detectability – estimated from trials in March 2021 and July 2021
- Scavenger loss rates – consisting of trials in July 2020, September 2020, October 2020, December 2020, January 2021, February 2021, April 2021, and May 2021
- Mortality estimates - based on monthly surveys at 33 turbines, from 2019-06-18 to 2021-05-30

The data was collected and provided by Nature Advisory and is analysed "as-is." A brief summary of the data is provided below, and the ultimate focus of this report is a discussion of the potential mortality.

Available data

The data analysed was collected, verified and provided to us from Nature Advisory[1].

Methodology overview

Mortality through collision is an ongoing environmental management issue for wind facilities. Different sites present different risk levels; consequently different sites have different monitoring requirements. In order to estimate the mortality loss at a given site (in a way that is comparable with other facilities) we must account for differences in survey effort, searcher and scavenger efficiency. We used a Monte-Carlo simulation to achieve this.

The analysis used survey data to estimate the average time to scavenge loss and searcher efficiency (and related confidence intervals). The algorithm then simulated different numbers of virtual mortalities. We could then estimate how many carcasses were truly in the field, given the range of searcher and scavenger efficiencies, and the survey frequency and coverage, and the true "found" details. After many simulations, we can estimate the likely range of mortalities that could have resulted in the recorded survey outcome.

[1] Symbolix Bodangora WF_ mortality data_FINAL.xlsx

This method has been benchmarked against analytical approaches (Huso (2011), Korner-Nievergelt et al. (2011)). Its outputs are equivalent but it is able to robustly model more complex survey designs (e.g. pulsed surveys, rotating survey list).

Searcher efficiency

Two searcher efficiency trials were held (2021-03-10 and 2021-07-01). The detectability trials used bird (14 replicates) and bat (16 replicates) carcasses. A range of bird sizes were used, including Grey Fantail, Australian Magpie, and Nankeen Kestrel carcasses.

AICc methods (Burnham and Anderson 2002) were used for searcher efficiency model selection. The selected model was one that differentiated bat and bird searcher efficiencies. Selection was based upon the best model's Akaike weight of $w_i = 0.32$, and its concordance with consistent findings across multiple wind farm locations which suggest that human searchers find bat and bird carcasses at differing rates (Stark and Muir 2020).

Table 1 summarises the result.

Bat detectability is 56%, with a 95% confidence interval of [30%, 80%]. Bird detectability is 86% with a 95% confidence interval of [57%, 98%].

Table 1: Detection efficiencies for birds and bats.

Variable	Bat	Bird
Number found	9	12
Number placed	16	14
Mean detectability proportion	0.56	0.86
Detectability lower bound (95% confidence interval)	0.3	0.57
Detectability upper bound (95% confidence interval)	0.8	0.98

Scavenger efficiency

Scavenger efficiency trials were conducted during July 2020, September 2020, October 2020, December 2020, January 2021, February 2021, April 2021, and May 2021. Trials ran over 30 days, and used both bats (19 replicates), and birds of various sizes (18 replicates). This included eight Little Red Flying Fox replicates in the April 2021 and May 2021 trials.

Survival analysis (Kaplan and Meier (1958)) was used to determine the average time until complete loss from scavenge. Survival analysis was required to account for the fact that we do not know the exact time of scavenge loss, only an interval in which the scavenge event happened. By performing survival analysis we can estimate the average survival percentage after a given length of time, despite these unknowns.

AICc selection suggested that the best model was one that differentiated birds and bats

(but classed Little Red Flying Foxes as bats, instead of separating them out). Selection was based upon the best model's Akaike weight of $w_i = 0.24$, and its concordance with consistent findings across multiple wind farm locations which suggest that scavenge rates for bat and bird carcasses are different (Stark and Muir 2020). We thus have treated bats and birds separately in the mortality estimate.

Figure 1 shows a survival curve fitted to bats and birds. The survival curves (solid lines) show the estimated proportion of the sets remaining at any given time. The shaded portions are the 95% confidence intervals on the estimates. For example, we see that for bats we expect around 12% to 56% of carcasses to remain after two days with the expectation being around 26%. For birds, we expect around 37% to 84% of carcasses to remain after ten days with the expectation being around 56%.

Under these assumptions, the median time to total loss via scavenge for bats is 0.8 days, with a 95% confidence window of [0.3, 1.9] days. For birds, the median time to total loss via scavenge is 2.3 days, with a 95% confidence window of [0.9, 5.8] days.

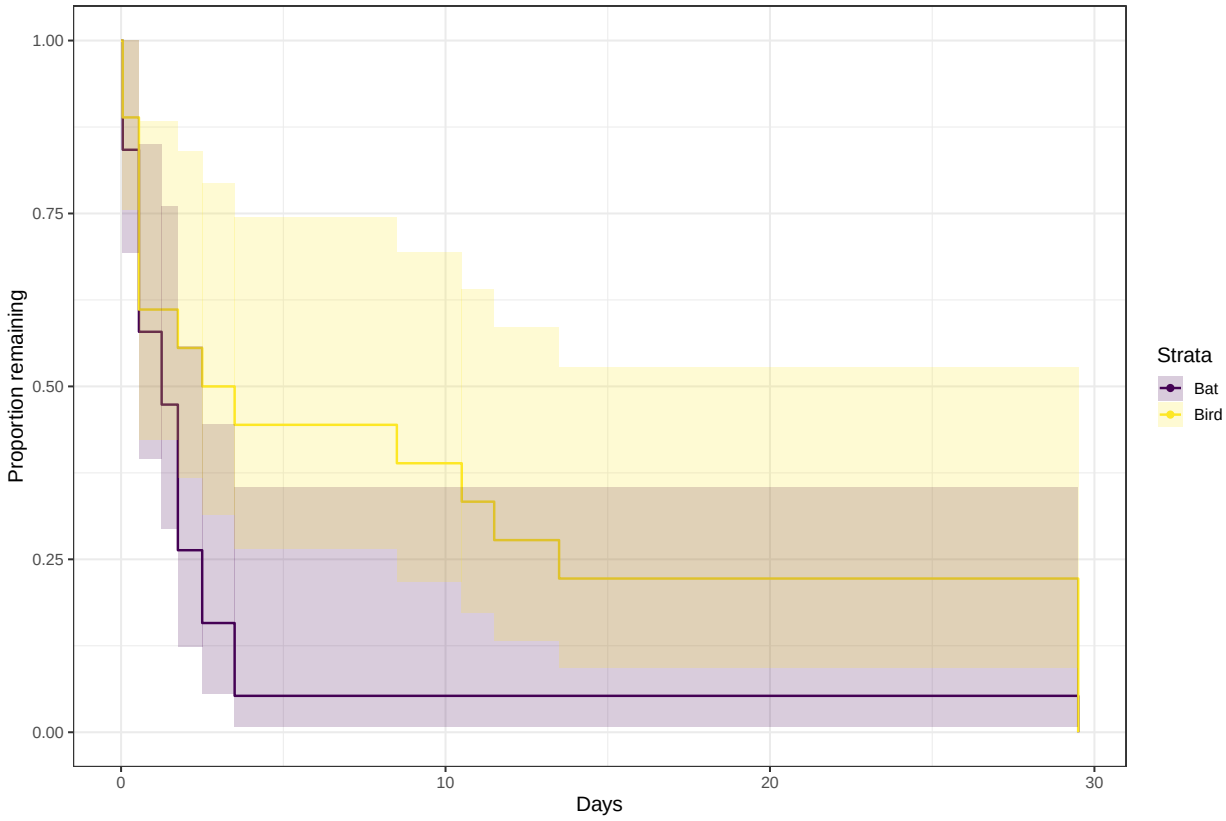

Figure 1: Survival curves for birds and bats, with 95% confidence interval shaded.

Mortality projection inputs

Carcass search data

The mortality estimate was based on a dated list of turbine surveys. The survey frequency is summarised in Table 2. 16 turbines were randomly selected to be surveyed twice each month. These turbines were surveyed out to a radius of 100 metres in standard surveys and to 60 metres in pulse surveys. The remaining 17 turbines were surveyed once every two months, with eight or nine surveyed each month. These turbines were searched out to a radius of 100 metres.

Table 2: Number of surveys per month.

Date	Number of surveys
2019 Jun	41
2019 Jul	34
2019 Aug	34
2019 Sep	31
2019 Oct	33
2019 Nov	33
2019 Dec	34
2020 Jan	33
2020 Feb	32
2020 Mar	49
2020 Apr	49
2020 May	38
2020 Jun	38
2020 Jul	43
2020 Sep	30
2020 Oct	46
2020 Nov	53
2020 Dec	32
2021 Jan	71
2021 Feb	56
2021 Mar	47
2021 Apr	41
2021 May	47

Mortality estimate - years one and two combined

Mortality estimation – methodology

With estimates for scavenge loss and searcher efficiency we then converted the number of bat and bird carcasses detected into an estimate of overall mortality at Bodangara Wind Farm from 2019-05-18 to 2021-05-30 (we allow for collisions to occur up to a month prior to the first survey).

The mortality estimation is done via Monte-Carlo simulation. We used 25000 simulations with the survey design simulated each time. Random numbers of virtual mortalities were simulated, along with the scavenge time and searcher efficiency (based on the measured confidence intervals). The proportion of virtual carcasses that were "found" was recorded for each simulation. Finally, those trials that had the same outcome as the reported survey detections were collated, and the initial conditions (i.e. how many true losses there were) reported on.

The complete set of model assumptions are listed below.

- There were 33 turbines on site.
- Search frequency for each turbine was taken from a list of actual survey dates (see Table 2 for a summary).
- Mortalities were allowed to occur up to a month before the initial survey (2019-06-18) and until the final surveyed date (2021-05-30).
- Birds are on-site at all times during this period.
- Bats are on-site at all times during this period.
- Finds are random and independent, and not clustered with other finds.
- There was equal chance of any turbine individually being involved in a collision / mortality.
- We assumed a log-normal scavenge shape.
- We took scavenge loss and search efficiency rates as outlined above.
- 16 turbines were selected at random to be surveyed twice each month, and were searched out to a 100 metre radius for standard surveys and 60 metres for pulse surveys. Standard surveys were performed for the remaining 17 turbines every two months. We estimated the "coverage factor" for the survey – i.e. the total fall zone surveyed for birds and bats (using estimates from Hull and Muir (2010)). We assumed that the coverage factor was 77% for birds and 95% for bats.

Mortality projection results

After running the simulation we investigated the distribution of mortalities that could have resulted in the actual numbers found during the surveys. The breakdown of found carcasses per species are summarised in Table 3.

Table 3: Carcasses found during formal surveys over two years.

Species	Bat	Bird	Feather Spot
Little Red Flying Fox	201	0	0
Gould's Wattled Bat	18	0	0
Southern Freetail Bat	16	0	0
White-striped Freetail Bat	10	0	0
Southern Forest Bat	5	0	0
Grey-headed Flying-Fox	4	0	0
Little Forest Bat	4	0	0
Inland Forest Bat	3	0	0
Large Forest Bat	2	0	0
Lesser Long-eared Bat	2	0	0
Yellow-bellied Sheathtail Bat	2	0	0
Chocolate Wattled Bat	1	0	0
Nankeen Kestrel	0	30	7
Brown Falcon	0	9	2
Galah	0	8	6
Australian Magpie	0	7	3
Wedge-tailed Eagle	0	6	0
Raven spp.	0	5	3
Unknown bird spp.	0	2	3
Eastern Rosella	0	2	1
Grey Fantail	0	2	0
Red-rumped Parrot	0	2	0
Noisy Miner	0	1	4
Magpie Lark	0	1	1
Pied Currawong	0	1	1
Australian Hobby	0	1	0
Australian Raven	0	1	0
Australian Wood Duck	0	1	0
Crested Pigeon	0	1	0
Rufous Songlark	0	1	0
Sacred Kingfisher	0	1	0
Striated Pardalote	0	1	0
Willie Wagtail	0	1	0
Apostlebird	0	0	1
Grey Butcherbird	0	0	1

We also note a number of carcasses were found opportunistically. We don't include these in our formal estimate of mortality, but we do report them in Table 4 for completeness.

Table 4: Informal carcass finds.

Species	Count
Little Red Flying Fox	97
Nankeen Kestrel	11
Grey-headed Flying-Fox	4
Australian Magpie	3
Wedge-tailed Eagle	2
Black Falcon	1
Inland Forest Bat	1
White-striped Freetail Bat	1
Southern Freetail Bat	1
Crested Pigeon	1
Australian Wood Duck	1
Galah	1
Gould's Wattled Bat	1
Southern Forest Bat	1
Musk Lorikeet	1
Australian Raven	1
Pied Currawong	1

Bat mortality estimate – results

During the two years of surveys a total of 67 bats (excluding Little Red Flying Foxes) were found during formal surveys (Table 3). The resulting estimate of total mortality, accounting for searcher efficiency, scavenge rate, search area and timing of surveys is an expectation (mean) of 1307 and a median of 1216 bats lost on site over the twenty-four months.

Table 5 and Figure 2 display the percentiles of the distribution, to show the confidence interval in this average.

Based on the detected carcasses and measured detectability and scavenge rate, we expect that there was a total site loss of around 1307 bats (excluding Little Red Flying Foxes) over the survey period, and are 95% confident that fewer than 2330 individuals were lost.

Table 5: Percentiles of estimated total bat losses over the two years of survey period.

0%	50% (median)	90%	95%	99%	99.9%
393	1216	2051	2330	2670	2850

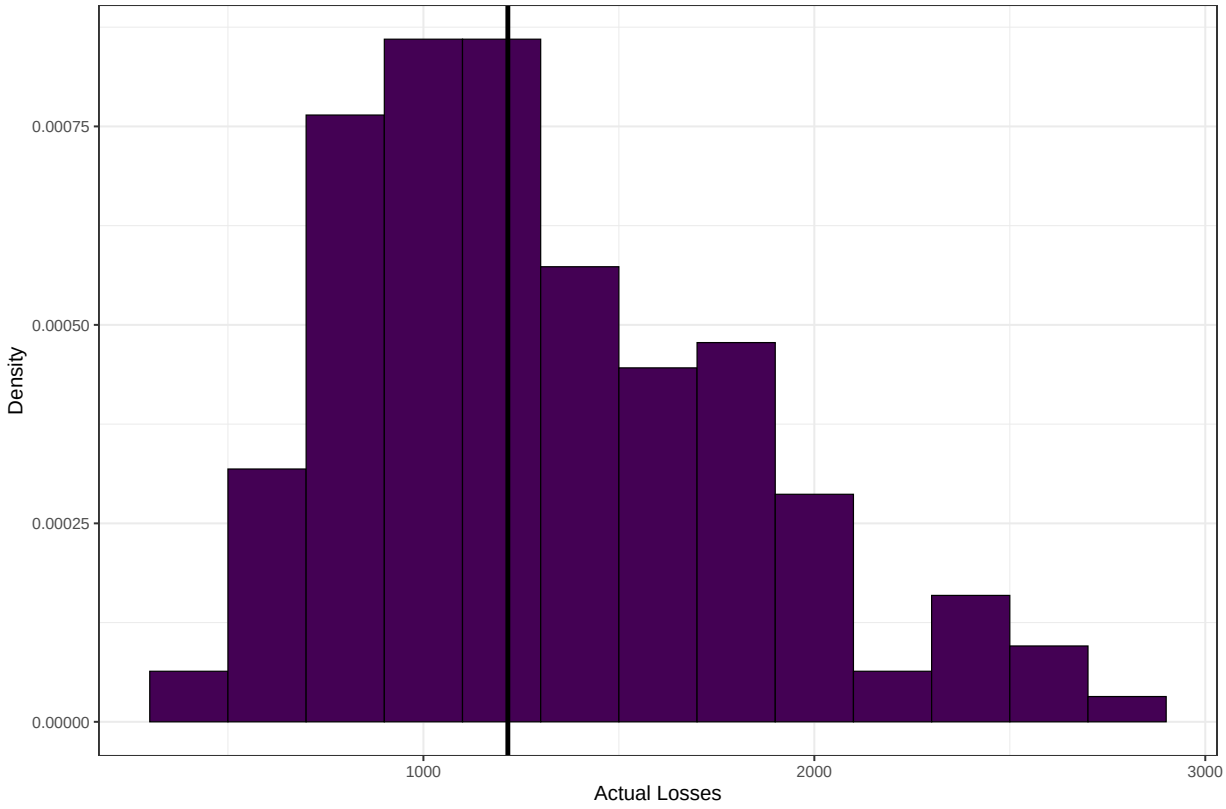

Figure 2: Histogram of the total losses distribution (bats, excluding Little Red Flying Foxes), given 67 were detected on-site. The black solid line shows the median.

Bird mortality estimate - results

During the two years of surveys a total of 80 birds (excluding Nankeen Kestrels) were found during formal surveys (Table 3). The resulting estimate of total mortality, accounting for searcher efficiency, scavenge rate, search area and timing of surveys is an expectation (mean) of 627 and a median of 608 birds (excluding Nankeen Kestrels) lost on site over the twenty-four months.

Table 6 and Figure 3 display the percentiles of the distribution, to show the confidence interval in this average.

In determining the estimate, we have used the standard practice of assuming that all carcasses and all feather spots (regardless of size or composition) are attributable to the wind turbines.

Based on the detected carcasses and feather spots and measured detectability and scav-

enge rate, we expect that there was a total site loss of around 627 birds (excluding Nankeen Kestrels) over the survey period, and are 95% confident that fewer than 1075 individuals were lost.

Table 6: Percentiles of estimated total bird losses (excluding Nankeen Kestrels) over the two years of survey period.

0%	50% (median)	90%	95%	99%	99.9%
244	608	859	1075	1236	1278

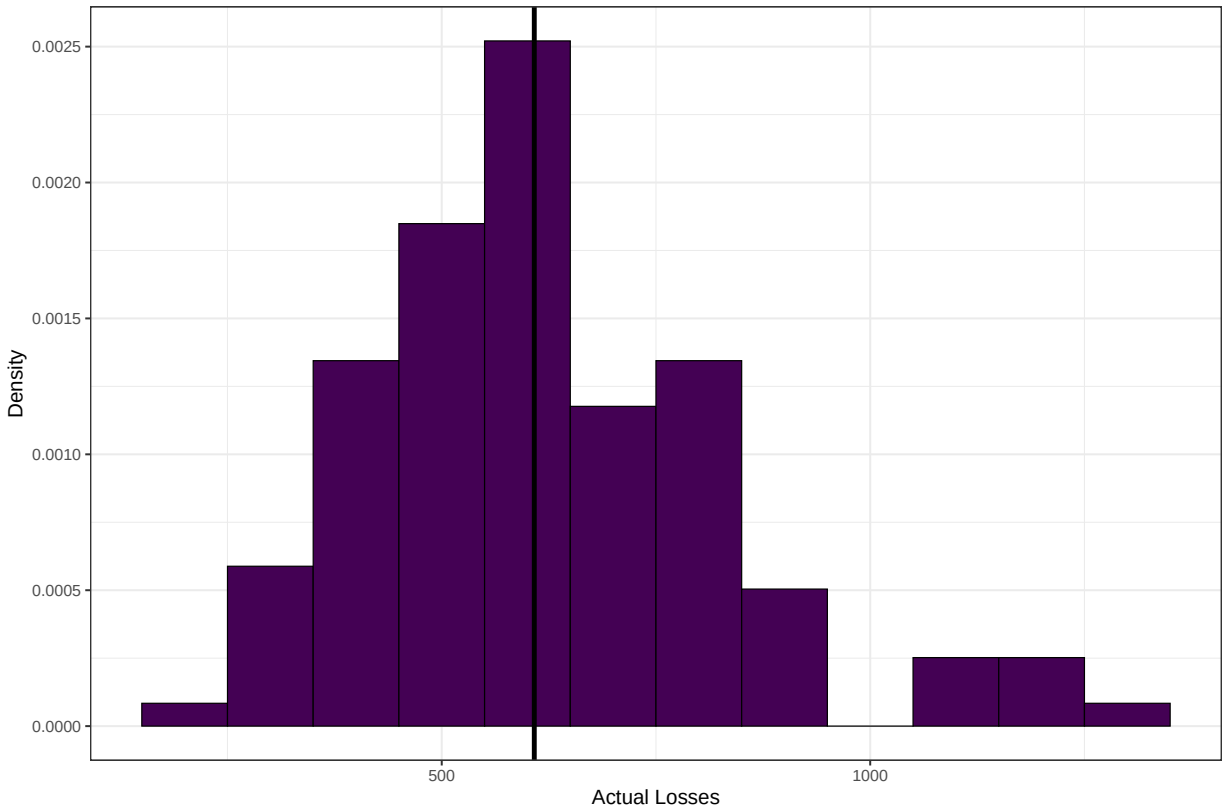

Figure 3: Histogram of the total losses distribution (birds, excluding Nankeen Kestrels), given 80 were detected on-site. The black solid line shows the median.

Comparison of year one and year two results

Bat results

During the first year of surveys (2019-05-18 to 2020-06-14) a total of 35 bats (excluding Little Red Flying Foxes) were found during formal surveys. The resulting estimate of total mortality is an expectation (mean) of around 771 bats over the survey period, and we are 95% confident that fewer than 1470 individuals were lost.

In comparison, in the second year of surveys a total of 32 bats (excluding Little Red Flying Foxes) were found during formal surveys. The resulting estimate of total mortality an expectation of 628 bats over the survey period, and we are 95% confident that fewer than 1288 individuals were lost.

Statistical testing (using the Kolmogorov-Smirnov test) was used to determine if there was a significant difference between the modelled distribution of mortalities in year one and year two.

When considering all bat mortalities (excluding Little Red Flying Foxes), we find no significant difference between the distribution of mortalities in the first and second years (the test statistic $D = 0.3$ is less than the critical value D* = 0.35 at the 0.05 significance level).

Assuming all model assumptions hold, this would imply that the true total number of bat losses (excluding Little Red Flying Foxes) in year one was not significantly different from the number of losses in year two.

Bird results

During the first year of surveys a total of 36 birds (excluding Nankeen Kestrels) were found during formal surveys. The resulting estimate of total mortality is an expectation of around 327 birds over the survey period, and we are 95% confident that fewer than 567 individuals were lost.

In comparison, in the second year of surveys a total of 44 birds (excluding Nankeen Kestrels) were found during formal surveys. The resulting estimate of total mortality is an expectation of 330 birds over the survey period, and we are 95% confident that fewer than 550 individuals were lost.

Using the Kolmogorov-Smirnov test, we find no significant difference between the distribution of mortalities in the first and second years (the test statistic $D = 0.04$ is less than the critical value D* = 0.35 at the 0.05 significance level).

Assuming all model assumptions hold, this would imply that the true total number of bird losses (excluding Nankeen Kestrels) in year one was not significantly different from the number of losses in year two.

Concluding remarks

In evaluating the potential impact, it is important to remember that all mortality estimators have an inherent assumption that there is an unlimited supply of carcasses to be found. In particular, we did not apply an upper limit on the number of bats that could be onsite, and we assumed that bats were present all year round. The ecological feasibility of this assumption should be accounted for if using these results to comment on overall ecological impact.

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Appendix 3: Superb Parrot observations at BWF 2019-2021

Turbine	Date	Time	No.	Height (m)	Distance (m)	Direction	Habitat flown from	Habitat flown to	Notes
6	18/06/2019	12:30	3	15	30	W	Open woodland	Open woodland/ grazing	Open woodland/ grazing
2	18/06/2019	14:10	10	8	70	S	Paddock trees	Paddock trees	Open grazing
4	18/06/2019	14:40	3	12	80	N	Paddock trees	Open woodland/ grazing	Grazing/ paddock trees
33	19/06/2019	10:00	heard		120	N	Paddock trees	Sitting in tree	Sitting in tree
12	19/06/2019	13:30	1	20	142	SW	Paddock trees	Unknown	Open Paddock
11	19/06/2019	13:35	6	30	400	W	Unknown	Unknown	Wooded Paddock
15	21/06/2019	8:42	7	10	100	S	Paddock trees	Paddock trees	Hardstand
27	21/06/2019	11:11	2	10	93	S	Open forest	Open forest	Hardstand
33	15/07/2019	11:25	2	15	120	NNE	Paddock tree	Woodland	Paddock
2	15/07/2019	15:50	4	20	150	S	Paddock tree	Woodland	Paddock
NA	15/07/2019	17:15	10	50	200	W			Paddock
NA	16/07/2019	8:10	8	10	100	SW	Woodland	Woodland	Paddock
5	17/07/2019	9:10	7	10	30	NE-SW	Open Woodland	Open woodland	Open woodland
12	19/07/2019	8:00	2	0	20	E	Paddock tree	Paddock trees	Pasture
12	19/07/2019	8:20	9	1.5	100	S	Open woodland	Open woodland	Paddock
NA	8/08/2019	9:00	1	5-Oct	10		Ironbark tree	Ironbark tree	Woodland
NA	8/08/2019	12:35	6	10	60	NE	Open Woodland	Pasture	Pasture
NA	10/08/2019	13:23	1	15	10	NW		Woodland	Woodland
5	11/08/2019	10:05	1	8	15	W	Pasture	Pasture	Pasture
NA	9/01/2020	8:52	8	20	80	289	Ground	Tree	Paddock
NA	9/01/2020	10:22	7	15	5	160	Open paddock	Open paddock	Open paddock
N/A	12/03/2020	9:16	3	-	-	-	Cypress Pine	Open Paddock	
N/A	12/03/2020	9:30	13	-	-	-	Ground	Ground	Large flock feeding on the ground
N/A	13/03/2020	8:34	3	-	-	-	Roadside	Roadside	
T04	14/03/2020	8:12	7	-	-	-	Woodland	Woodland	Feeding
T16	14/03/2020	9:26	3	-	-	-	Road	Creek	Feeding
N/A	18/04/2020	8:52	2				Paddock Tree	Paddock Tree	Juvenile birds
N/A	19/04/2020	8:56	2	0	-	-	Ground	Paddock Tree	Recorded in White Box Woodland remnant
Gillinghall Road	6/01/2021	17:46	13	0	-	10	Remnant roadside eucalypts	Remnant roadside eucalypts,	6 individuals were on the ground next to Gillinghall Rd before flying away upon being encountered. These were likely feeding adjacent to the road. The other individuals were seen mid-flight or flying away from roosting positions in eucalypts.
Gillinghall Rd leading to T5 and T6	17/01/2021	12:20	2	10	-	SW	Grassy eucalypt woodland remnant along track	Unknown	Pair flying SW at about 10 m high (about tree height), crossing over the track and more grassy eucalypt woodland remnant, as well as patches of grassy and thistly open paddock. Area was a gentle slope.
At second gate from Gillinghall Rd leading to T5 and T6	17/01/2021	12:25	35	15	0	S	Grassy eucalypt woodland remnant along track	Unknown	50% flew S where I lost sight of these, and 50% flew east where I saw the species land. Area was a gentle slope. Birds were flying 10 – 15 m high (at or slightly above tree height). Crossed over or flew along dirt track, as well as grassy eucalypt woodland and grassy or thistly open paddock. At least 3 were roosting in eucalypts, possibly feeding.
At second gate from Gillinghall Rd leading to T5 and T6	17/01/2021	14:12	8	25	-	S	Grassy eucalypt woodland remnant	Grassy eucalypt woodland remnant.	Flew about 25 m high (above tree height). At least one flew S, and 5 flew NW. Crossed over the dirt track and more woodland remnant. Area was a gentle slope.
Within 100 m of gate to T9	19/01/2021	17:00	4	15	-	N	Unknown	Unknown	Seen mid-flight flying N along Gillinghall Rd at a height of about 15 m (about or slightly above tree height). Area was a slope.
Along Gillinghall Rd, within 300 m of turnoff from Goolma Rd	19/01/2021	17:15	2	10	-	N	Eucalypts	Unknown	Roosting, fled on approach. Terrain was plains. Crossed open paddock with forb groundcover. Were flying N at about 10 m high, or at about tree height.
At second gate from Gillinghall Rd leading to T5 and T6	21/01/2021	16:10	7	10	-	-	N/A. Did not fly.	N/A. Did not fly.	Area was a gentle slope. Birds were roosting in eucalypts in grassy eucalypt woodland remnant.
At second gate from Gillinghall Rd leading to T5 and T6	21/01/2021	18:44	20	18	-	E	Eucalypts	Eucalypts	Area was a gentle slope. Birds were flying E along the creek line at roughly tree height (about 18 m above ground where the creek was, 15 m above the tops of the banks). The bird in the eucalypt by the creek remained where it was and did not fly.
At turnoff to T2 from Driell Ck Rd	22/01/2021	9:00	6	12	-	N	Unknown	Unknown	Seen mid-flight, at or slightly above tree height (about 12 m high). Flew N. Crossed the road, roadside eucalypts, and open paddock with tussock grasses. Area was a gentle slope.
T33	23/01/2021	15:00	1	7	-	-	Eucalypt in tall grass.	Eucalypt	Flew a short distance between a pair of eucalypts in long grass on a ridge, relatively isolated from any other trees. Appeared to be roosting. Flew about 7 m high.

T18	10/02/2021	18:55	45	10	-	-	Paddock white cypress pine.	Unknown	Approx. 100m W of T18. GPS did not allow a waypoint. Not seen feeding.
At second gate to T5 and T6 from Gillinghall Rd	12/02/2021	9:00	70	0	10	-	Paddock – grass on ground.	Eucalypts	On the ground next to the road. Some individuals were observed feeding on eucalypt flowers in trees. Few mature males.
At second gate to T5 and T6 from Gillinghall Rd	12/02/2021	12:02	2	10	-	-	Remnant grassy eucalypt woodland	Eucalypts	One bird was not seen, but its presence was identified aurally.
Between first and second gate to T5 and T6 from Gillinghall Rd	12/02/2021	12:06	7	10	-	-	Remnant grassy eucalypt woodland	Eucalypts	No feeding observed.
Gate to T10-15 from Gillinghall Rd	14/02/2021	16:22	1	10	-	-	Roadside grassy eucalypt linear remnant – large box gum.	Unknown.	No feeding observed.
T15	14/02/2021	17:51	2	10	-	-	Paddock tree – ironbark. Dry creek line nearby.	Eucalypts.	No feeding observed. Each individual flew to different paddock trees.
T23	18/02/2021	9:55	2	10	-	-	Paddock tree – box gum.	Unknown	No feeding observed.
Third from T24, between T24 and T25	18/02/2021	12:02	2	10	-	-	Roadside dead eucalypt.	Unknown	No feeding observed.
T27	4/03/2021	12:05	4	20	-	-	Box-ironbark woodland	Woodland edge	Feeding on ironbark blossoms
T27	4/03/2021	12:15	4	15	-	-	Woodland edge	Unknown. Likely paddock trees and woodland	
Between first and second gate to T5 and T6 from Gillinghall Rd	5/03/2021	8:30	2	10	-	-	Eucalypt	N/A. Did not fly.	Aural ID only
Between first and second gate to T5 and T6 from Gillinghall Rd	5/03/2021	9:58	4	10	-	-	Creekside eucalypt	Roadside eucalypt	Only 1 seen. Another 3 heard.
About 1.5km N of T27	10/03/2021	14:50	4	15	-	-	N/A. Did not fly. Roosting in heavily flowering Ironbark.	N/A. Did not fly.	
Third gate from main road to T22	11/03/2021	15:43	2	15	-	-	N/A. Did not fly. Roosting in ironbark.	N/A. Did not fly.	
T28	10/03/2021	11:30	9	?	?	SW	Not seen. Flyover. Flew SW.	Not seen. Flyover.	Heard only
T33	9/03/2021	12:42	1	0	-	-	Ground	Paddock ironbark	Aural ID only
Gate to T10-15 from Gillinghall Rd	11/03/2021	11:48	1	10	-	-	Roadside trees	Roadside trees	
T27	12/03/2021	12:46	3	15	-	-	Ironbark	Ironbark	
At gate between T12 and T13	7/03/2021	9:45	1	15	-	-	N/A. Did not fly. Roosting in paddock box gums.	N/A. Did not fly.	Aural ID only
Third gate from T24, between T24 and T25	8/03/2021	9:22	2	0	-	-	Roadside grass	Unknown. Probably woodland remnant along creek	Possibly eating grass seed
At gate between T12 and T13	8/03/2021	13:23	2	10	-	-	Unknown for one. Dead tree for the other	Remnant grassy woodland	
WTG05 entry gate	10/03/2021	7:56	2	10	-	-	Unknown	Unknown	
T27	10/03/2021	10:27	12	15	-	-	Box-Ironbark woodland	N/A	Feeding on ironbark blossoms
Along old railway line towards NE corner of wind farm	10/03/2021	12:30	18	15	-	-	Woodland remnant	Unknown	
Along track between main road and T22	19/04/2021	9:00	4	-	-	-	Unknown	Unknown	
T23	19/04/2021	9:40	1	10	-	-	Paddock tree	Paddock tree	
T29	19/04/2021	15:13	1	-	-	-	Unknown	Unknown	
Along track between main road and T22	23/04/2021	8:51	1	-	-	-	Unknown	Unknown	

Appendix 4: Raptor observations at BWF

Date	Time	Species	number	Location	Direction	height	Duration	Behaviour	Map ref
1/06/2019	9:55	Brown Falcon	1	Perched	N/A	15	Unknown	Resting	1.1
1/06/2019	12:25	Wedge-tailed Eagle	1	Air	Circling, parallel to ridge	200	3	Soaring	1.2
1/06/2019	13:00	Nankeen Kestrel	1	Perched	Toward	20	Unknown	Resting	1.3
1/06/2019	13:50	Brown Falcon	1	Air	Parallel to ridge	50	3	Flapping	1.4
1/06/2019	13:20	Nankeen Kestrel	1	Air	Parallel to ridge	15	Unknown	Foraging	1.5
1/06/2019	11:50	Peregrine Falcon	1	Air, perched	Toward, away	30	6	Flapping, gliding, foraging	1.6
15/07/2019	13:50	Wedge-tailed Eagle	1	Air	Parallel to ridge	100	Unknown	Soaring	2.1
18/07/2019	8:00	Australian Hobby	1	Air	North	10	3	Foraging	2.2
18/07/2019	11:00	Black-shouldered Kite	1	Air	South	25	2	Flapping	2.3
8/08/2019	8:45	Brown Falcon	1	Air	Parallel to ridge	20	1	Flapping	3.1
8/08/2019	12:30	Wedge-tailed Eagle	1	Air	Parallel to ridge	40	3	Soaring	3.2
8/09/2019	10:40	Nankeen Kestrel	1	Air	Away	40	1	Soaring, hovering, foraging	3.3
16/09/2019	6:45	Nankeen Kestrel	1	Perched	N/A	1	1	Resting	4.1
16/09/2019	9:44	Whistling Kite	1	Air	Away, circling, away	30	4	Powered, soaring, Foraging, Powered	4.2
17/09/2020	14:02	Nankeen Kestrel	1	Air	Parallel to ridge	10	2	Soaring, hovering, foraging	4.3
18/09/2019	14:19	Brown Falcon	1	Perched, ground	Away	1	4	Resting, foraging	4.4
18/09/2019	16:10	Nankeen Kestrel	1	Air	Parallel to ridge	60	2	Soaring, foraging, soaring	4.5
19/09/2019	9:20	Wedge-tailed Eagle	2	Air	Parallel to ridge	150	16	Soaring	4.6
10/10/2019	10:40	Nankeen Kestrel	1	Air	Parallel to ridge	20	2	Soaring, Foraging, Soaring, Resting	5.1
10/10/2019	11:00	Wedge-tailed Eagle	2	Air	Circling, Away	200	3	Soaring	5.2
10/11/2019	7:50	Wedge-tailed Eagle	1	Air	Away	20	1	Powered	5.3
10/11/2019	11:17	Nankeen Kestrel	1	Air	N/A	60	2	Hovering, Foraging	5.4
10/12/2019	11:10	Nankeen Kestrel	1	Air	Parallel to ridge	2	1	Soaring, Foraging	5.5
13/10/2019	9:48	Nankeen Kestrel	1	Air	Toward	60	6	Hovering, Foraging, Powered, Hovering, Foraging	5.6
13/10/2019	11:50	Wedge-tailed Eagle	1	Air	Circling	200	2	Soaring	5.7
14/10/2019	10:09	Nankeen Kestrel	1	Air	Circling	20	6	Soaring, hovering, foraging	5.8
15/11/2019	16:04	Brown Falcon	1	Air, perched	Parallel to ridge	30	1	Powered, Resting	6.1
15/11/2019	16:22	Black-shouldered Kite	1	Air	Parallel to ridge	45	1	Powered	6.2
16/11/2019	8:36	Wedge-tailed Eagle	1	Air	Away	200	5	Soaring	6.3
17/11/2019	14:21	Nankeen Kestrel	1	Air	Away	10	3	Hovering, Soaring, Gliding	6.4
18/11/2019	8:46	Nankeen Kestrel	1	Air, perched, Air	Parallel to ridge	8	2	Hovering, Powered, Resting, Foraging, Resting	6.5
12/12/2019	10:45	Nankeen Kestrel	1	Perched	Parallel to ridge	10	3	Resting, Foraging, Powered Flight, Resting	7.1
13/12/2019	7:55	Nankeen Kestrel	1	Perched, Air	Away	10	15	Resting, Foraging, Gliding, Resting	7.2
13/12/2019	8:35	Peregrine Falcon	1	Air	Parallel to ridge	15	1	Powered Flight, Foraging	7.3
14/12/2019	12:29	Wedge-tailed Eagle	1	Air	Parallel to ridge, Away	150	4	Soaring, Gliding	7.4
15/12/2019	6:28	Brown Falcon	1	Perched	N/A	1.5	1	Resting	7.5
11/01/2020	10:42	Nankeen Kestrel	1	Air	Parallel to ridge	15	1	Powered Flight	8.1
12/03/2020	13:20	Wedge-tailed Eagle	1	Air	Away	250	1	Soaring	10.1
13/03/2020	13:23	Wedge-tailed Eagle	1	Air	Away	300	1	Soaring	10.2
29/03/2020	11:17	Brown Falcon	1	Perched, Air	Towards, Away	1.5	7	Resting, Powered, Resting, Powered, Resting	10.3
15/04/2020	8:55	Australian Hobby	1	Perched	Parallel to ridge	25	7	Powered Flight, Resting	11.1

15/04/2020	10:56	Wedge-tailed Eagle	1	Air	Parallel to ridge	10	1	Powered Flight	11.2
15/04/2020	11:15	Wedge-tailed Eagle	2	Air	Circling	180	4	Soaring	11.3
18/04/2020	15:35	Brown Falcon	1	Air	Away	20	1	Powered Flight	11.4
13/05/2020	6:52	Black Falcon	1	Perched, Air	Parallell to ridge	8	1	Resting, Powered	12.1
14/05/2020	11:08	Brown Falcon	1	Perched, Air	Away	18	3	Resting, Powered, Gliding	12.2
14/05/2020	13:34	Wedge-tailed Eagle	1	Air	Parallel to ridge	120	2	Soaring, Gliding	12.3
16/05/2020	11:23	Wedge-tailed Eagle	4	Air	Circling	50	7	Displaying	12.4
28/05/2020	13:50	Wedge-tailed Eagle	1	Air	Circling	180	4	Soaring	12.5
28/05/2020	14:45	Nankeen Kestrel	1	Air	Parallel to ridge	10	1	Powered Flight	12.6
29/05/2020	14:10	Brown Falcon	1	Air, Perched	Parallel to ridge	8	3	Powered Flight, Resting	12.7
10/06/2020	7:20	Australian Hobby	1	Perched	N/A	18	1	Resting	NA
11/06/2020	12:53	Wedge-tailed Eagle	2	Air	Circling	70	3	Soaring	NA
13/06/2020	11:52	Wedge-tailed Eagle	1	Air	Parallel to ridge	30	1	Gliding, Powered Flight	NA
8/07/2020	13:02	Wedge-tailed Eagle	2	Air	Circling	100	8	Soaring	NA
9/07/2020	13:34	Wedge-tailed Eagle	1	Air	Away	200	3	Soaring	NA
12/07/2020	9:15	Wedge-tailed Eagle	1	Perched, Air	Away	1	1	Resting, Powered	NA
9/09/2020	7:22	Nankeen Kestrel	1	Perched	Stationary	5	5	Foraging	16.1
13/09/2020	14:48	Nankeen Kestrel	1	Air	Away	10	5	Hovering, Foraging	16.2
15/09/2020	9:53	Wedge-tailed Eagle	1	Air	Toward, Away	50	2	Gliding	16.3
15/09/2020	13:00	Brown Falcon	1	Perched, Air	Parallel to ridge	4	2	Powered Flight, Foraging	16.4
7/10/2020	10:45	Wedge-tailed Eagle	2	Air	Circling, Away	40	30	Soaring, Gliding	17.1
9/10/2020	16:30	Nankeen Kestrel	2	Air	Circling, Away	60	4	Soaring, Powered Flight, Displaying	17.2
10/10/2020	9:15	Brown Falcon	1	Perched	N/A	6	3	Resting	17.3
10/10/2020	17:58	Brown Falcon	1	Perched, Air	Parallel to ridge, Away	6	3	Powered Flight, Foraging	17.4
3/11/2020	9:40	Brown Falcon	1	Perched	N/A	3	8	Resting	18.1
3/11/2020	8:05	Nankeen Kestrel	1	Perched, Air	N/A	5	3	Resting, Foraging, Powered Flight	18.2
3/11/2020	16:45	Wedge-tailed Eagle	2	Air	Circling, Away	40	5	Soaring	18.3
4/11/2020	15:43	Nankeen Kestrel	1	Perched	N/A	6	2	Resting	18.4
6/01/2021	15:15	Wedge-tailed Eagle	2	Air	Circling, Away	50	10	Soaring	19.1
6/01/2021	18:05	Brown Falcon	1	Air	Away	15	2	Powered Flight	19.2
19/01/2021	9:00	Nankeen Kestrel	1	Air	Toward, Away	23	3	Gliding, Powered Flight	20.1
21/01/2021	11:44	Nankeen Kestrel	1	Air	Circling, Parallel to ridge	12	1	Soaring	20.2
21/01/2021	11:45	Nankeen Kestrel	1	Air, Perched	Away	10	1	Powered Flight, Resting	20.3
22/01/2021	9:04	Black-shouldered Kite	1	Air	Toward, Away	15	1	Powered Flight	20.4
22/01/2021	11:35	Black-shouldered Kite	1	Air, Perched	Toward, Away	15	5	Soaring, Gliding, Powered Flight, Resting	20.5
22/01/2021	14:10	Black-shouldered Kite	1	Air, Perched	Circling	20	5	Powered Flight, Gliding, Resting	20.6
23/01/2021	12:35	Nankeen Kestrel	1	Air, Perched	Parallel to ridge, Away	10	3	Gliding, Powered Flight, Resting	20.7
09/02/21	10:30	Black-shouldered Kite	3	Perched	N/A	N/A	5	Resting	21.1
09/02/21	14:47	Wedge-tailed Eagle	1	Air	Circling	90	6	Soaring	21.2
10/02/21	13:03	Nankeen Kestrel	1	Air	Towards, Away	25	1	Powered Flight	21.3
10/02/21	19:10	Nankeen Kestrel	1	Air	Towards, Away	20	1	Powered Flight	21.4
12/02/21	8:55	Nankeen Kestrel	1	Air	Away	10	1	Powered Flight	21.5
12/02/21	12:17	Nankeen Kestrel	1	Air	Towards, Away	15	1	Powered Flight	21.6
12/02/21	17:54	Brown Falcon	1	Air	Parallel to ridge	20	1	Powered Flight	21.7
13/02/21	17:22	Wedge-tailed Eagle	1	Air	Circling	70	1	Soaring	21.8

13/02/21	17:56	Nankeen Kestrel	2	Air, Perched	Towards, Away	12	1	Powered Flight, Resting	21.9
17/02/21	11:22	Wedge-tailed Eagle	1	Air	Circling	75	1	Soaring	21.10
17/02/21	15:46	Brown Falcon	1	Air	Towards, Away	20	1	Powered Flight, Gliding	21.11
17/02/21	16:52	Nankeen Kestrel	1	Air	Towards, Away	30	1	Powered Flight	21.12
11/03/2021	15:43	Square-tailed Kite	1	Air	Circling, Away	150	1	Soaring	22.1
7/03/2021	16:11	Black-shouldered Kite	4	Air	Circling, Parallel with ridge	35	2	Soaring, Gliding, Powered Flight	22.2
11/03/2021	7:35	Nankeen Kestrel	5	Air	Parallel to ridge, Away	10	1	Gliding, Powered Flight	22.3
11/03/2021	7:42	Brown Falcon	1	Ground, Air	Parallel to ridge, Away	0	1	Resting, Powered Flight, Soaring, Gliding	22.4
12/03/2021	10:33	Brown Falcon	1	Perched	N/A	8	1	Resting	22.5
12/03/2021	12:53	Brown Falcon	1	Ground, Air	Away	0	1	Resting, Powered Flight, Gliding	22.6
16/04/2021	7:06	Nankeen Kestrel	1	Perched, Air	Away	10	1	Resting, Powered Flight	23.1
16/04/2021	8:54	Unknown bird spp.	1	Air	Circling, Away	10	1	Soaring, Gliding	23.2
16/04/2021	12:17	Nankeen Kestrel	1	Air	Away	10	1	Powered Flight, Gliding	23.3
16/04/2021	16:42	Nankeen Kestrel	1	Perched, Air	Away	9	1	Resting, Powered Flight	23.4
17/04/2021	8:01	Brown Falcon	2	Perched, Air	Away	6	1	Resting, Powered Flight	23.5
17/04/2021	14:55	Nankeen Kestrel	1	Air	Parallel to ridge	15	2	Hovering, Foraging, Powered Flight	23.6
17/04/2021	15:02	Brown Falcon	1	Air	Parallel to ridge	20	1	Gliding, Powered Flight	23.7
17/04/2021	16:12	Nankeen Kestrel	1	Air	Towards, Away	15	2	Hovering, Powered Flight	23.8
17/04/2021	16:53	Nankeen Kestrel	1	Perched, Air	Away, Parallel to ridge	4	1	Resting, Gliding, Powered Flight	23.9
17/04/2021	17:34	Nankeen Kestrel	1	Air	Away	12	1	Powered Flight, Gliding	23.10
18/04/2021	10:32	Brown Falcon	1	Air	Circling	45	2	Soaring	23.11
18/04/2021	10:57	Nankeen Kestrel	2	Air	Circling, Parallel to ridge	45	1	Soaring, Gliding, Powered Flight, Displaying	23.12
18/04/2021	12:23	Nankeen Kestrel	1	Air	Away	13	1	Powered Flight	23.13
18/04/2021	14:57	Nankeen Kestrel	1	Air	Away	11	1	Powered Flight	23.14
18/04/2021	15:15	Unknown bird spp.	1	Air	Away	45	1	Powered Flight, Gliding	23.15
18/04/2021	16:12	Nankeen Kestrel	1	Air	Away	11	1	Powered Flight, Gliding, Resting	23.16
18/04/2021	16:54	Brown Falcon	2	Air	Away	50	1	Gliding, Powered Flight	23.17
19/04/2021	8:40	Nankeen Kestrel	1	Air	Away	4	1	Powered Flight	23.18
19/04/2021	9:09	Nankeen Kestrel	1	Perched, Air	Away	7	1	Resting, Powered Flight	23.19
19/04/2021	9:15	Nankeen Kestrel	4	Ground, Air, Perched	Circling, Parallel to ridge	10	4	Resting, Soaring, Gliding, Powered Flight, Foraging	23.20
19/04/2021	9:54	Nankeen Kestrel	1	Air	Parallel to ridge	35	21	Powered Flight, Gliding	23.21
19/04/2021	9:59	Nankeen Kestrel	4	Air	Parallel to ridge	30	4	Powered Flight, Gliding	23.22
19/04/2021	10:19	Nankeen Kestrel	1	Air	Parallel to ridge	30	1	Powered Flight, Gliding	23.23
19/04/2021	10:28	Wedge-tailed Eagle	2	Air	Circling, Parallel to ridge	100	7	Powered Flight, Gliding, Soaring, Displaying	23.24
19/04/2021	10:28	Brown Falcon	1	Air	Circling, Parallel to ridge	100	7	Powered Flight, Gliding, Soaring, Displaying. Was attacking WTEs.	23.25
19/04/2021	16:59	Nankeen Kestrel	2	Air	Parallel to ridge	40	2	Powered Flight, Gliding	23.26
20/04/2021	9:28	Nankeen Kestrel	1	Air	Towards, Away	13	2	Powered Flight	23.27
20/04/2021	9:28	Black-shouldered Kite	1	Air	Towards, Away	13	2	Hovering, Foraging	23.28
20/04/2021	9:39	Nankeen Kestrel	1	Air	Parallel to ridge	30	1	Powered Flight, Gliding	23.29
20/04/2021	9:45	Nankeen Kestrel	1	Air	Away	10	1	Powered Flight, Gliding	23.30
20/04/2021	9:49	Nankeen Kestrel	1	Air	Away	10	1	Powered Flight, Gliding	23.31
20/04/2021	9:55	Nankeen Kestrel	1	Ground, Perched, Air	Away	5	1	Powered Flight	23.32
20/04/2021	11:33	Nankeen Kestrel	1	Air	Away	20	1	Powered Flight, Gliding	23.33
20/04/2021	14:51	Nankeen Kestrel	1	Air	Away	7	1	Resting, Powered Flight, Gliding	23.34

20/04/2021	14:59	Black-shouldered Kite	1	Air	Circling, Parallel to ridge	30	2	Hovering, Soaring	23.35
20/04/2021	15:21	Nankeen Kestrel	1	Perched, Air	Away	5	2	Powered Flight	23.36
20/04/2021	15:35	Nankeen Kestrel	1	Air	Circling, Away	12	1	Soaring, Gliding, Powered Flight	23.37
21/04/2021	9:14	Nankeen Kestrel	1	Air	Away	40	1	Powered Flight, Gliding	23.38
21/04/2021	10:24	Nankeen Kestrel	2	Air, Perched	Parallel to ridge	8	2	Powered Flight, Gliding, Resting	23.39
21/04/2021	15:31	Nankeen Kestrel	1	Air	Away	50	1	Powered Flight, Gliding	23.40
23/04/2021	7:53	Nankeen Kestrel	1	Air	Away	40	1	Powered Flight, Gliding	23.41
23/04/2021	9:02	Nankeen Kestrel	1	Air	Away	20	1	Powered Flight, Gliding	23.42
23/04/2021	10:56	Wedge-tailed Eagle	2	Air	Circling	100	2	Soaring	23.43
23/04/2021	11:16	Nankeen Kestrel	1	Air	Away	30	1	Powered Flight, Gliding	23.44
15/05/2021	8:21	Black-shouldered Kite	2	Air	Circling, Parallel to ridge	12	2	Soaring, Gliding, Hovering, Powered Flight, Displaying	24.1
15/05/2021	15:05	Nankeen Kestrel	1	Air	Towards, Away	2	2	Hovering, Powered Flight	24.2
15/05/2021	15:11	Nankeen Kestrel	1	Air	Away	20	1	Gliding, Powered Flight	24.3
15/05/2021	16:43	Nankeen Kestrel	2	Air	Away	15	2	Powered Flight, Hovering	24.4
15/05/2021	17:02	Nankeen Kestrel	3	Air	Towards, Away	8	2	Displaying, Powered Flight, Gliding	24.5
15/05/2021	17:06	Black-shouldered Kite	1	Air	Towards, Away	20	2	Hovering, Powered Flight	24.6
15/05/2021	17:21	Black-shouldered Kite	1	Air, Perched	Towards, Away	30	1	Powered Flight, Resting	24.7
16/05/2021	10:06	Nankeen Kestrel	1	Air	Towards, Away	5	1	Powered Flight	24.8
16/05/2021	11:43	Nankeen Kestrel	1	Air	Parallel to ridge	35	1	Hovering	24.9
16/05/2021	11:46	Nankeen Kestrel	1	Air	Parallel to ridge	8	1	Hovering	24.10
16/05/2021	11:51	Nankeen Kestrel	2	Air	Towards, Away	45	1	Displaying	24.11
16/05/2021	12:39	Nankeen Kestrel	2	Ground, Air	Parallel to ridge	11	1	Resting, Hovering, Foraging, Powered Flight	24.12
16/05/2021	12:41	Nankeen Kestrel	2	Ground, Air	Away	6	1	Resting, Powered Flight	24.13
16/05/2021	13:10	Nankeen Kestrel	1	Air	Away	40	1	Powered Flight	24.14
16/05/2021	14:11	Nankeen Kestrel	1	Air, Perched	Away	50	1	Gliding, Resting	24.15
16/05/2021	14:16	Nankeen Kestrel	1	Air, Perched	Away	5	1	Resting, Powered Flight	24.16
16/05/2021	14:19	Nankeen Kestrel	1	Ground, Air	Away	4	1	Resting, Powered Flight	24.17
16/05/2021	14:20	Nankeen Kestrel	1	Ground, Air	Away	4	1	Resting, Powered Flight	24.18
16/05/2021	14:28	Nankeen Kestrel	1	Perched, Air	Away	3	1	Resting, Powered Flight	24.19
16/05/2021	14:57	Brown Falcon	1	Air	Circling, Parallel to ridge	80	3	Gliding, Soaring, Powered Flight	24.20
16/05/2021	16:01	Nankeen Kestrel	1	Air	Away	7	1	Powered Flight	24.21
17/05/2021	8:21	Black-shouldered Kite	1	Air	Towards, Away	11	1	Powered Flight	24.22
17/05/2021	8:42	Nankeen Kestrel	1	Air, Perched	Away	4	1	Powered Flight, Resting	24.23
17/05/2021	14:52	Brown Falcon	1	Air	Away	18	3	Powered Flight, Gliding	24.24
17/05/2021	14:52	Nankeen Kestrel	1	Air	Away	18	3	Powered Flight, Gliding	24.25
17/05/2021	14:56	Nankeen Kestrel	3	Perched, Air	Towards, Away	15	2	Hovering, Displaying	24.26
18/05/2021	11:49	Nankeen Kestrel	1	Air	Away	20	1	Powered Flight	24.27
18/05/2021	15:31	Nankeen Kestrel	1	Perched, Air	Away	5	1	Resting, Powered Flight	24.28
19/05/2021	9:14	Nankeen Kestrel	1	Ground, Air	Away	2	1	Resting, Powered Flight, Gliding	24.29
19/05/2021	10:14	Australian Hobby	1	Perched, Air	Away	2	2	Resting, Powered Flight	24.30
19/05/2021	12:40	Nankeen Kestrel	2	Air	Circling	5	1	Hovering, Powered Flight, Gliding, Soaring	24.31
19/05/2021	14:27	Nankeen Kestrel	1	Air, Perched	Circling	5	3	Powered Flight, Hovering, Soaring, Resting	24.32
19/05/2021	15:35	Nankeen Kestrel	1	Ground, Air	Away	15	1	Hovering, Powered Flight	24.33
19/05/2021	15:37	Nankeen Kestrel	2	Ground, Air	Away	7	1	Resting, Powered Flight	24.34
19/05/2021	15:40	Nankeen Kestrel	1	Ground, Air	Away	12	1	Resting, Powered Flight	24.35

28/05/2021	10:25	Nankeen Kestrel	9	Air	Towards, Away	12	2	Powered Flight, Hovering	24.36
28/05/2021	10:29	Nankeen Kestrel	1	Air	Away	55	1	Powered Flight	24.37
28/05/2021	10:34	Nankeen Kestrel	7	Ground, Air	Away	15	2	Resting, Powered Flight	24.38
28/05/2021	13:25	Nankeen Kestrel	3	Ground, Air	Away, Circling	10	1	Resting, Powered Flight	24.39
28/05/2021	13:30	Nankeen Kestrel	4	Air	Away	10	1	Powered Flight	24.40
29/05/2021	13:06	Nankeen Kestrel	2	Ground, Air	Away	10	2	Powered Flight	24.41
30/05/2021	11:58	Nankeen Kestrel	4	Perched, Air	Away	50	2	Powered Flight	24.42
30/05/2021	14:09	Black-shouldered Kite	1	Air	Parallel to ridge	30	1	Hovering, Powered Flight	24.43
28/05/2021	10:31	Nankeen Kestrel	1	Air, Perched	Away	10	1	Powered Flight, Resting	24.44
28/05/2021	10:32	Nankeen Kestrel	1	Ground, Air	Away	10	1	Resting, Powered Flight	24.45
28/05/2021	10:41	Nankeen Kestrel	1	Perched	N/A. Did not fly.	N/A.	1	Resting	24.46
28/05/2021	10:42	Nankeen Kestrel	1	Air	Parallel to ridge	20	1	Powered Flight	24.47
28/05/2021	14:54	Nankeen Kestrel	1	Air	Circling, Parallel to ridge	30	1	Powered Flight, Gliding, Soaring	24.48
28/05/2021	16:09	Nankeen Kestrel	2	Air	Circling	10	1	Soaring	24.49
28/05/2021	16:10	Nankeen Kestrel	1	Air	Circling, Parallel to ridge	10	1	Soaring	24.50
29/05/2021	9:39	Nankeen Kestrel	1	Perched, Air	Away	10	1	Resting, Powered Flight	24.51
29/05/2021	9:42	Nankeen Kestrel	1	Ground, Air	Away	10	2	Resting, Powered Flight	24.52
29/05/2021	10:02	Nankeen Kestrel	1	Air, Perched	Towards, Away	10	3	Powered Flight, Resting	24.53
29/05/2021	10:53	Nankeen Kestrel	1	Air	Towards, Away	10	1	Powered Flight, Gliding	24.54
29/05/2021	15:15	Nankeen Kestrel	1	Air	Towards, Away	10	1	Powered Flight	24.55
30/05/2021	8:59	Nankeen Kestrel	1	Air, Perched	Away	10	1	Powered Flight, Resting	24.56
30/05/2021	14:21	Nankeen Kestrel	1	Air	Parallel to ridge	10	1	Powered Flight	24.57
30/05/2021	14:22	Nankeen Kestrel	1	Air	Parallel to ridge	10	1	Powered Flight	24.58
30/05/2021	14:22	Nankeen Kestrel	1	Air	Away	10	1	Powered Flight	24.59
30/05/2021	14:23	Nankeen Kestrel	1	Air	Towards, Away	10	1	Powered Flight	24.60

Appendix 5: Nankeen Kestrel flight paths

Figure 2A: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

Wind Farm boundary

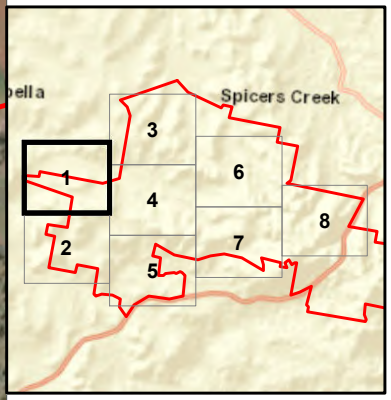
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel



N

Metres
0 200

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

OVERVIEW - Created by: - \\Nat-haw-dt04\e\GIS\2015 Jobs\15124\15124 Flight paths 200304.mxd

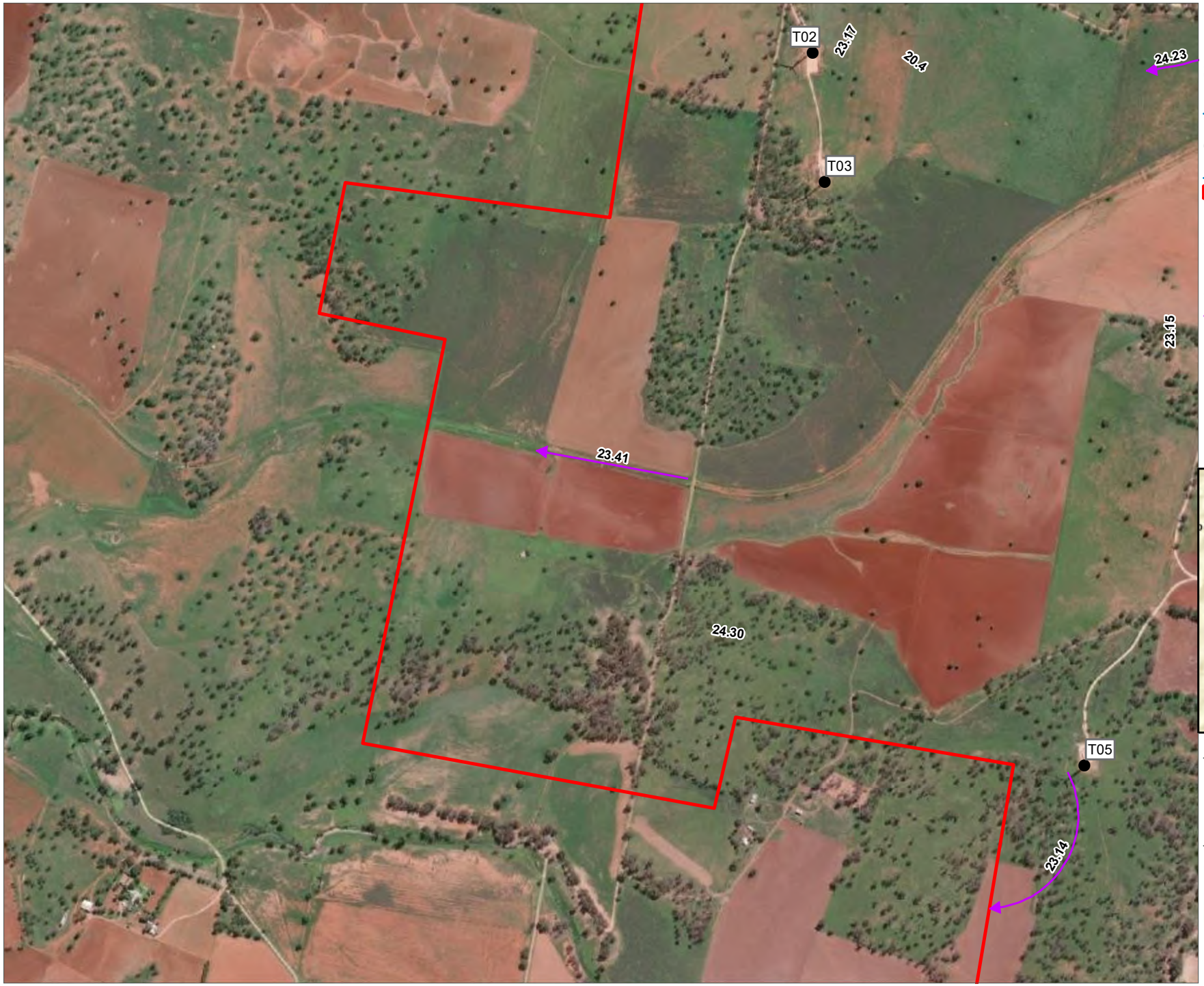


Figure 2B: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

Wind Farm boundary
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel

N

Metres
0 200

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OVERVIEW - Created by: - \\Nat-haw-dt04\e\GIS\2015 Jobs\15124\15124 Flight paths 200304.mxd

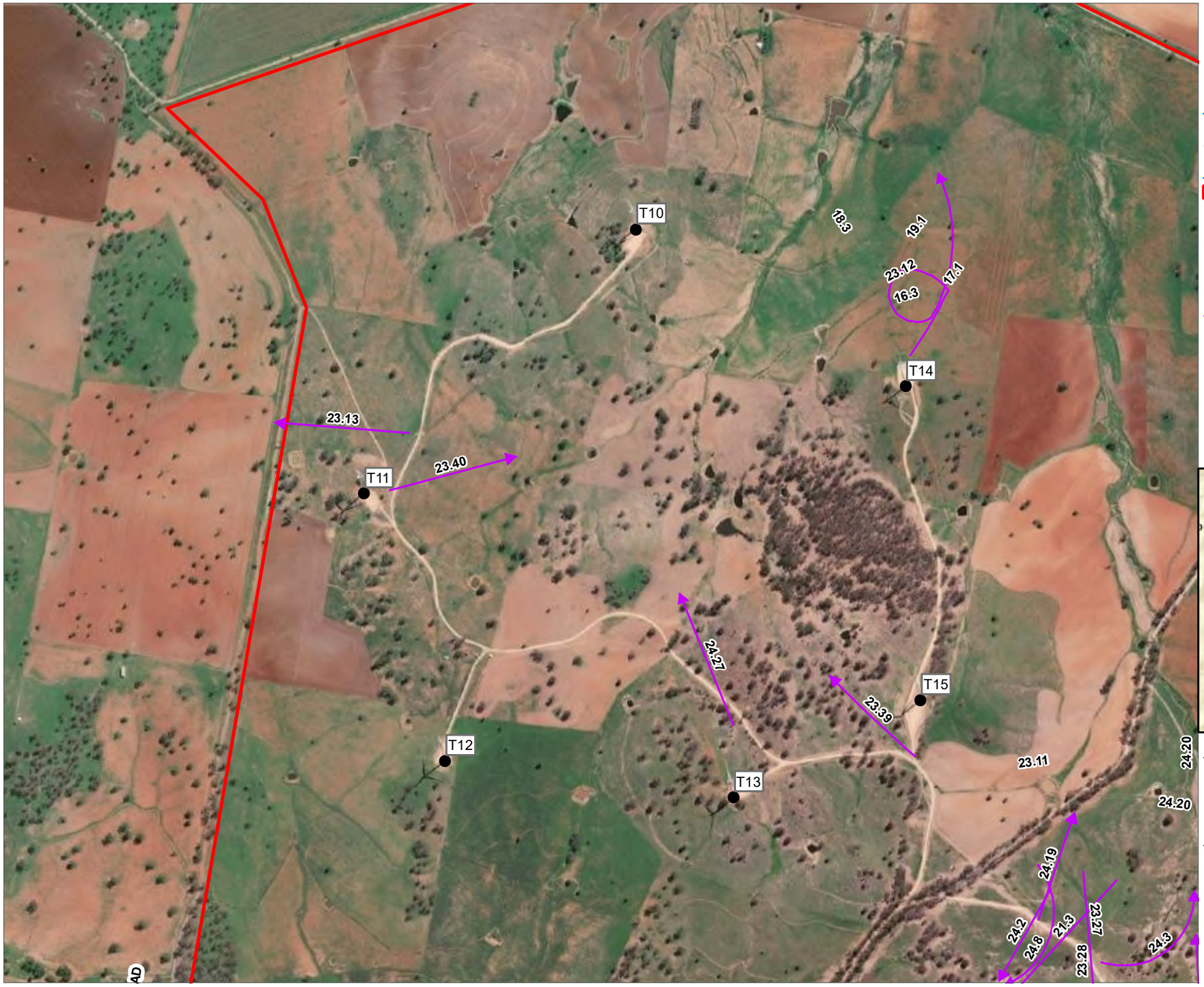


Figure 2C: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

Wind Farm boundary

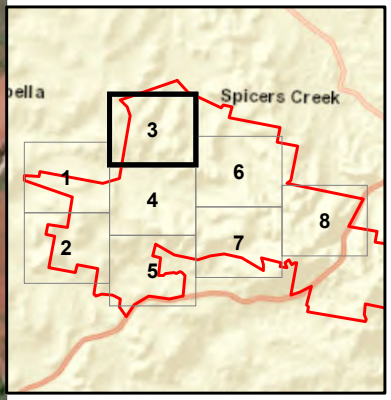
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel



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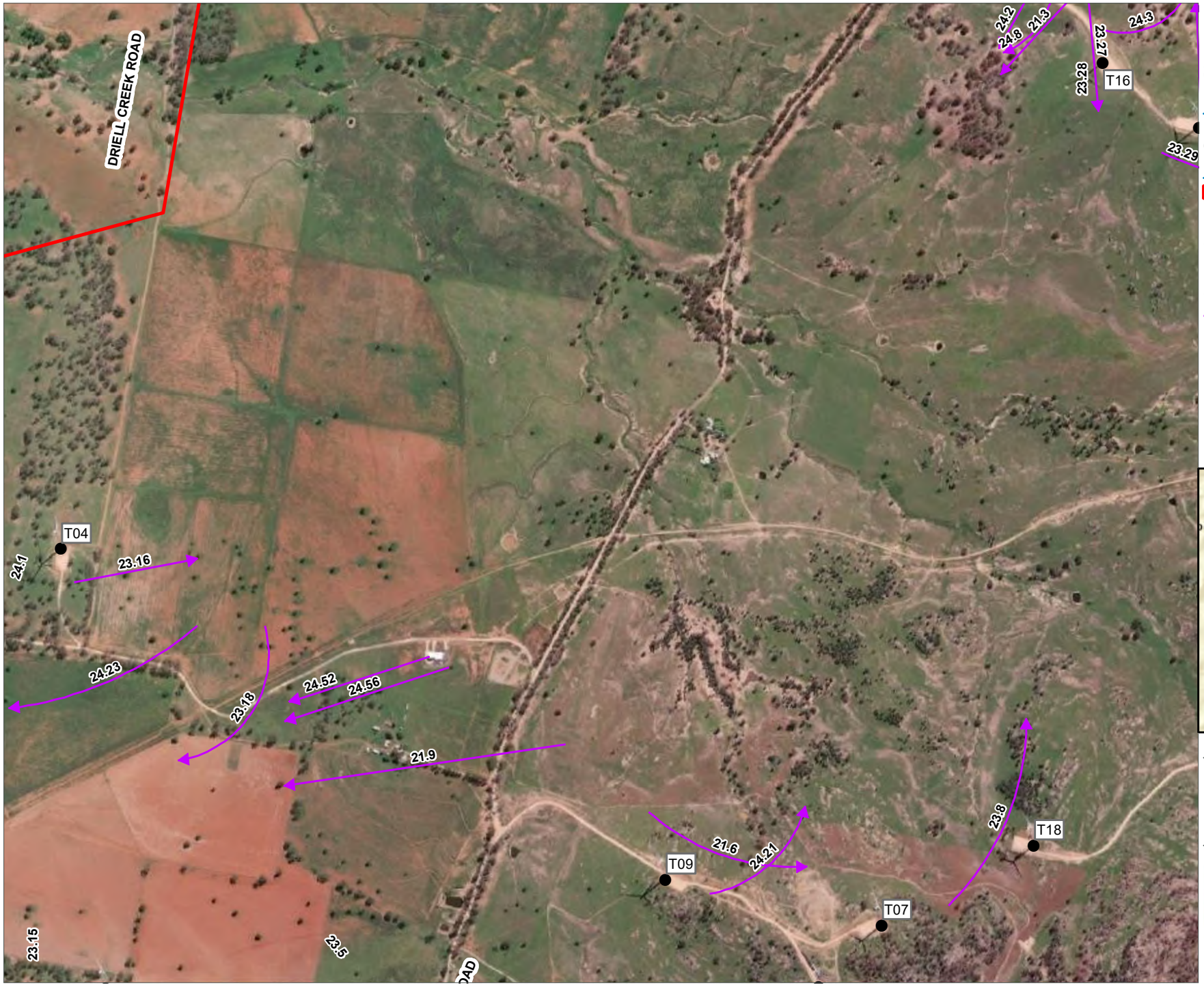


Figure 2D: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

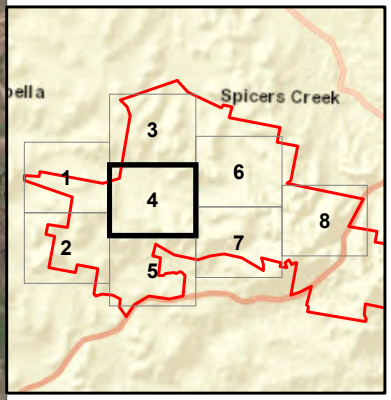
Wind Farm boundary
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel



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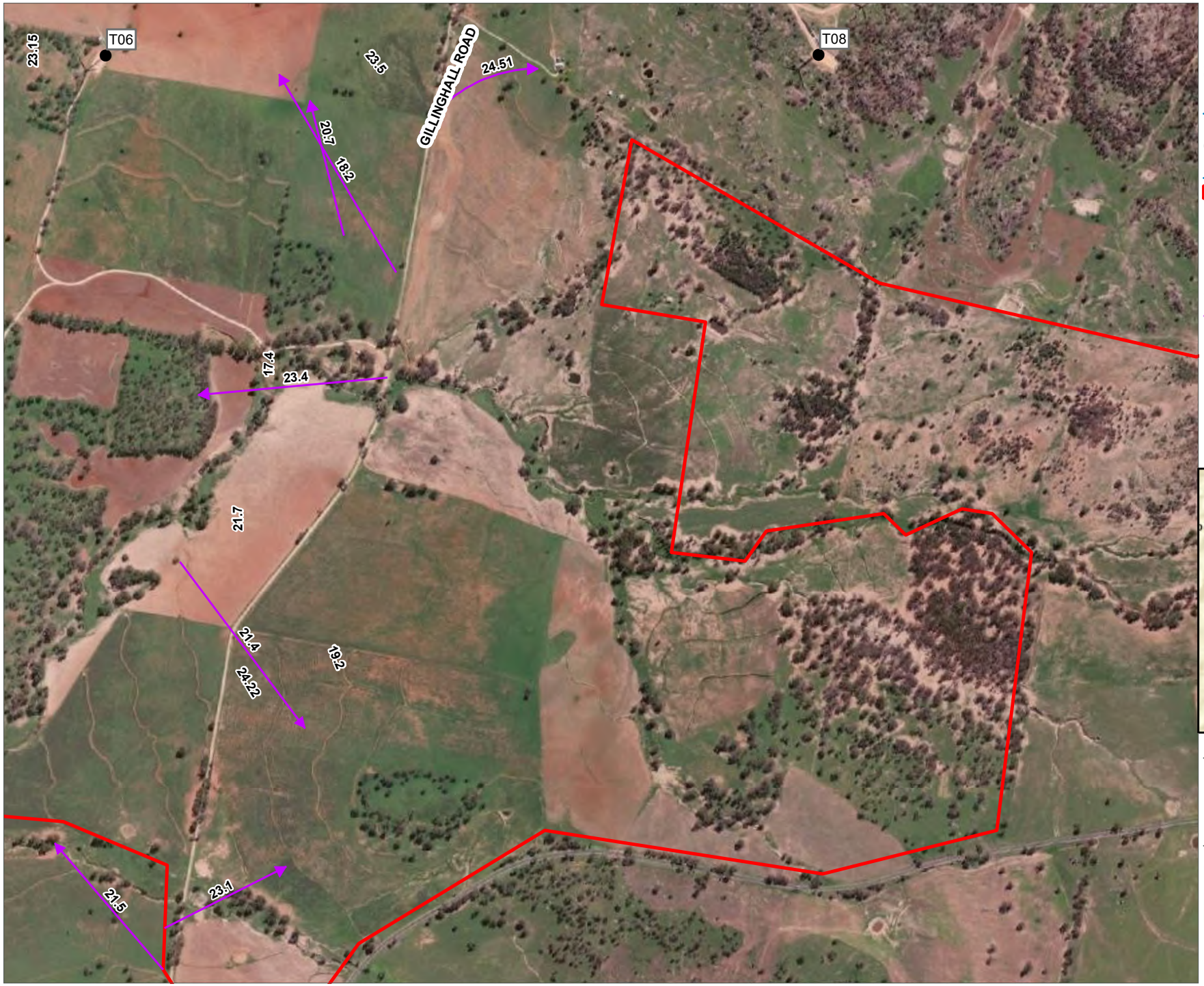


Figure 2E: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

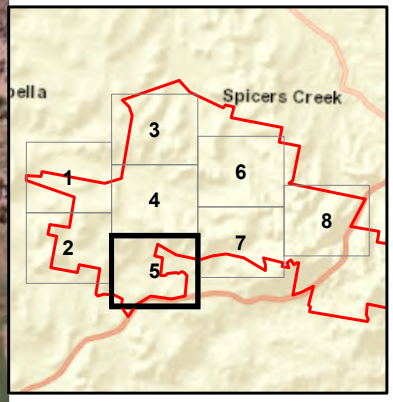
Wind Farm boundary
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel



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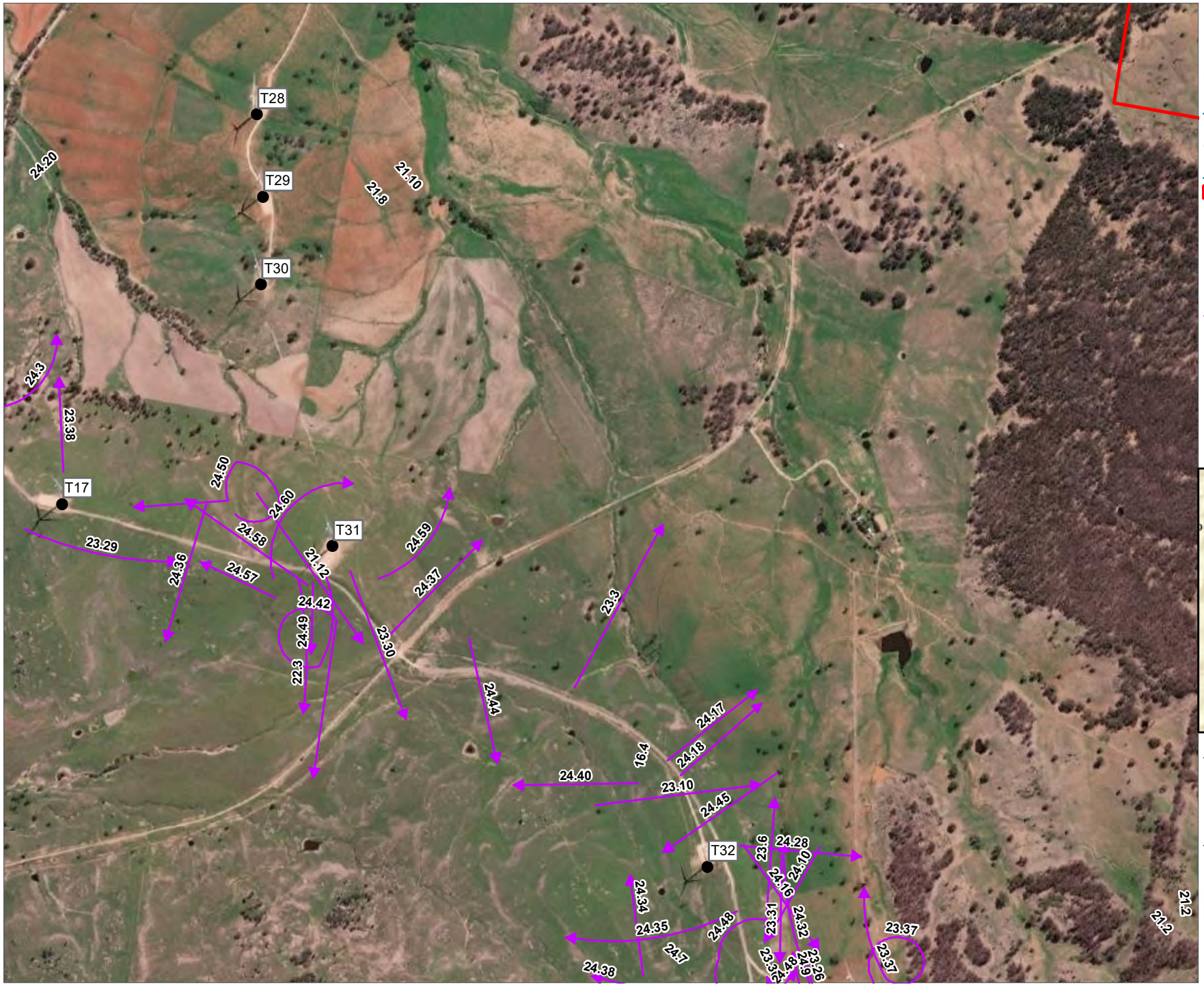


Figure 2F: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

Wind Farm boundary

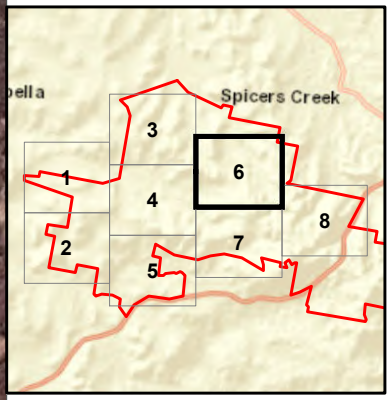
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel



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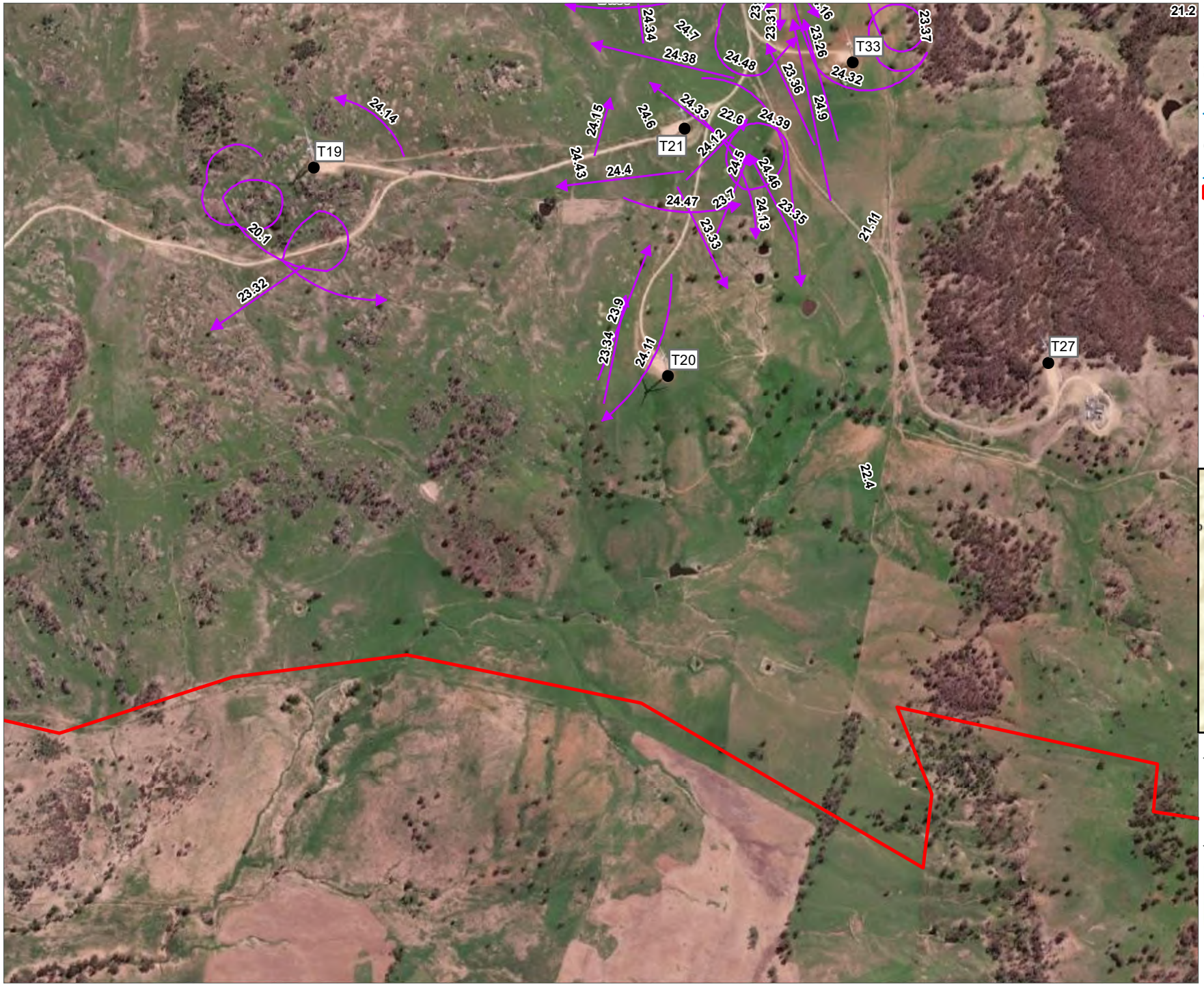

Figure 2G: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

Wind Farm boundary

Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel

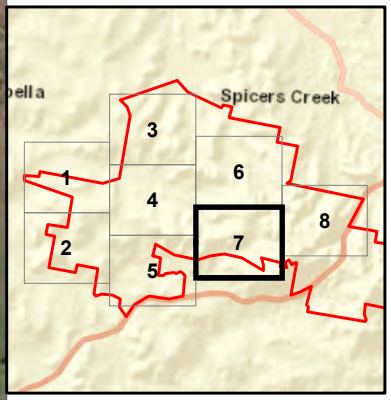

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Figure 2H: Nankeen Kestrel flight paths - September 2020 - May 2021

Project: Bodangora Wind Farm
Client: Infigen Energy
Date: 26/07/2021

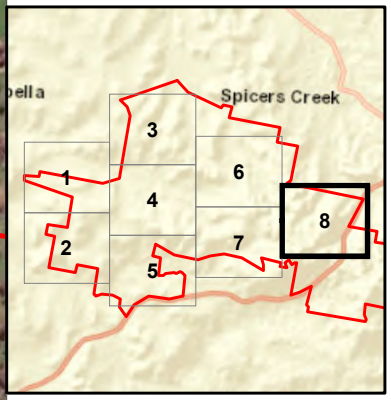
Wind Farm boundary
Turbines

Species - Perched

Nankeen Kestrel

Species - Flight path

Nankeen Kestrel



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