



# Sapphire Wind Farm

## Fourth Year Annual Report on the Implementation of the Bird and Bat Adaptive Management Plan

Prepared for Sapphire Wind Farm 1  
Operations Pty Ltd

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**Nature  
Advisory**

(Formerly Brett Lane & Associates Pty Ltd)

5/61-63 Camberwell Road  
Hawthorn East, VIC 3123  
PO Box 337, Camberwell VIC 3124  
(03) 9815 2111  
[www.natureadvisory.com.au](http://www.natureadvisory.com.au)

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# 1. Introduction

## 1.1. Project Background

Sapphire Wind Farm (SWF) is located in the Kings Plain District, 24 kilometres west of Glen Innes and 28 kilometres east of Inverell in the northern tablelands of New South Wales (NSW) (Figure 1). The site has been mostly cleared of its original native vegetation and is predominately being utilised for grazing. The wind farm currently comprises 75 turbines and associated infrastructure.

The history of the SWF commenced in 2007, with the proposition of a 159-turbine wind farm. Development applications were approved in June 2013 and December 2014 by the NSW Department of Planning and Environment (DPE) and the former Commonwealth Department of the Environment (DotE) (now Department of Climate Change, Energy, Environment and Water (DCCEEW) respectively. In January 2016, Sapphire Wind Farm Pty Ltd requested a modification to the approval to reduce the number of turbines from 159 to no more than 109 turbines whilst increasing the maximum tip height to 200 metres above the ground and rotor diameter to 126 metres. The DPE and the DotE approved the modification request in June 2016. The project completed construction in late 2018 with a refined design which involved the construction of 75 turbines at locations approved in the modification.

Condition C6 of the DPE approval required the preparation of a Bird and Bat Adaptive Management Program (BBAMP), these requirements have been outlined in the following section. Specifically, Condition C6(d) required the proponent to identify ‘at risk’ bird and bat groups, seasons and/or areas within the project site which may attract high levels of mortality. The BBAMP (BL&A 2017) was prepared by Brett Lane & Associates Pty Ltd, predecessor of Nature Advisory Pty Ltd and approved by the Director-General of DPE.

Sapphire Wind Farm Pty Ltd engaged Nature Advisory to implement the approved Bird and Bat Adaptive Management Plan (BBAMP) for the SWF. Specifically, the scope of the work included:

- Operational bird and bat carcass (mortality) monitoring program;
- Monitoring ‘at risk’ groups of birds; and
- Bird utilisation surveys.

## 1.2. Previous monitoring and recommendations

The first phase of the monitoring program began during the partial-operational phase in July 2018. In total, this comprised 31 months of monitoring and 24 months of fully operational surveys, concluding in January 2021. The second year of the monitoring program was conducted from February 2020 to January 2021, the second annual report (Nature Advisory 2021) for this period is summarised below:

No management triggers occurred during the monitoring program. The results from the monitoring program and the mortality estimates suggested it was unlikely that mortalities of any species identified at the site would significantly impact these populations on a state level, regional level or overall. The report acknowledged that Wedge-tailed Eagle (*Aquila audax*) (WTE), nominated as an ‘at risk species’ in the BBAMP, had higher observed mortalities relative to other bird species during the monitoring period. The report concluded that the carcass monitoring program to date had provided a sufficient baseline of the impacts SWF has on birds and bats and further carcass searches should not be required as part of ongoing BBAMP implementation. Future BBAMP implementation would include:

- Incidental monitoring of carcasses and feather spots continue to be reported;
- Inclusion of any incidental finds in annual reporting for the first five years of operation;

- Continuation of carrion removal, limiting lambing and stock feeding close to turbines;
- Integration a rabbit control program (as appropriate); and
- Annual reporting.

The third-year annual report (Nature Advisory 2022a) reported on the above activities during February 2021 to January 2022. One WTE carcass was reported as an incidental find and the report recommended the program continue as described above and, in addition; included the proposed Addendum described below.

### 1.3. Addendum to the BBAMP

The Biodiversity and Conservation Division (BCD), as the regulator to whom annual reporting is submitted under the BBAMP reporting obligations, provided response via letter on the 20<sup>th</sup> July 2021 to the second annual report on the requirements of the continued implementation of the BBAMP, and recommended that:

*“1. Carcass monitoring should continue at the Sapphire Wind Farm in accordance with the Bird and Bat Adaptive Management Plan.*

*2. Additional measures to mitigate bird and bat strike should be considered and documented in the Bird and Bat Adaptive Management Plan.*

*3. Trials of these additional impact mitigation measures should be implemented at the Sapphire Wind Farm, where appropriate, and presented in future monitoring reports along with the results of the carcass monitoring.”*

An Addendum to the BBAMP (Nature Advisory 2022b) was prepared (3<sup>rd</sup> of March 2022) in response to the BCD letter and received a response from BCD on the 22<sup>nd</sup> March 2022 supporting the proposed mitigation measures and monitoring suggestions. Approval was given by DPE for the addendum to officially form part of the BBAMP in November 2022.

The addendum provided an adaptive monitoring program targeting WTE, as a high-risk species, consisting of a search of all 75 turbines at SWF, searched at six monthly intervals, as opposed to the initial monthly carcass searches outlined in the BBAMP. One search will take place after the breeding period (generally Oct-Dec) after the young have fledged; the second search would take place six months after the first. The methods and justification for this modified regime are provided in Section 2 below. A WTE breeding and flight activity survey was also undertaken as part of the monitoring effort.

In line with SWF Project Approval Condition C6, ongoing information should be collated and included in reports submitted to the Director-General (now the Secretary of Planning) and OEH (now BCD) on an annual basis for the first five years of operation. This report comprises the fourth annual report, covering all monitoring activities during the fourth year of official operation of SWF from February 2022 and January 2023.

As per Section 4.7 of the BBAMP, and the Addendum, the fourth annual report includes, but is not limited to:

- A brief description of the management prescriptions implemented and identification of any modifications made to the original management practices.
- The survey methods (including list of observers, dates and times of observations);
- Results of carcass searches and incidental carcass observations;
- Identification of any unacceptable impacts or impact triggers, and application of the decision-making framework and relevant adaptive management measures.

- A summary of livestock carcass removal for the purposes of predator reduction;
- Details of any landowner feral animal control programs and their timing;
- A discussion of the results, including:
  - Whether indirect impacts on bird and bat use of the site are of significance at a regional, state or national level, or if species of concern have been affected.
  - Bird risk reduction measures.
  - Any further recommendations for reducing mortality, if necessary.
  - Whether the level of mortality was unacceptable for affected listed ('at risk') species of birds or bats.
  - Recommendations for further monitoring.

This report is divided into the following sections:

**Section 3** provides the methods of the fourth year of monitoring.

**Section 4** presents the results of the fourth year of monitoring.

**Section 5** discusses the conclusions of the fourth year of monitoring.

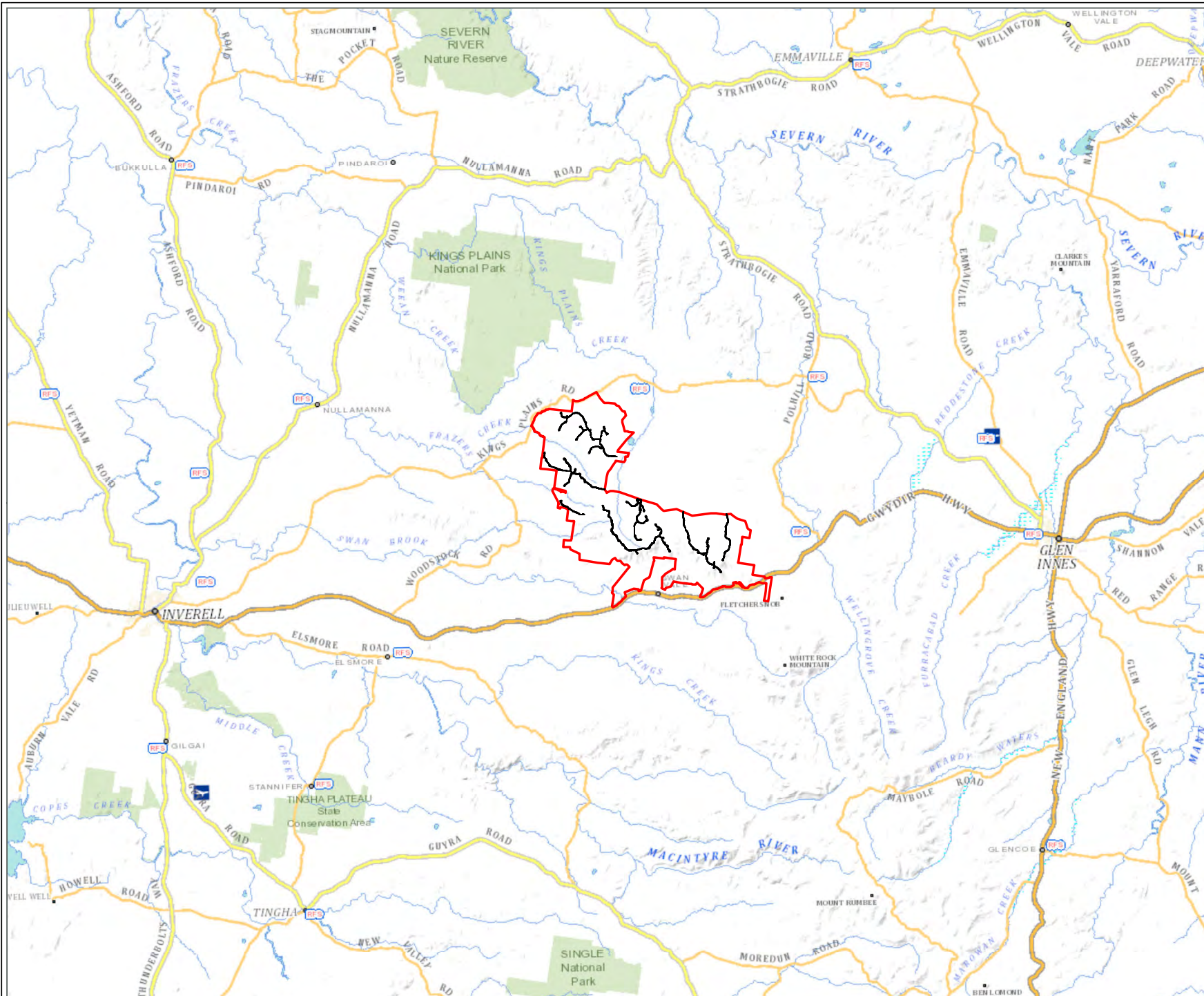
**Section 7** provides recommendations for future monitoring.

This investigation was undertaken by a team from Nature Advisory, comprising Divyang Rathod (Zoologist), Joshua Brown (Zoologist), Rachel Charles (Zoologist), Gavin Thomas (Senior Ecologist), Jackson Clerke (Senior Zoologist and Project Manager), and Bernard O'Callaghan (Director).

Figure 1: Locality map

Project: Sapphire Wind Farm BBAMP  
Client: CWP Renewables Pty Ltd  
Date: 23/03/2020

- Study area
- Turbines
- Access tracks



N



Kilometers  
0 5.5



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www.natureadvisory.com.au  
03 9815 2111 - info@natureadvisory.com.au

## 2. Methods

### 2.1. Carcass search program

During the initial operational carcass monitoring program under the BBAMP and outlined in Section 1, carcass searches were conducted at 18 selected turbines at monthly intervals, with repeated searches ("pulse searches") occurring at each of these turbines within three days of the monthly search, in order to detect any rapidly scavenged species.

No carcass searches were undertaken during year three and the Year Three Annual Report, in consultation with BCD regarding the yet to be approved addendum methods, recommended that only WTE carcass searches would be carried out at all 75 turbines with no follow up pulse searches. One search would take place in the months following the breeding period (generally Oct-Dec) after the young have fledged. The second search would take place six months after the first.

Monitoring of other bird species would be recorded via incidental carcass finds reported by the Wind Farm site personnel.

Symbolix (2020) assessed combined scavenger rate data across 10 wind farms in Victoria which showed that WTE carcasses can persist on average for 287 days, meaning that WTE are typically not scavenged. Based on this information, it is expected that WTE carcasses would remain in situ and be detected prior to complete decomposition by searching all turbines at six monthly intervals.

A modified search method was adopted to target WTE; a 100-metre-radius zone surrounding each designated turbine was searched at 12-meter intervals walked on foot by human searchers from the base of the turbine. Given the large size of WTE ensuring they have a very high detectability for searchers, smaller intervals or an inner search zone were not considered necessary. All mortalities of other species were also recorded.

During the six monthly carcass survey, mortalities were classed as either a bird carcass, a feather spot, or a bat carcass. If carcasses were found outside the scheduled search period (i.e., finds by wind farm personnel), these were recorded as an incidental find. It is likely that feather spots represent a bird that has collided with a turbine and has later been scavenged. When a dead bird or bat was recorded under a turbine, data from a pro-forma was collected (BBAMP, appendix 2), carcass numbered, and an in situ photograph of the carcass was taken.

On finding a bird carcass, feather-spot or bat carcass, the finder:

- Completed a casualty report;
- Removed it from the site to avoid re-counting; and
- Transferred fresh carcasses to a freezer at the site office for storage.

According to Section 6 of the BBAMP, an 'impact trigger' occurs when "*A threatened bird/bat species (or recognisable parts thereof) listed under the Commonwealth EPBC Act or NSW Threatened Species Conservation Act 1995, is found dead or injured under or close to a wind turbine during any mortality search or incidentally by wind farm personnel.*"

In this situation, an investigation must be started within 10 days of the find to determine the cause of the impact, the likelihood of re-occurrence, the most effective mitigation measures to be implemented (if needed) and if any additional species specific monitoring would be required.

In the case of non-threatened species carcass finds, an impact trigger is defined as:

*“A total of four or more bird or bat carcasses, or parts thereof, of the same species in two successive searches at the same turbine of a non-threatened species (excluding ravens, magpies, White Cockatoos, corellas, pipits and introduced species.*

Carcass searches were conducted by two zoologists from Nature Advisory between 23<sup>rd</sup> to the 30<sup>th</sup> of January 2023.

### Limitations

Given the amended BBAMP search regime was approved during November 2022, one 75 turbine search effort has been completed during this reporting period.

## 2.2. WTE activity and nest monitoring

Within the SWF boundary, WTE nest utilisation (including breeding activity) and general activity was assessed at SWF from 15<sup>th</sup> to the 18<sup>th</sup> of November, in accordance with the Year Three BBAMP recommendations and approved Addendum of November 2022.

WTE nests were searched in the treed habitat within the SWF boundary and identified via observing surrounding treed landscape from 20 vantage points and via transects walked through the large patches of woodland. Any nests identified were GPS located and will be monitored on an annual basis (with a review of monitoring requirements undertaken in each annual reporting) between October to December to record breeding activity and utilisation.

WTE activity within the WF boundary was assessed from 20 vantage points across the site from 15-18<sup>th</sup> November 2022 (Figure 2). The area surrounding the vantage points was surveyed (via binoculars once each for 15 minutes to observe the presence of any WTE and their activity at any nests.

Observations of WTE flights were plotted on a map and the following data recorded:

- Species,
- numbers,
- start and end time of observations,
- date,
- flight heights,
- location and
- behaviour.

## 2.3. Incidental raptor observations

Incidental observations of raptors occurred whilst moving throughout the SWF and during the six monthly carcass searches. These incidental observations were recorded and plotted on a map collecting the same data as outlined above.

## 2.4. Carrion removal program

Under the BBAMP, SWF is required to undertake carrion inspections and keep a log book of findings and actions undertaken to remove any deceased livestock from within 200 meters of turbines. The third annual report for BBAMP recommended revised risk reduction measures in regards to carrion removal:

Monthly inspections/searches by site personnel for any stock, introduced or native mammal and bird carcasses (to be recorded as incidental finds) that may attract raptors (e.g., kangaroo, pigs, goats, foxes, rabbits, dead stock). This search will be undertaken via vehicle and visual checks in addition to using



binoculars to look for large carcasses within 200 metres of each turbine. Results from inspections will be documented and the following information collected each month:

- Date of inspection,
- Person undertaking the inspection,
- Any carrion identified and location (e.g., Turbine ID),
- Any carrion still present from previous inspection,
- Action taken (e.g., consultation with landholders or removal of carrion)
- Pest animal activity or presence,
- Lambing activity (when applicable),
- Any incidental observations by landowners or SWF staff.

## 3. Results

### 3.1. Carcass search results

A total of eight carcasses were recorded under turbines during the fourth year of the post-construction monitoring period. Detailed information on search activity and carcass finds are kept on file by Nature Advisory and can be made available on request. Table 1 summarises the carcass find results.

No incidental mortalities were reported during the monitoring program.

#### 3.1.1. Limitations

Carcass searches were conducted across all 75 turbines. However, some searches were considered as “partial searches” due to steep, rocky, or otherwise dangerous terrain, along with barbed fencing, which presented high OHS risks to zoologists undertaking searches. Therefore, the full search radius of some turbines could not be safely completed.

Areas not able to be searched were checked visually from a safe vantage point for WTE carcasses. It is not expected that some partial searches would significantly impact the viability of the monitoring across 75 searches.

### 3.2. WTE activity and nest monitoring results

A total of six WTE observations were recorded during the survey, with a group of four individuals being recorded in a single observation. Flight heights ranged from 20 meters above the ground to 200 meters. One WTE nest was found to be active with a juvenile present (Figure 2). Another raptor nest was discovered; however, it was empty.

Geographically, WTE observations were recorded mostly around the southern section of the wind farm, particularly around the woodland adjacent to turbines numbered 63 through 73. This is to be expected as the active WTE nest was also observed in this area.

WTE observations are provided in Table 2 and observations and nest platform locations are provided in Figure 3.

### 3.3. Incidental raptor observations

Two species of raptor were recorded flying at the wind farm during the carcass monitoring period, these were WTE and Nankeen Kestrel. Most incidental observations were WTE with a maximum number observed at one time being two individuals. Flight height ranged from 20 meters to 130 meters. Data collected for each raptor flight path is presented in Table 3 and presented Figure 4.

### 3.4. Carrion removal program

No carrion removal has been reported.

Table 1: Carcass search results during year 4

Date	Common name	Scientific name	Turbine no.	Distance from turbine (m)	Carcass (C)/ Feather spot (FS)/ Incidental (INC)	Notes
25/01/2023	White-striped Free-tail bat	<i>Tadarida australis</i>	47	63	C.23.1.1	forearm = 6cm, deteriorated/damaged face, back, less than a week old
25/01/2023	Crimson Rosella	<i>Platycercus elegans</i>	48	10	FS.23.1.1	11cm feather, no body found
26/01/2023	Grey Teal	<i>Anas gracilis</i>	57	92	FS.23.1.2	feathery spot, no body
26/01/2023	Crested Pigeon	<i>Ocyphaps lophotes</i>	61	1	C.23.1.2	less than 12 hours old, adult, got hit at the back of the neck
26/01/2023	Crimson Rosella	<i>Platycercus elegans</i>	58	59	FS.23.1.3	around 10 feathers left, under eucalypt canopy
26/01/2023	Wedge-tailed Eagle	<i>Aquila audax</i>	58	74	C.23.1.3	many large wing clumps, 3 main clumps, bones, almost full size skull
26/01/2023	Crimson Rosella	<i>Platycercus elegans</i>	55	60	FS.23.1.4	found under eucalypt canopy
26/01/2023	Wedge-tailed Eagle	<i>Aquila audax</i>	28	60	C.23.1.4	more than 5 days old, feathers and intact bones present

Table 2: WTE activity observations

Observation number	Species	Scientific name	Date	Start time	Finish time	No. of birds	Flight height (m)	Min height (m)	Max height (m)	Flight direction	Flight behaviour	Comments
1	Wedge-tailed Eagle	<i>Aquila audax</i>	15/11/2022	14:18	14:21	2	160	160	400	SW	Soaring	2 adult birds in spiralling flight rising to 400 plus the drifting SE away from observer
2	Wedge-tailed Eagle	<i>Aquila audax</i>	16/11/2022	10:15	10:16	1	120	80	120	SE	Gliding	1st year bird.
3	Wedge-tailed Eagle	<i>Aquila audax</i>	16/11/2022	11:20	11:22	1	60	60	100	N	Gliding	1st year bird.
4	Wedge-tailed Eagle	<i>Aquila audax</i>	16/11/2022	12:08	12:08	4	200	160	400	W	Displaying	4 birds (2 pairs)
5	Wedge-tailed Eagle	<i>Aquila audax</i>	17/11/2022	12:45	12:45	2	100	80	220	SE	Soaring	2 birds soaring and circling before breaking out of thermal and heading SE
6	Wedge-tailed Eagle	<i>Aquila audax</i>	17/11/2022	14:05	14:05	1	400	400	600	E	Soaring	single bird in soaring flight



Figure 2: WTE active nest

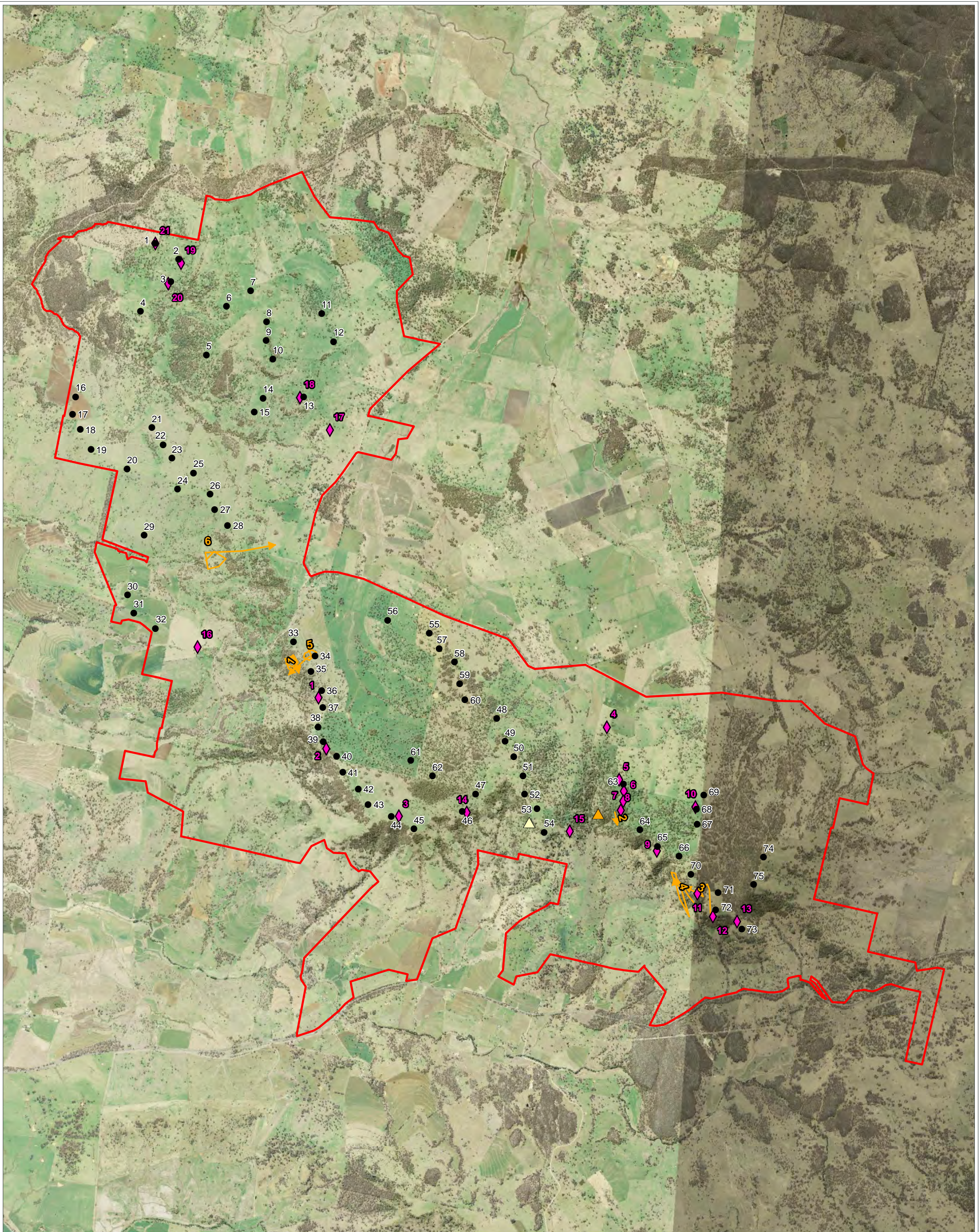
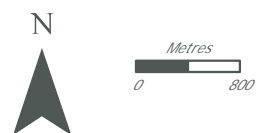


Figure 3: Wedge-tailed Eagle activity and nest observations

Project: *Sapphire Wind Farm* Client: *CWP Renewables Pty Ltd* Date: *24/02/2023*

- ▭ Study area
- Turbines
- ▲ Raptor platform
- ▲ WTE PTM
- WTE flight path
- ◆ WTE observation



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Table 3: Incidental raptor observations

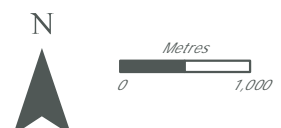
Species	Scientific name	Date	Start time	Finish time	No. of birds	Flight height (m)	Min height (m)	Max height (m)	Flight direction	Flight behaviour	Comments
Wedge-tailed Eagle	<i>Aquila audax</i>	24/01/2023	10:20	10:25	2	100	20	100	NE	Circling	Circling over valley, height range of +100m
Wedge-tailed Eagle	<i>Aquila audax</i>	25/01/2023	9:50	9:55	1	Perched	NA	NA	NA	Perched on tree and then soared away	Perched on dead tree
Wedge-tailed Eagle	<i>Aquila audax</i>	26/01/2023	12:07	12:11	2	100	80	100	SW	Circling	Height range of 80-100m
Wedge-tailed Eagle	<i>Aquila audax</i>	26/01/2023	12:35	12:50	2	120	120	130	NW	Soaring and circling	flown over plains, height range of 120-130m north of T59 flying NW
Nankeen Kestrel	<i>Falco cenchroides</i>	27/01/2023	15:27	15:30	1	40	30	50	NW	Flapping	flew next to electric wire, height range of 30-50m. North of T28 flying NW
Nankeen Kestrel	<i>Falco cenchroides</i>	28/01/2023	9:52	9:53	1	Perched	NA	NA	NA	Resting then took off	E of T2 resting on a log heard the car and took off



Figure 4: Wedge-tailed Eagle incidental observations

Project: *Sapphire Wind Farm* Client: *CWP Renewables Pty Ltd* Date: *23/02/2023*

- |                          |                            |
|--------------------------|----------------------------|
| Study area               | <b>Species</b>             |
| Turbines                 | Nankeen Kestrel            |
| BUS and reference points | Wedge-tailed Eagle         |
| Possible breeding area   | <b>Perched observation</b> |
| Raptor platform          | Nankeen Kestrel            |
| WTE PTM                  | Wedge-tailed Eagle         |



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## 4. Discussion

Years One and Two carcass monitoring results included two formal finds of WTE during targeted carcass searches and four incidental finds. Mortality estimates presented in the Year Two report also predicted an average potential impact, based on formal carcass search results, of approximately five mortalities during the first 12 months of monitoring and 12 during the second year of monitoring. Year Three incidental finds reported by SWF included one WTE mortality, and no formal WTE carcass finds.

Year Four monitoring results have included two WTE mortalities detected across one full carcass search of all 75 turbines and no incidental mortalities reported. The results obtained during the fourth year of monitoring appear consistent with the findings of the first three years of monitoring, and do not indicate an increase of impacts at SWF.

The notes on WTE carcass find “C.23.1.3” show that a skull and bones were present, indicating an advanced state of decomposition of the carcass. This supports the findings of Symbolix (2020) in that WTE carcasses remain in situ until decomposition, and supports the BBAMP addendums methods that such remains will be detectable during six monthly searches.

Three other bird species were identified during carcass searches: the Crimson Rosella, Grey Teal and Crested Pigeon. Only one bat carcass was found; the White-striped Free-tail bat. Each is a relatively common and widespread species to farmland landscapes in NSW and other parts of Australia, and the populations of each is considered secure and not in decline.

The observation of one active WTE nest indicates at least one resident pair of WTE utilising the site. Observations of four adult individuals simultaneously may indicate a second resident pair on, or in, the vicinity of SWF. This, in addition to the recorded flight paths, indicates a regular and continued use of the site by WTE for breeding and general activity. The majority of WTE observations tended to occur around the southern area of SWF, particularly around turbines numbered 63 through to 73, this is likely to be related to nesting occurring in the adjacent woodlands.

No carrion within 200m of a turbine has been reported or removed by SWF personnel. Considering turbine impacts on WTE remain largely the same thus far, it is unclear what effect the carrion removal program is having, or whether it is required. Without information on inspection frequency, numbers of carrion observed and the ability to remove them from near turbines, the effectiveness of a carrion removal program cannot be assessed for relevance or improvement. Recommendations are provided below.

Recommendations for a continued monitoring program into Year Five are provided below.



## 5. Recommendations

### 5.1. Carcass search program

Carcass monitoring will continue to be completed at all SWF turbines every six months (or twice a year) for an additional year (Year Five). All 75 turbines at SWF will be searched at 12-meter intervals to a radius of 100 meters with no follow up pulse searches completed.

During the period between the formal carcass searches, incidental carcass monitoring will continue to take place by wind farm personnel. Any bird or bat carcasses identified will be reported and recorded in accordance with Section 4.4.5 of the BBAMP.

Incidental monitoring of WTE flight paths will be undertaken during carcass searches by zoologists collecting the same data as outlined in Section 2.2. Observations will contribute to monitoring site usage and WTE numbers.

### 5.2. WTE activity and nest monitoring

A WTE nest and activity survey will be undertaken during Year Five at SWF during October – December 2023 to monitor breeding activity at the active WTE nest identified. Searches will also be conducted for additional potential nests throughout the site. Nest searches will also include observations of WTE flights and activity recorded and plotted on maps capturing the data outlined in the methodology section 2.2.

The nests identified during this search will be recorded and monitored on an annual basis during October to December to record breeding activity and utilisation. The intention of this monitoring is to monitor utilisation for breeding purposes and utilisation in general. The need for continued monitoring of WTE will be reviewed in annual reporting and in consultation with BCD.

Increased or decreased breeding activity or site utilisation may provide additional insight into the impacts of SWF on WTE and the effectiveness of revised risk reduction measures, outlined below.

### 5.3. Revised risk reduction measures

The approved addendum to the BBAMP (Nature Advisory 2022b) provides revised mitigation measures to improve the implementation of the previous BBAMP measures and enable assessment and review in annual reporting. These are reiterated below and are the responsibility of SWF to implement and record.

The aim of the revised program is to track implementation of mitigation measures at SWF and their outcomes and then assess this against the findings of the revised monitoring program and potential impacts on WTE throughout the operation of SWF.

Land-use and stock management underneath and around turbines can influence the presence and behaviour of native birds on site. Examples include:

- Grain feeding can be an “attractant” for parrots; and
- Carrion and rabbits can be an “attractant” to raptors in the area.

Thus, this section proposes possible mitigation measures to address these matters.

A moderate risk to WTE has been identified for SWF in the BBAMP. The WTE and other raptors forage for carrion (dead and decaying flesh of an animal) and also on small mammals, rabbits etc. In order to reduce the risk of raptors colliding with turbines, a formalised carrion monitoring and removal program will be implemented during operations. This will reduce the attractiveness of the site to raptors (specifically WTE) and therefore reduce the potential for fatal collisions by this group of birds. This program will focus on an

area of a minimum of 200 metres around turbines, where safe, feasible and practical. The procedures below will be adopted:

- The SWF Site Manager has been appointed to perform the function of Carrion Removal Coordinator who will undertake the activities described below. In the event the SWF Site Manager is not available, an alternative suitable person will be appointed to undertake this function.
  - Monthly inspections of the wind farm site to search for any stock, introduced or native mammal and bird carcasses (to be recorded as incidental finds) that may attract raptors (e.g., kangaroo, pigs, goats, foxes, rabbits, dead stock). This search will be undertaken via vehicle and visual checks in addition to using binoculars to look for large carcasses within 200 metres of each turbine. Results from inspections will be documented and the following information collected each month:
    - Date of inspection,
    - Person undertaking the inspection,
    - Any carrion identified and location (e.g., Turbine ID),
    - Any carrion still present from previous inspection,
    - Action taken (e.g., consultation with landholders or removal of carrion)
    - Pest animal activity or presence,
    - Lambing activity (when applicable),
    - Any incidental observations by landowners or SWF staff.
  - Additional, opportunistic observations by operators during normal inspections and work routines and by landowners as they travel around their properties provides further opportunity to identify and report carcasses of stock or feral animals so that timely collection can be undertaken to remove them. This can be address by operator and landowner protocols and information included in monthly inspection data.
  - Any carcasses and/or remains found that are within 200 metres of turbines, will be collected and disposed of as soon as possible, in a manner that will avoid attracting raptors close to turbines. If a carcass is not removed, its visibility during the next monthly inspection should be recorded.
  - Consultation with landowner or wind farm staff in relation to the appropriate disposal of collected carrion. This is to be disposed of at least 200 metres away from the closest turbine. Results of consultations will be logged and the locations of any carrion dumps (active or planned) to be noted. This can be assessed against any potential WTE mortality locations.
  - Carcass occurrence and removal will be recorded in monthly inspection records maintained by SWF Project Manager.
- During lambing season (usually late autumn/winder) young lambs are susceptible to death. Therefore, if possible and subject to agreement of landowners, lambing will be restricted to paddocks at least 200 metres away from turbines, where practicable, to reduce the risk that raptors (WTE in particular) are attracted close to the turbines.
- A consultation log with landholders will be maintained and used to inform ongoing success of mitigation measures. Consultation with landholders to be undertaken requesting that they keep

lambling to paddocks without access to turbines where possible. Locations of lambling activity will be recorded during monthly inspections and mapped to reflect actual land use activity during WF operation. This can be compared with any potential WTE mortality identified during carcass searches.

- In order to reduce collision risks to birds, where practical and with landowner agreement, the practice of grain feeding of stock within 200 metres of turbines should be minimised as it could cause draw additional parrots and other birds to the site.
- Any feral animal control on the wind farm site should involve the removal and appropriate disposal of resulting carcasses in a timely manner.
- If a large active presence of rabbits is observed during monthly inspections near turbines, subject to landholder approval, an integrated rabbit control program (to reduce site attractiveness to WTE) will be completed within 200 metres of turbines. Methods to control rabbits include burrow destruction and shooting. Any rabbit control program will require cooperation and agreement from the landowner.
- Monthly inspection data, actual land use and land holder consultations covering the requirements above, will be reported on in accordance with the BBAMP reporting requirements and provided to BCD in annual reporting.

Using the information collected above, the efficacy of the mitigation measures implemented will also be assessed annually. This will include an assessment of WTE carcass search data and site utilisation data against: carrion occurrence rates, removal requests, removal undertaken and actual land use (lambling and carrion dump locations)

The program will be reviewed in accordance with the BBAMP reporting requirements. If, for example, WTE mortality increases annually when compared to the initial 24-month operational monitoring period, then the need for continuation, refinement or additional mitigation measures will be discussed, in consultation with BCD/DPIE.

#### 5.4. Reporting

Findings of the revised monitoring program will be reported in the 5<sup>th</sup> year Annual Report, at this time any further recommendations for amendments will be made in consultation with BCD.

## 6. References

- Brett Lane & Associates (BL&A) 2017, *Sapphire Wind Farm Bird and Bat Adaptive Management Program*. Prepared for CWP Renewables Pty Ltd. Report No. 16045 (3.3),
- Hull, CL & Muir, S 2010, Search areas for monitoring bird and bat carcasses at wind farms using a Monte-Carlo method, *Austr. J. Env. Management* 17:77-87.
- Nature Advisory, 2021. Second Year Annual Report of the Implementation of the Bird and Bat Adaptive Management Plan. Prepared for SWF1 Operations Pty Ltd. June 2021. Report No. 16045 (26.1).
- Nature Advisory, 2022a. Third Year Annual Report of the Implementation of the Bird and Bat Adaptive Management Plan. Prepared for SWF1 Operations Pty Ltd. March 2022. Report No. 16045 (28.1).
- Nature Advisory, 2022b. Addendum to Bird and Bat Adaptive Management Plan. Prepared for CWP Renewables Pty Ltd. Report No. 16045.8 (3.3)
- Symbolix, 2020. Post construction bird and bat monitoring at wind farms in Victoria (2020). 13<sup>th</sup> Wildlife Research Meeting 2020.