Willatook Wind Farm

Minister's Assessment under Environment Effects Act 1978

JULY 2023

Acknowledgement


The Victorian Government acknowledges Aboriginal and Torres Strait Islander people as the Traditional Custodians of the land and acknowledges and pays respect to their Elders, past and present.

List of abbreviations

BBAM Plan	bird and bat adaptive management plan
BSW	Barwon South West
CFA	Country Fire Authority
CHMP	cultural heritage management plan
CRM	collision risk modelling
dB	decibels
dB(A)	a-weighted decibels
dBL	decibels (linear peak)
DEECA	Department of Energy, Environment and Climate Action
DELWP	Department of Environment, Land, Water and Planning
Draft Standards	Draft Brolga Assessment and Mitigation Standards for wind energy facility permit applications
DTP	Department of Transport and Planning
EES	environment effects statement
EMF	environmental management framework
EMI	electromagnetic interference
EMM	environmental management measures
EPA	Environment Protection Authority (Vic)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EP Regulations	Environment Protection Regulations 2021
ERR	Earth Resources Regulation
Eurobat Guidelines	Eurobats Publication Series No.6 Guidelines for consideration of bats in wind farm projects – Revision 2014
EVC	ecological vegetation class
FFG Act	*Flora and Fauna Guarantee Act 1988* (Vic)
GDE	groundwater dependent ecosystem
ha	hectares
IAP	inquiry and panel
Interim Guidelines	Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011 (Revision 1, February 2012)
km	kilometres
L_{A90}	a-weighted sound level just exceeded for 90% of the measurement period
L_{Aeq}	a-weighted equivalent continuous sound level

L_{Amax}	a-weighted maximum sound level during a measurement period
m	metres
m/s	metres per second
m^3	cubic metres
mg/L	milligrams per litre
ML	megalitres
mm/s	millimetres per second
MNES	matters of national environmental significance
MRSD Act	*Mineral Resources (Sustainable Development) Act 1990* (Vic)
NZ Standard	NZS 6808:2010 New Zealand Standard *Acoustics – Wind Farm Noise*
PVA	population viability analysis
RAP	registered Aboriginal party
SAC	special audible characteristic
TDS	total dissolved solids
The project	Willatook Wind Farm
Wind Prospect	Wind Prospect Pty Ltd (the proponent)

Contents

Executive summary

On 27 December 2018, following receipt of a referral from Wind Prospect Pty Ltd, the Minister for Planning decided that under the *Environment Effects Act 1978* an environment effects statement (EES) was required for the Willatook Wind Farm Project. Wind Prospect prepared an EES, which the Minister authorised for public exhibition. The EES was exhibited for public comment from 4 July to 12 August 2022.

On 12 August 2022, the Minister for Planning appointed an inquiry to consider the project's environmental effects. The inquiry was also appointed as a panel under the *Planning and Environment Act 1987* to consider the planning permit applications and related submissions. Planning Panels Victoria received 67 submissions on the exhibited EES and 47 submissions on the planning permit applications. The inquiry and panel (IAP) held a public hearing over 15 days between 11 October and 7 November 2022. The IAP provided its report to me on 16 January 2023. The IAP's report, EES, submissions and documents tabled at the hearing, have informed the preparation of my assessment of the environmental effects of the project, as set out within this document. My assessment will be considered by statutory decision makers as they contemplate the project's approvals.

The project is a controlled action under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential impacts on matters of national environmental significance (MNES). As the EES is an accredited assessment for the EPBC Act, my assessment examines impacts on MNES and will be provided to the Commonwealth Minister for the Environment and Water to inform their decision about whether and under what conditions EPBC Act approval should be granted.

I support the IAP's findings that the project, as proposed in the EES has the potential for unacceptable residual impacts on listed threatened species, specifically Brolga and Southern Bent-wing Bat, as it does not sufficiently buffer wetlands and other habitat in the project area. Therefore, I support the IAP's recommendations for modifying the project and strengthening Wind Prospect's proposed avoidance and management measures, to reduce the project's potential environmental effects to an acceptable level. It is my assessment the project can proceed with acceptable environmental effects, providing the modifications recommended herein are implemented together (section 5) with environmental management measures (EMMs) consistent with those endorsed by the IAP and as refined through this assessment. In particular, the turbine-free buffers for Brolga and Southern Bent-wing Bat need to be increased and revised buffers should be mapped, in consultation with the Department of Energy, Environment and Climate Action (DEECA), before amended development plans are submitted to me as responsible authority for approval.

I acknowledge the revised buffers will substantially reduce the number of turbines within the proposed wind farm footprint and that these modifications may affect the project's energy generation. However, while the transition to renewable energy generation is an important policy and legislative priority for Victoria, projects need to be balanced with the protection of declining biodiversity values, which is also a priority and legislative requirement.

Our understanding of affected species' behaviour and the potential impacts to them from wind farms will continue to evolve over the life of the project. Therefore, an adaptive management approach to mitigation over the life of the project should build on Wind Prospect's inclusion of low wind speed curtailment in their proposed bird and bat adaptive management plan with my recommendations to further mitigate potential impacts on Southern Bent-wing Bat. Moreover, to further avoid and minimise impacts to Brolga during construction, I support the IAP's recommendation for a construction moratorium during the Brolga breeding season from July to November (inclusive).

I also note the residual impacts on the EPBC Act listed ecological community, Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains are likely to be significant. However, as the residual impacts on this community are proposed to be offset in accordance with the EPBC Act *Environmental Offsets Policy*, I am confident that my recommended EMMs and the required approvals (see Appendix B) will assist in avoiding and minimising impacts on MNES.

My conclusions and recommendations are informed by the work of the IAP that was appointed by the former Minister for Planning to inquire into, and report on, the environmental effects of the project and the planning permit applications prepared for the project. I have been greatly assisted in this assessment by the efforts of the IAP, its report, the various parties who made submissions to the IAP and gave evidence in its hearings, and the work of my department.

1 Introduction

On 5 October 2018, Wind Prospect Pty. Ltd. referred the Willatook Wind Farm Project to the Minister for Planning for a decision on the need for an environment effects statement (EES). On 27 December 2018, the Minister decided that an EES was required for the project. Wind Prospect prepared an EES, which was publicly exhibited from 4 July to 12 August 2022.

The Minister for Planning appointed a joint inquiry and planning permit application panel (IAP) on 12 August 2022 to consider the EES and the planning permit applications. Planning Panels Victoria received 67 submissions on the exhibited EES, and 47 submissions were received on the planning permit applications. The IAP held a public hearing over 15 days between 11 October and 7 November 2022. A total of 243 documents were tabled at the hearing. The IAP provided its report to me on 16 January 2023. The report, along with the EES, its supporting technical reports, public submissions, tabled documents and relevant legislation, policy and guidelines have informed my assessment of the environmental effects of the project under the *Environment Effects Act 1978*.

1.1 Purpose of this document

This document constitutes my assessment of the environmental effects of the project under the *Environment Effects Act 1978*. This assessment represents the final step in the EES process and provides authoritative advice to decision-makers, Wind Prospect and all other stakeholders on the likely environmental effects of the project, their acceptability and how the effects are best addressed in relevant statutory decisions and the delivery of the project.

This assessment will inform the decisions required under Victorian law for the proposal to proceed. The EES process is accredited for the assessment purposes of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). My assessment will also inform the decision to be made by the Commonwealth Minister for the Environment and Water under the EPBC Act about whether, and under what conditions, the project will be approved.

1.2 Structure of the assessment

The structure of my assessment is as follows:

- Chapter 2 provides a brief description of the project;
- Chapter 3 refers to key relevant Acts;
- Chapter 4 summarises the project's proposed planning controls, environmental management framework (EMF) and other post-approval governance arrangements;
- Chapter 5 assesses the environmental effects of the project in relation to the evaluation objectives by environmental discipline;
- Chapter 6 presents my conclusions, including responses to the recommendations of the IAP;
- Appendix A contains my recommendations about the proposed environmental management measures (EMMs); and
- Appendix B contains a consolidated assessment of impacts on matters of national environmental significance.

2 Project Description

Wind Prospect proposes to construct a wind energy facility near Orford in southwest Victoria (Figure 1). The EES described the project as the construction, operation and decommissioning of the following components:

- up to 59 wind energy turbines (maximum blade tip height of 250 m, minimum clearance between the blade tips and the ground of 40 m and rotor swept area in the order of 190 m in diameter) to be mounted on towers up to 170 m high;
- an on-site electricity substation;
- a battery;
- up to three permanent meteorological masts;
- approximately 300 m of above ground power lines connecting the substation to the existing Tarrone Terminal Station;
- approximately 112 km of underground power lines connecting the turbines to the on-site substation;
- approximately 60 km of internal access tracks;
- a temporary quarry for the production of crushed rock products required during the construction phase of the project;
- an operations and maintenance building;
- temporary construction infrastructure including construction compounds, concrete batching plants, hardstand and laydown areas associated with each turbine;
- works on public roads as required to enable the road transport of project components, including turbine blades to the site; and
- ancillary facilities for the operation of the wind farm.

Subject to approvals and project financing, works for Willatook Wind Farm would commence in 2024 with operations commencing in approximately 2026.

The project has a total area of over 4,000 ha with an estimated construction footprint of about 222 ha. About 122 ha of the construction footprint is proposed to be rehabilitated once construction is complete.

The current land use —agriculture and rural residential living— will persist following construction and commissioning of the wind farm. Wind Prospect will not acquire the land, rather it will negotiate commercial agreements with landholders hosting turbines.

The project is described in more detail in Chapter 5 of the EES.

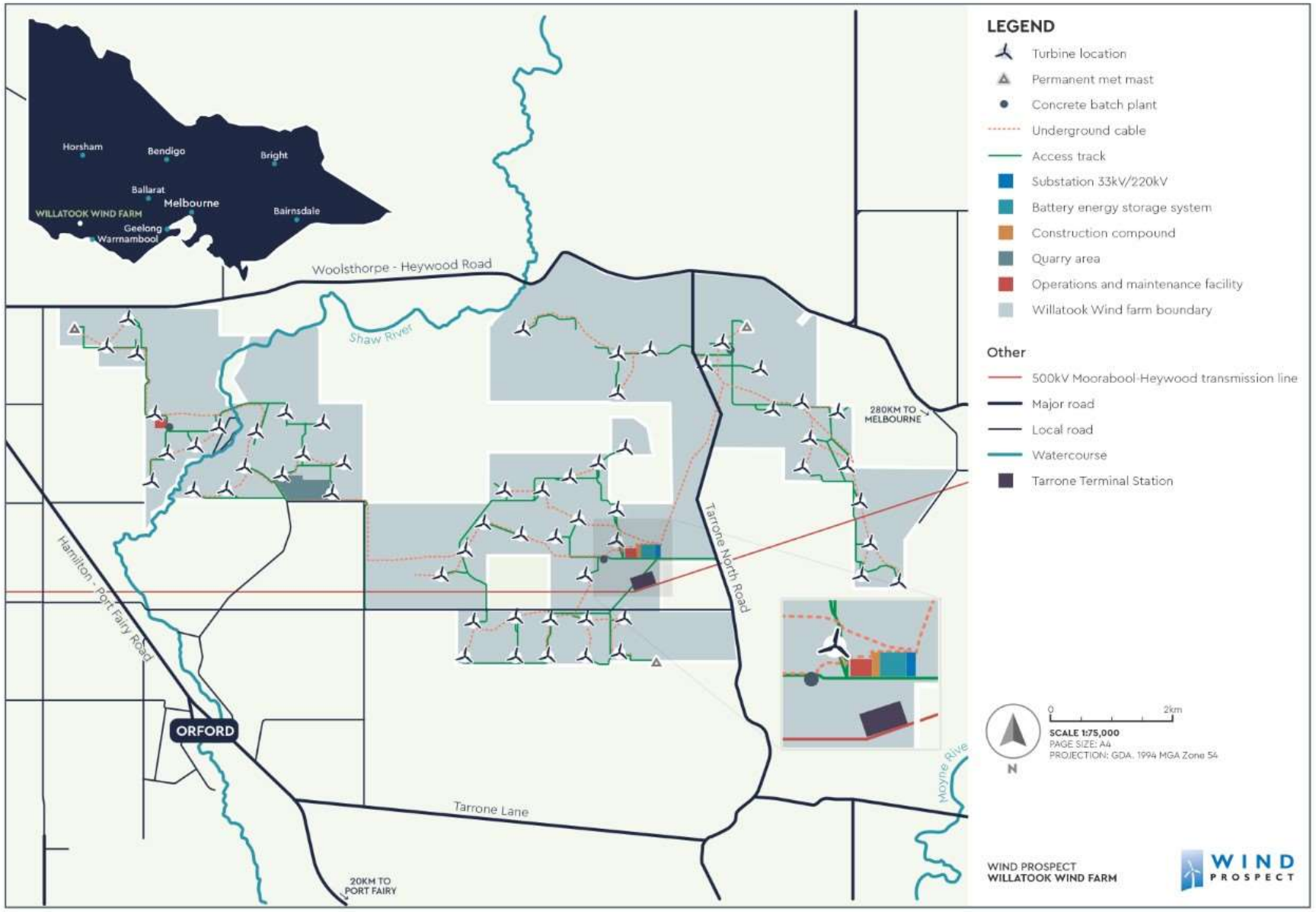


Figure 1: Proposed location and layout of the Willatook Wind Farm (source: https://www.willatookwindfarm.com.au/the-project).

3 Statutory processes

This section refers to key Acts that are relevant to my assessment and delivery of the project. Wind Prospect require a variety of statutory approvals under Victorian and Commonwealth law before they can proceed with the project. My assessment under the Environment Effects Act will inform approval decisions under the *Planning and Environment Act 1987*, the *Aboriginal Heritage Act 2006* and the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act), as well as a range of other permits and consents. The project is also a controlled action requiring approval under the EPBC Act.

3.1 Environment Effects Act

The Environment Effects Act provides for assessment of proposed project that are capable of having a significant effect on the environment. Section 8C of the Environment Effects Act provides that approvals decisions for the project may not be made until this assessment is completed and has been considered by the decision-makers who have been given notice.

Following exhibition of draft scoping requirements for public comment between July and August 2019, the Minister for Planning issued final scoping requirements specifying the range of matters to be addressed in the EES. The former Department of Environment, Land, Water and Planning (DELWP)[1] convened a technical reference group for the project in accordance with standard EES practice to provide advice to Wind Prospect and DELWP on the preparation of the EES.

The EES was prepared by Wind Prospect and placed on public exhibition from 4 July to 12 August 2022. Two planning permit applications, one for the Willatook wind energy facility in Moyne Shire (PA2201620) and one for native vegetation removal along the over-dimensional transport route in Glenelg Shire (P22065), and a preliminary draft quarry work plan were also exhibited with the EES. The EES attracted 67 submissions and 47 submissions were lodged in response to the planning permit applications. Three of the submissions on the EES were from state and local government bodies.

On 12 August 2022, the Minister for Planning appointed an inquiry under section 9(1) of the Environment Effects Act to review submissions and inquire into the environmental effects of the proposal, in accordance with its terms of reference, which were approved by the Minister on 24 June 2022.

The inquiry members were also appointed as a panel under Part 8 of the Planning and Environment Act to consider any objections received on the planning permit applications. Planning Panels Victoria received all the submissions made in response to the EES and the planning permit applications for consideration by the IAP.

The panel held a directions hearing on 2 September 2022, followed by public hearings, which were held from 11 October to 7 November 2022. The panel provided its report to me on 16 January 2023

The panel report, along with the EES, its supporting technical reports, public submissions, tabled documents and relevant legislation, policy and guidelines, has informed the preparation of this assessment of the project's environmental effects under the Environment Effects Act.

3.2 Victorian statutory approvals

The project requires a number of Victorian statutory approvals, including:

- an approved cultural heritage management plan under the Aboriginal Heritage Act;
- a planning permit under the Moyne Planning Scheme for the development of the wind energy facility and associated infrastructure;
- a planning permit under the Glenelg Planning Scheme for removal of native vegetation in Glenelg Shire along the haulage route for the project; and
- an approved work plan and a work authority for a quarry under the MRSD Act.

1 On 1 January 2023, the previous functions of DELWP were moved to two new departments: Department of Energy, Environment and Climate Action (DEECA) and the Department of Transport and Planning (DTP). For simplicity, this report refers to DELWP in relation to any matters that occurred prior to 1 January 2023 and to the new departments in relation to future matters.

Aboriginal Heritage Act

The Aboriginal Heritage Act stipulates that an approved cultural heritage management plan (CHMP) must be prepared for works for which an EES is required. The project is situated on land for which the Eastern Maar Aboriginal Corporation is the Registered Aboriginal Party (RAP) under the Aboriginal Heritage Act. A portion in the north-western corner of the project site is on land for which both the Gunditj Mirring Traditional Owners Corporate and Eastern Maar Aboriginal Corporation are the formally recognised Traditional Owners.

A draft CHMP (no. 11090) has been prepared for the project. The CHMP will be evaluated by First Peoples – State Relations as there was no RAP in place for the project site at the time the notice of intent to prepare a CHMP was submitted in 2009.

Planning and Environment Act

The Planning and Environment Act sets out processes for the consideration of planning permit applications and decision-making about granting or refusing planning permits, in the context of the relevant planning scheme and planning provisions. Wind Prospect applied to the Minister for Planning, as the responsible authority, for planning permits for the proposed project. The former Minister for Planning called in the planning permit applications under section 97B(1)(c) of the Planning and Environment Act to allow concurrent assessment and public exhibition processes under the Environment Effects Act and the Planning and Environment Act. Calling in the permit applications also allowed for the panel process required under the Planning and Environment Act to be combined with the inquiry process required under the Environment Effects Act.

The planning permit applications may not be determined until the required CHMP has been approved.

Mineral Resources (Sustainable Development) Act

An approved work plan and work authority are required under the MRSD Act for the quarry proposed to be established and operated within the wind farm project area to supply construction materials for the project. The exhibited EES included a preliminary draft quarry work plan.

Section 77T of the MRSD Act provides that, subject to certain conditions (which have not yet been fulfilled but which are expected to be fulfilled following the making of this assessment), a planning permit is not required for a quarry which has been subject to a completed EES process. Decisions about approving the work plan will be made under the MRSD Act following consideration of this assessment.

The preliminary draft quarry work plan proposed that the quarry will supply crushed rock products only for the construction phase of the Willatook Wind Farm. The quarry is to be closed and the quarry footprint rehabilitated following completion of the project construction works for this project.

3.3 Other Victorian statutory approvals

The project also requires a range of other consents and permits including:

- consent to undertake works on or across a waterway and consent to take and use groundwater under the *Water Act 1989*;
- a permit to remove listed flora and fauna from public land under the *Flora and Fauna Guarantee Act 1988* (FFG Act);
- a permit to take or handle wildlife under the *Wildlife Act 1975*; and
- consent to undertake works on roads under the *Road Management Act 2004*.

3.4 Commonwealth statutory approval

In April 2019, Wind Prospect referred the proposed Willatook Wind Farm to the Commonwealth Government (referral 2019/8439) for a determination on whether the project was a controlled action under the EPBC Act.

On 12 June 2019, the project was determined to be a controlled action requiring assessment and approval under the EPBC Act because of its potential impacts on matters of national environmental significance (MNES): listed threatened species and communities (sections 18 and 18A). Following confirmation from the State, the Commonwealth advised Wind Prospect that the project's impacts on MNES were to be assessed via an accredited state (EES) process under the

bilateral agreement made between the Australian and Victorian governments under section 45 of the EPBC Act. The EES process is therefore addressing assessment requirements for this project under the EPBC Act, with the decisions about whether, and under what conditions, to approve the project to be made by the federal Minister for the Environment and Water after consideration of this assessment. My assessment of the potential impacts on MNES is consolidated in Appendix B.

4 Environmental assessment and management framework

My assessment has been informed by consideration of the EES, public submissions, evidence tabled to the IAP, information and submissions presented at the public hearing and the IAP's report. Legislation, policy, strategies, guidelines and the objectives and principles of ecologically sustainable development contextualise my assessment.

4.1 Assessment evaluation objectives

To provide an integrated structure for this assessment, key aspects of legislation and statutory policy are reflected in evaluation objectives that were set out in the EES scoping requirements (Table 1). The IAP considered the project's effects having regard to these evaluation objectives, and I have also made my assessment in reference to these objectives.

Table 1: Assessment evaluation objectives

Evaluation objective	Relevant section of this report
Biodiversity and habitat – *avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species. Where relevant, offset requirements are to be addressed consistent with state and Commonwealth policies.*	**5.1, 5.2, 5.9, Appendix B**
Catchment values and hydrology – *maintain the functions and values of aquatic environments, surface water and groundwater quality and stream flows and avoid adverse effects on protected beneficial uses.*	**5.3, 5.9**
Landscape and visual – *minimise and manage potential adverse effects for the community with regard to landscape and visual amenity.*	**5.5, 5.9**
Geoheritage values – *minimise and manage potential adverse effects to geoheritage values.*	**5.9, 5.10**
Amenity – *minimise and manage adverse air quality and noise and vibration effects on residents and local communities as far as practicable during construction, operation and decommissioning having regard to applicable limits, targets or standards.*	**5.4, 5.9, 5.10**
Cultural heritage – *avoid or minimise adverse effects on Aboriginal and historic cultural heritage and associated values.*	**5.8, 5.9, 5.10**
Land use and socioeconomic – *avoid and minimise adverse effects on land use (including agricultural and residential), social fabric of the community (with regard to wellbeing, community cohesion), local infrastructure, electromagnetic interference, aviation safety and to neighbouring landowners during construction, operation and decommissioning of the project.*	**5.6, 5.10**
Traffic and roads – *avoid and minimise adverse effects on roads and road users during construction, operation and decommissioning of the project.*	**5.7, 5.9**

4.2 Management of environmental effects

I acknowledge that the project will generate both positive and negative environmental effects. A sound environmental management framework and control regime is needed to ensure that adverse effects of the project are effectively mitigated and managed. I have considered key elements of the environmental management regime proposed by Wind Prospect in the EES (described below), when assessing the project's environmental effects. This section also considers the planning controls and environmental governance arrangements proposed for the project and my findings in relation to these.

Planning controls

The planning permits are the key Victorian approvals needed for the project. Two planning permit applications were developed by Wind Prospect and exhibited with the EES:

- PA2201620 for the development of the wind farm within the Moyne Shire; and
- P22065 for removal of native vegetation in Glenelg Shire along the haulage route for the project.

Clause 52.32 of the planning scheme sets out the matters that I must consider in assessing wind farm proposals. Broadly these include:

- The Municipal Planning Strategy and the Planning Policy Framework;
- The effect of the wind farm on the surrounding area in terms of noise, blade glint, shadow flicker and electromagnetic interference;
- The impact of the development on significant views, including visual corridors and sightlines;
- The impact of the wind farm on the natural environment and natural systems;
- The impact of the wind farm on cultural heritage;
- The impact of the wind farm on aircraft safety;
- Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (Department of Environment, Land, Water and Planning, November 2021); and
- The New Zealand Standard NZS6808:2010, Acoustics – Wind Farm Noise.

The IAP considered these matters in its assessment of the environmental effects of the project. It found that the environmental effects of the project on balance can be managed to an acceptable level and the relevant project approvals should be granted, subject to adequately addressing the recommendations in its report. The recommendations include changes to the area in which turbines can be located to provide adequate protection for Brolga breeding wetlands and bat habitat.

The IAP provided recommended planning permit conditions in Appendix G (for PA2201620) and Appendix H (for P22065) of its report. I generally support the IAP's recommended planning permit conditions, subject to the recommendations I have made in sections 5 and 6 of this assessment. However, I note there are some matters of wording that will require updates later and the planning permit conditions are likely to require updating in response to the project changes required by my assessment.

The permit conditions will require approval and endorsement of amended development plans that incorporate amended Brolga and bat habitat buffers. This will help to ensure the refinement of areas where works and impacts are permitted to occur, taking into account the findings and recommendations of this assessment. It is appropriate that further refinement of the avoidance and minimisation of impacts be required by the planning permit conditions.

The IAP recommended other changes to the planning permit conditions related to the following issues, which I have discussed in the relevant sections of my assessment:

- construction timing in relation to Brolga breeding season (section 5.1);
- the proposed Brolga monitoring and compensation plan (section 5.1);
- the proposed bird and bat adaptive management plan (sections 5.1 and 5.2);
- native vegetation management and offsets (section 5.2);
- wind turbine noise (section 5.4);
- aviation safety requirements (section 5.6); and
- bushfire prevention and response (section 5.10).

In principle, I generally support the IAP's recommended changes to the planning permit conditions, noting I have recommended changes to recommendations and have provided my rationale for not supporting certain permit conditions (see section 6). In summary, I consider that the broad planning controls recommended by the IAP with revisions made in accordance with my assessment of the environmental effects will facilitate the project, while minimising environmental effects and protecting conservation values. The proposed temporary quarry will be exempt from planning permit requirements, in accordance with the MRSD Act and my assessment. EMMs relevant to the quarry should be captured within the quarry work plan required under the MRSD Act.

Environmental management framework

An EMF was presented in Chapter 26 of the EES, which outlines the key environmental management documentation proposed to be developed for the project and associated review and environmental reporting requirements (as

summarised in Figure 2). The EMF also provides a consolidated list of the proposed EMMs and identifies the key project approvals and compliance requirements. For this project, the EMMs will be given statutory weight via either conditions of approval or captured in various environmental plans. The management plans outlined in Figure 2 need to be prepared consistent with the proposed EMF, amended as per my assessment, and the conditions of approval.

The IAP found that the EMF proposed in the EES, subject to recommendations in its report, in conjunction with the planning permit conditions, provides a sound framework for managing environmental impacts to an acceptable level, which I support.

Wind Prospect made updates to the EMF prior to the public hearings and provided a tracked changes version to the IAP[2]. I generally support Wind Prospect's EMF and the EMMs proposed, including the IAP's recommended changes, unless otherwise discussed in section 5 and appendices A and B of my assessment. Wind Prospect will need to develop its environmental management plans for the project under the planning permit conditions, generally in accordance with the EMF, as amended for consistency with my assessment. Before development can commence, the environmental management plans must be submitted to and approved by me as the responsible authority, in consultation with DEECA.

I note that the IAP suggested changes to the planning permit conditions to require the environmental management plans for the project to be developed in accordance with an EMF endorsed by me as responsible authority, and that this change reflected the approach proposed in the EES. However, I am satisfied that the EMF does not need my endorsement *per se*, and I recommend amendments to the proposed permit conditions to remove the need for endorsement of the EMF. My rationale is that the requirements of the EMF, including the proposed EMMs, will have to be reflected in the environmental management plans before they can be approved and will, therefore, be given effect through that process. The environmental management plans will also be given statutory weight through conditions of approval, including planning permits and the quarry work plan.

Further investigations

While I am satisfied that the environmental effects of the project have been adequately identified and assessed, I note the IAP made recommendations for some further investigations relating to some aspects of the project. I am satisfied that these further investigations are not needed to inform this assessment under the Environment Effects Act on the acceptability of the project's environmental effects. These aspects are addressed further in section 5 of my assessment.

2 Tabled Document 36

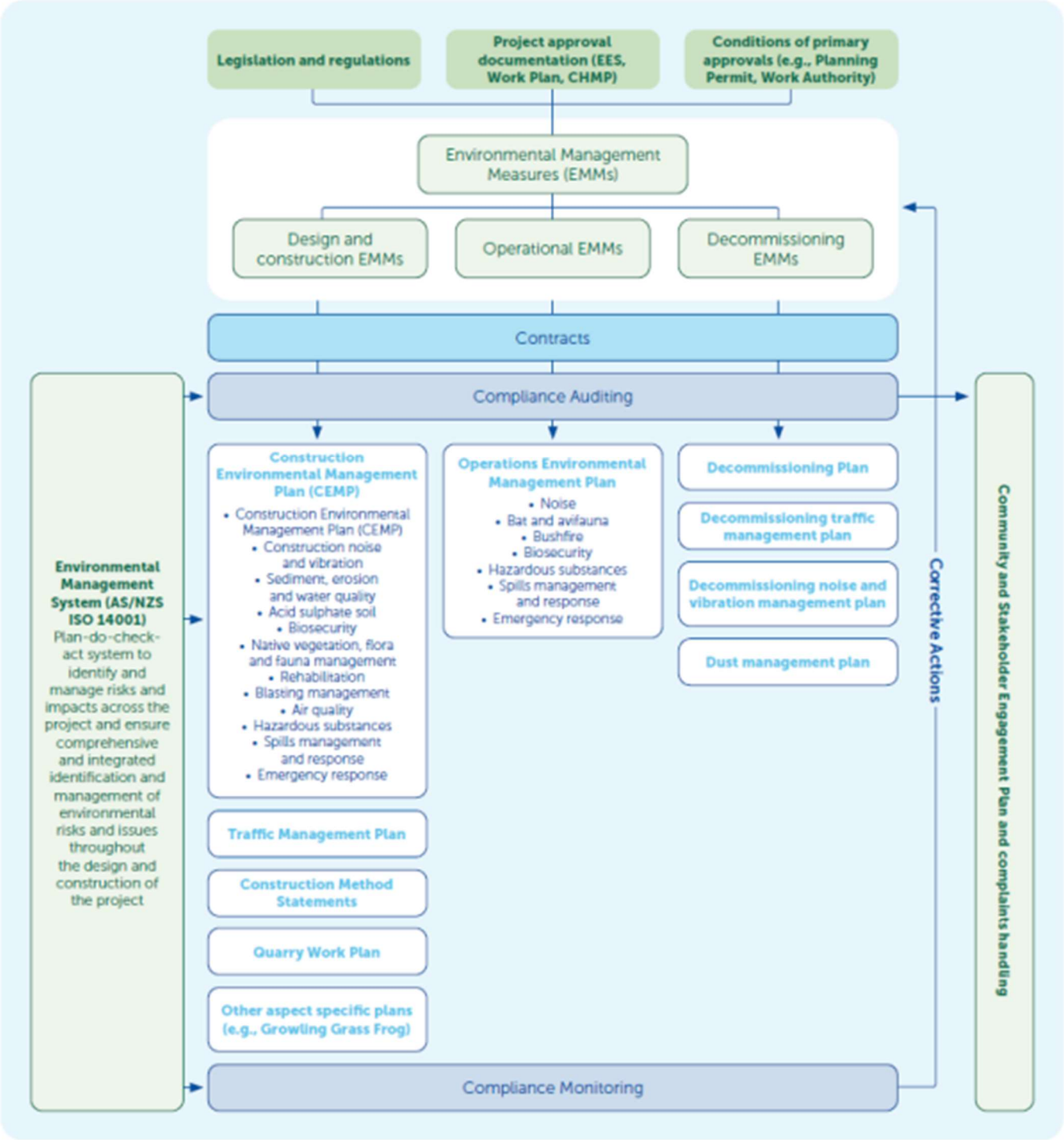


Figure 2: Environmental management documents (Source: Wind Prospect, Chapter 26 of the EES)

Environment Protection Act 2017

In addition to the requirements of the planning permit and the quarry work plan, environmental effects of the project will also be subject to the requirements of the Environment Protection Act. The Environment Protection Act imposes a general environmental duty that establishes a proactive approach to risk identification, assessment and control for all industries and individuals in Victoria who are *"…engaged in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable".*

The general environmental duty requires that 'a person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.'[3]

Environment Protection Regulations 2021

The Environment Protection Regulations 2021 were amended in 2022 to make EPA Victoria the sole regulator of wind turbine noise in Victoria. The Environment Protection Regulations determine the turbine noise limits for wind energy facilities and set out the requirements for wind energy facility operators to comply with the Environment Protection Act. These changes resulted in Amendment VC206 to the Victorian Planning Provisions, which removed the need for post-construction noise permit conditions for wind energy facilities from Clause 52.32 of planning schemes.

The regulations require the operator of a facility to *"…ensure that the wind turbine noise from the facility complies with the noise limit for that facility"*. Exceedance of the noise limit for the facility is deemed by the regulations to be unreasonable noise.

3 Environment Protection Act, s 25(1).

5 Assessment of environmental effects

On balance, it is my assessment that the project can meet the EES evaluation objectives, and that its environmental effects will be acceptable, subject to the implementation of the project modifications proposed in this assessment and EMMs consistent with those endorsed by the IAP and refined as per the findings and recommendations of this assessment.

The IAP made numerous findings and recommendations in respect of the project and its effects. My response to its findings and recommendations, along with my assessment of the environmental effects of the project, are detailed in the sections below.

I accept the IAP's recommendations that the turbine-free buffers for Brolga and Southern Bent-wing Bat for this project should be increased from those proposed by the proponent in the EES. Revised buffers consistent with the findings of this assessment should be mapped in consultation with DEECA before amended development plans are submitted to me as responsible authority for approval. I acknowledge that the revised buffers will reduce the amount of land available for development of the wind farm and that these modifications may affect the potential renewable energy generation. While the transition to renewable energy generation is an important policy and legislative priority for Victoria, protection of declining biodiversity values is also a priority that needs to be balanced with achieving renewable energy targets. My assessment, then, while allowing for the positive contribution of the wind farm to reducing our reliance on fossil fuels, must also allow for the critically endangered status of Southern Bent-wing Bat and endangered status of Brolga.

Section 6 provides my main conclusions and recommendations about the environmental effects of the project and responds to the IAP's key recommendations. Appendix A summarises my recommendations for the EMMs. My findings in relation to MNES are provided in Appendix B.

5.1 Brolga

Evaluation objective

Avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species. Where relevant, offset requirements are to be addressed consistent with state and Commonwealth policies.

Assessment context

Brolga issues are addressed in Chapter 11 and Technical Appendices C1 and C2 of the EES and in Chapter 5.1 of the IAP Report. Wind Prospect has proposed turbine-free buffers and seven EMMs to deal with Brolga impacts. Potential Brolga impacts have been the subject of specific recommendations by the IAP.

Brolga (*Antigone rubicunda*) is a species of crane native to Australia and New Guinea. Since European settlement, the species' southern range has contracted, and its population has declined. The southern population appears to be functionally isolated from the larger population in tropical northern Australia[4], which the EES notes numbers in the tens of thousands. The Brolga is listed as endangered under the FFG Act, and an action statement was prepared in 2003[5]. It is also listed as vulnerable under both the New South Wales *Biodiversity and Conservation Act 2016* and the South Australia *National Parks and Wildlife Act 1972*. It is not listed under the Commonwealth EPBC Act.

In Victoria, Brolgas breed mostly in ephemeral wetlands, with seasonal hydrology apparently a factor in breeding site selection. A successful breeding population requires multiple potential breeding sites, with different sites used in different years according to conditions. Sites are used repeatedly, if irregularly, so long as they remain suitable. The Brolga Action Statement under the FFG Act identifies loss of breeding wetlands as one of the key threats to Brolgas in Victoria.

Following recognition of the potential conflict between wind farm development and Brolga in south-western Victoria, the then Department of Sustainability and Environment oversaw the preparation and publication of the *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011 Revision 1 February 2012* (the Interim Guidelines). The Interim Guidelines set out approaches to protecting key Brolga habitat elements – breeding wetlands and flock roosting sites – from wind farm impacts, especially collision casualty impacts. The Interim Guidelines provide guidance about collision risk modelling (CRM) and population viability

4 See for example Hollands, David: *Cranes, Herons and Storks of Australia*. Bloomings Books, Melbourne, 2016.

5 Flora and Fauna Guarantee Act 1988, Action Statement No. 119. Phillip du Guesclin, Aurthur Rylah Institute, Department of Sustainability and Environment, 2003.

analysis (PVA). In the context of the Interim Guidelines' objective "that individual wind farms have, at a minimum, a zero *net* impact on the Victorian Brolga population" (p. 6), the Interim Guidelines also provide guidance on compensation measures for residual impacts that could arise even when breeding and flocking sites are fully protected.

Although the Interim Guidelines have no statutory force, Planning Panels Victoria statutory decision-makers have given the document weight over the past decade. Ministers' assessments under the Environment Effects Act for the Dundonnell and Golden Plains wind farms also referred to and were informed by the Interim Guidelines.

In 2020 DELWP published *Draft Brolga Assessment and Mitigation Standards for wind energy facility permit applications* (the Draft Standards) for public comment. Approximately 60 submissions were received. The Draft Standards are yet to be finalised.

The Draft Standards referred to Dr Inka Veltheim's PhD study on Victorian Brolgas[6], which reported and analysed empirical data about movements by pre-fledged Brolga chicks within breeding home ranges. Dr Veltheim's study showed that a Brolga family will make use of adjacent wetlands that are close enough to reach on foot from the nesting wetland, so that breeding home ranges may be irregular in shape. Home ranges of breeding Brolgas in Dr Veltheim's study (nine families, two with two chicks), as inferred from movements of chicks, varied in area by an order of magnitude. Although one Brolga family in Dr Veltheim's study was located within the footprint of Macarthur wind farm, with turbines activated during the pre-fledging period, her study did not investigate the extent to which Brolgas may be disturbed by wind turbines or other infrastructure or may be influenced by proximity of such infrastructure in selecting nesting sites.

The Interim Guidelines provide that, in the absence of any project or site-specific assessment, any wetland where breeding has been recorded that has not been permanently drained is to be treated as a breeding wetland and provided with a turbine-free buffer comprising a home range extending 3.2 km from the edges of the breeding wetland plus an additional 300 m "to avoid disturbance effects". The Interim Guidelines also provide for reduced project-specific turbine-free buffers to be implemented "provided they can be shown to meet the objectives set for breeding and non-breeding habitats". Proposed project and site-specific reduced buffers should also satisfy DEECA.

The Interim Guidelines also provide for turbine free buffers for flock roosting (non-breeding) sites. There are no traditional flock roosting sites within the radius of investigation of 10 km from the Willatook Wind Farm footprint, so the focus of this assessment in terms of Brolga home ranges is limited to breeding sites.

The Draft Standards propose a significantly reduced breeding home range of 600 m around the nesting wetland, compared to the default 3.2 km in the Interim Guidelines, based on movements recorded in Dr Veltheim's study. Both the Interim Guidelines and the Draft Standards provide for the additional 300 m allowance for disturbance. Under the Draft Standards, breeding home ranges are extended to include wetlands within 2 km of a suitable breeding wetland, also reflecting findings from Dr Veltheim's study. I note that this approach is similar to the "habitat model" approach which previous assessments under the Environment Effects Act endorsed for the Dundonnell and Golden Plains wind farms, although the home range distance from the edge of the nesting wetland is larger (600 m compared to 400 m) and the proximity of adjacent wetlands for inclusion in the home range is smaller (2 km compared to 3.2 km). Data from Dr Veltheim's study provide a basis for both the 600 m (about 80% of recorded movements around nesting wetlands were within 600 m of the wetland) and the 2 km (wetlands located within 2 km accounted for 95% of longer distance movements). Unlike the Interim Guidelines, which identify breeding wetlands on the basis of breeding records, the Draft Standards provide for recognition of wetlands as breeding habitat based on physical and hydrological characteristics.

The EES, submissions and tabled documents and the IAP report refer to wetlands variously as "breeding", "suitable", "functional", or simply as "wetlands". There are also references, including in the Interim Guidelines and in the Draft Standards, to excluding wetlands on the basis that they have been "drained" or "permanently drained". These qualifications complicate the task of definitively identifying wetlands for consideration in mapping breeding home ranges, and hence for determining the boundaries of aggregated turbine-free buffers for the purposes of achieving acceptable environmental effects in terms of Brolga.

For this assessment, I have accepted the concept of the "habitat model", with the dimensions proposed in the Draft Standards, recognising that the Draft Standards, while not finalised, reference recent authoritative published work analysing empirical data about Brolga movements in the field during the breeding season. The Draft Standards therefore utilise updated and specific information about Brolga "breeding home range" movements which was not available at the

6 *Movements, behaviour and ecology of the brolga,* Antigone rubicunda*, at multiple spatial and temporal scales*, School of Applied and Biomedical Sciences, Faculty of Science and Technology, Federation University Australia.

time the Interim Guidelines were prepared, or at the times when the Minister's assessments for the Dundonnell and Golden Plains wind farms were made (2016 and 2018 respectively). I generally agree with the IAP's recommended approach for delineating breeding home ranges, following the principles adopted in the Draft Standards for determining reduced buffer areas, as allowed for in the Interim Guidelines.

In delineating a breeding home range for a given nesting wetland – the wetland in which the nest is located – I am satisfied that all wetlands within 2 km, irrespective of whether they would themselves qualify as "breeding" wetlands, should be included. Wetlands may be attractive to Brolga families with unfledged offspring both as foraging resources which are likely to be richer than surrounding dryland habitat and as potential overnight roosting habitat. Wetlands can perform both of those functions without needing to remain inundated for any specific period associated with nest building and incubation.

I note the IAP's finding that although the Draft Brolga Standards are yet to be finalised, and therefore have little formal weight, "*…they provide a comprehensive compilation of the most recent literature available on the south-west Brolga to inform breeding home range habitat protection."*

Breeding site turbine-free buffers

Application of the Interim Guidelines' default home range of 3.2 km around known breeding wetlands for the Willatook wind farm is not appropriate given the work that has been done since the publication of the Interim Guidelines over ten years ago, and the endorsement of reduced buffers in assessments under the Environment Effects Act for other wind farms in 2016 (Dundonnell) and 2018 (Golden Plains).

The approach in the Draft Standards to identify wetlands as potential breeding wetlands based on geographical characteristics rather than solely on historical breeding records is an advance relative to the approach in the Interim Guidelines, while noting that wetlands with acceptable historical records should also be regarded as breeding wetlands even if their geographical characteristics might not match the model. A conservative approach to excluding wetlands from consideration, including wetlands that have been subject to drainage works, is preferable to disregarding potential breeding wetlands or appearing to condone the loss of potential breeding wetlands for Brolga, which has been recognised as a key threat to the Victorian population (see Brolga Action Statement).

I am satisfied that it is appropriate and preferable to treat wetlands within 2 km of a breeding wetland (identified as above) as elements of a breeding home range centred on that breeding wetland.

Neither Dr Veltheim's study nor the Draft Standards supports or proposes a different basic radius for identifying the breeding home range for an isolated wetland. I note that DELWP BSW Region recommended a home range radius of 1,369 m for the isolated wetland to the east of the proposed wind farm. Dr Veltheim's study found that about 95% of tracked daily movements from any breeding home range wetland were within 1,369 m. However, that calculation did not distinguish between home ranges centred on isolated wetlands and those featuring wetland complexes, nor did it distinguish between movements towards an adjacent wetland and other movements. I note that Wind Prospect's closing submissions did not oppose that recommendation, although it noted that it would have no material effect on the proposed wind farm. Despite the IAP's support for an increased home range for isolated wetlands, I am not satisfied that adequate evidence is available to justify such a substantial variation from home range dimensions proposed in the Draft Standards in light of Dr Veltheim's work. It is my assessment at this time that home ranges for isolated wetlands should be mapped consistently with the principles proposed in the Draft Standards for home ranges incorporating multiple wetlands: that is, 600 m in all directions, measured from the margins of the wetland when full. A further 300 m disturbance allowance should be added in all directions from the mapped home range boundaries to delineate the "turbine-free buffer" for that home range.

Therefore, for each confirmed breeding wetland and any other suitable breeding wetland in terms of capacity to hold water for 120 days at least once in ten years on average, it is my assessment that turbine-free buffers should be mapped according to the principles set out in the Draft Standards. Turbine free buffers should then be observed in refining the wind farm layout to exclude all wind farm elements as set out in the Draft Standards. In keeping with the principles set out in the Interim Guidelines, it is my assessment that before submitting a revised permit application, Wind Prospect should prepare accurate mapping of turbine free buffers in consultation with DEECA BSW.

Wind Prospect proposed project-specific breeding home range size comprising breeding wetlands plus land within 400 m of the wetland boundaries, with a further disturbance allowance of 300 m constituting the derived turbine free buffer. This was described in the EES and IAP report as a 795 m buffer, a figure that included a 95 m blade-length offset to the

proposed tower location. The EES stated that the proposed approach represented an update to the habitat modelling method used for Dundonnell Wind Farm. As discussed elsewhere in the assessment, I do not accept that a further allowance for the length of turbine blades is appropriately considered "turbine free". I note that Wind Prospect's proposed approach (400 m) is consistent with the approach that was proposed in the EES for the Golden Plains wind farm, and which was not accepted by the IAP for that project or supported in the Minister's assessment for that project.

The Willatook Wind Farm EES identified eight confirmed breeding sites relevant to the proposed wind farm, including five within the Cockatoo Swamp Complex (W12w, W12c, W12e, W1 and W4) and three isolated wetlands (25816, 25729 and 25741). The EES argued that another wetland (25932) was not a breeding site, due to its being permanently drained and modelled to not hold water for 120 days. However, there was a record of a local landholder providing a statutory declaration stating that Brolga have nested on the property in wetland 25932. For the purposes of this assessment, and in the absence of definitive evidence that the wetland has been permanently drained since the documented breeding observation occurred, I consider that wetland 25932 should be considered a breeding wetland.

The EES proposed a single buffer around the Cockatoo Swamp Complex. This complex included five confirmed breeding sites (W12w, W12c, W12e, W1 and W4, also referred to as 25721) and five wetlands that provide suitable habitat for breeding (25941, W10, FD2, FD21 and W13).

The specific wetlands that were buffered were informed by hydrological modelling. The criteria used to determine whether a wetland or farm dam can provide suitable Brolga habitat for breeding, foraging or roosting were: that they were modelled to hold water for at least 120 consecutive days at least once every 10 years, they were at least 0.6 ha in area and that they had at least 20% cover of emergent vegetation. The Draft Standards do not support the last two criteria.

DELWP BSW submitted that dismissing wetlands as potential breeding wetlands for reasons not adopted in the Draft Standards, such as location within plantations or the extent of vegetation, is not appropriate. DELWP BSW also submitted that wetlands with historic breeding records should be dismissed from consideration as breeding wetlands only if they had subsequently been permanently drained. I support this position and note that it aligns with what is provided for in the Interim Guidelines.

Collision risk modelling, population viability analysis and Brolga compensation plan

The EES presents CRM based on the proposed wind farm design, which concludes that over the life of the wind farm it is likely that no more than one bird will suffer a collision. Such an incident represents a residual impact arising from unpredictable flights across the wind farm, not associated with regular breeding or flocking behaviour. When the CRM output is applied to the population viability analysis, the outcome is that 1-5 birds should be added to the population over the life of the wind farm to meet the "zero net impact" objective of the Interim Guidelines.

Discussion

Protection of breeding wetlands

The IAP recommended that a site-specific turbine-free buffer of 995 m (inclusive of blade length) should be applied to both:

- farm dams and wetlands located within 2 km of suitable Brolga breeding wetlands; and
- from the edge of all wetlands meeting the 120-day inundation criteria.

The 995 m buffer consists of a 600 m foraging buffer, a 300 m disturbance buffer and a setback of 95 m for the proposed maximum blade length.

It is my assessment that the "turbine-free buffers" should exclude all parts of a turbine, including turbine towers and turbine blades at any orientation. Land over which blades could sometimes extend is not "turbine-free". Powerlines should be excluded from turbine-free buffers wherever practicable, noting that there is empirical evidence of Brolgas being susceptible to colliding with powerlines[7]. Turbine-free buffers should be understood to comprise the breeding home range plus the disturbance allowance, which in the absence of evidence to the contrary should be maintained at a minimum of 300 m.

7 See for example Goldstraw, P. W., and Du Guesclin, P. B. (1991). *Bird casualties from collisions with a 500 kv transmission line in southwestern Victoria, Australia*. In: Proceedings from the 1987 International Crane Workshop, pp.219-224, and Farnes, Robert F (2019). *Birds of Portland District Victoria*, p. 82.

It is my assessment that Wind Prospect should prepare definitive mapping showing breeding home ranges for all wetlands where breeding has been recorded historically and all other wetlands suitable for breeding, in line with the Draft Standards. Breeding home ranges should be mapped for each such wetland on the basis of 600 m from all edges of the wetland and extending up to 2 km to include any other mapped wetland (irrespective of size, anticipated inundation period, emergent vegetation or any other criterion). All breeding home ranges should be augmented by a 300 m disturbance allowance to result in total turbine-free buffers for Brolga breeding wetlands. Turbine tower footings should be set back from the turbine free buffer boundaries as far as necessary to ensure that turbine infrastructure does not intrude into the turbine free buffer at any time, at any height above the ground.

In line with the Interim Guidelines, Wind Prospect should provide the mapping described above to DEECA, BSW Region, for consultation. Subject to any refinements due to consultation, the final mapping and the views of DEECA about the mapping should be provided directly to me as responsible authority for consideration in the context of the planning permit application (whether as advertised or as subsequently amended, for example in light of this assessment) for the Willatook Wind Farm.

I note that the Interim Guidelines provide for breeding wetlands to be discounted only if they have been "permanently drained and/or planted with trees" (p. 8). I am concerned that government guidance for assessing habitat for an endangered species such as Brolga should not be interpreted to encourage removal of habitat in order to enable more lucrative development of land. Therefore, I recommend to DEECA, in advancing the Draft Standards or any other guidance relative to Brolga (including for example any revision of the FFG Act Action Statement), that a date at which the consideration of wetland status will be applied be specified. Wetlands claimed to have been drained after that date should be considered as suitable wetlands for the purposes of applying the guidance. An appropriate date might be the date in 2020 on which the Draft Standards were published in the Engage Victoria website and public comments invited.

The list of sites to be buffered includes those proposed in the EES to be buffered by Wind Prospect, plus the following.

Confirmed and historical breeding sites

- Wetland 25816 (Wild Dog Swamp). This wetland is a confirmed breeding site to the east of the project area and was identified by the EES as an isolated wetland. Wind Prospect did not include a buffer for this wetland on the maps in the EES due to its distance from the nearest proposed turbine being >1,800 m (outside the buffer area). The IAP recommended the buffer be included to ensure the area is protected during any future changes to the project. I note the potential for the breeding home range for wetland 25816 to be larger than anticipated in the EES if a minimum 600 m radius from the edge of the breeding wetland is adopted, and also if other wetlands are identified within 2 km of its margins. Wind Prospect should map the home range and turbine-free buffer boundaries for wetland 25816 in line with this assessment and the Draft Standards, and in consultation with DEECA BSW.
- 25729 and 25741 – these wetlands are confirmed breeding sites that were not buffered in the EES due to being outside of the project area. However, their turbine free buffers should be mapped as above, in consultation with DEECA BSW, to confirm whether they intersect the wind farm footprint or not.
- 25932 – this wetland is south west of the project area, south of the plantation area, and was considered by Wind Prospect to be permanently drained. The IAP recommended this wetland should be buffered as it is a historical Brolga breeding wetland and that an assessment of its 2 km radius should be undertaken to determine whether it is an isolated wetland or part of a network of wetlands. I do not consider wetland 25932 has been shown to be permanently drained and therefore it should be addressed as a breeding wetland consistent with the Interim guidelines and this assessment. Wind Prospect should map the home range and turbine-free buffer boundaries for wetland 25932 in line with this assessment and the Draft Standards, and in consultation with DEECA BSW.

Potential breeding sites

- W3 – this wetland is within 2 km of other wetlands included in the Cockatoo Swamp Complex, but it is not within 2 km of the confirmed breeding sites within that complex. It is recognised as "functional" in the EES. W3 should be considered a breeding wetland, as recommended by the IAP, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.
- FD16 – this farm dam should be considered a breeding wetland, as recommended by the IAP, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.

- W7 (25936) – This wetland is within the south-western corner of the proposed wind farm footprint. It is recognised as "functional" in the EES. W7 should be considered a breeding wetland, as recommended by the IAP, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.
- 25710 – This wetland is in the eastern sector of the Cockatoo Swamp complex. Although it is outside the proposed wind farm footprint, a turbine-free buffer for the wetland would substantially intersect that footprint. It is recognised as "functional" in the EES. Wetland 25710 should be considered a breeding wetland, as recommended by the IAP, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.
- 25731 – This wetland is within the southern central sector of the proposed wind farm footprint, south of the Cockatoo Swamp complex. It is recognised as "functional" in the EES. Wetland 25731 should be considered a breeding wetland, as recommended by the IAP, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.
- 25974 – This wetland is south of the Cockatoo Swamp complex, on the eastern edge of the north-western sector of the proposed wind farm and within 1 km of wetland W10. It is recognised as "functional" in the EES. Wetland 25974 should be considered a breeding wetland, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.
- 12a - This wetland is inside the southern boundary of the proposed wind farm footprint, south of the Cockatoo Swamp complex. Although it is modelled to hold sufficient water to support Brolga nesting only once in ten years, it is recognised as "functional" in the EES. Wetland 12a should be considered a breeding wetland, as recommended by the IAP, and its breeding home range and turbine free buffer mapped and applied in accordance with the principles adopted in this assessment.
- 25241 – This seems to be an error – no such wetland number occurs in EES Appendix C1.

The IAP also recommended additional work be undertaken for the following wetlands:

- 25698 – to confirm whether this site near wetland W3 has been permanently drained and whether it is suitable or not for Brolga
- 25668 – to determine the reason why its extent was reduced by the Lidar assessment.

Regarding the additional work recommended for these two wetlands, I support the IAP's recommendations in the context that the recommended information, when gathered, should be discussed with Department of Transport and Planning (DTP) and with DEECA BSW and, if either wetland is found to be suitable for Brolga breeding, home range mapping should be provided similar to that recommended for other suitable breeding wetlands.

The IAP recommended that construction works be avoided during the Brolga breeding season (July-November). Construction during this period may also be challenging due to likely wet ground conditions and potential impacts on surface water and groundwater. To the extent that adverse impacts on Brolga breeding could result from disturbance associated with construction activity, machinery and works, I consider that avoiding construction works during this period may be beneficial to Brolga and I support this recommendation of the IAP to avoid disturbance impacts. The IAP proposed this as a planning permit condition requiring the construction environment management plan to include a measure requiring no construction from July to end of November. I support this recommended requirement for the construction environmental management plan.

I acknowledge that when the detailed mapping recommended above is completed, it will place a substantial proportion of the proposed wind farm footprint within turbine free buffers. This in turn may affect the potential renewable energy generation from the proposed wind farm, especially in the context of other measures to protect significant biodiversity values addressed elsewhere in this assessment.

Powerline marking

As mentioned above, above ground wind farm infrastructure, including powerlines, should be excluded from turbine free buffers. Brolga are known to be susceptible to powerline collisions. Should Wind Prospect conclude that it is not practicable for a powerline route to avoid a turbine free buffer area, it should provide a clear rationale for the proposed alignment and powerline design (including, for example, why it should not be installed as an underground powerline). In

the event that such an alignment is approved, any such powerline should be fitted with visual markers to reduce the likelihood that Brolgas (or other large birds) will collide with it. The length of powerlines within turbine free buffers should be included in the collision casualty monitoring program for the wind farm.

I also recommend that consideration be given to placing visual markers on the guy wires supporting met masts, as those wires constitute a collision hazard for Brolgas and other birds.

Brolga compensation plan

The EES presents CRM and PVA, which concludes that the net loss of Brolgas over the life of the project due to residual impacts is likely to be less than one individual (0.3-0.8). A compensation plan which adds 1-5 Brolgas to the population over the life of the project would meet the Interim Guidelines objective of "a zero *net* impact on the Victorian Brolga population".

The Interim Guidelines offer two options for compensating for residual losses – marking of pre-existing powerlines to reduce collision casualties and protection and enhancement of breeding sites to improve breeding success. Both options could contribute positively over time to the population, the first by reducing an existing source of mortality and the second by increasing breeding success and potentially increasing recruitment into the breeding population.

I understand that few compensation plans under the Interim Guidelines have been approved or implemented, so there is little empirical evidence about the success of particular compensation programs. However, given the known susceptibility of Brolgas to collision with powerlines, and data available from overseas studies about the efficacy of powerline marking in reducing collision casualties for cranes and other large birds[8], I recommend that Wind Prospect's proposed Brolga Monitoring and Compensation Plan consider both options for compensation.

Monitoring

Monitoring of collision casualties has routinely been required under approvals for Victorian wind farms. Monitoring programs have varied between projects, making analysis of data difficult, but it has enabled a consolidated list of species known to have been impacted to be collated[9] and has supported analytical identification of key species that may be of concern in assessing wind farm proposals[10]. I support the inclusion of an appropriate collision casualty monitoring program for Brolga and other birds and bats in the Bird and Bat Adaptive Management (BBAM) Plan for Willatook Wind Farm, and in principle for other Victorian wind farms.

Policy guidance

For this assessment I have relied primarily upon the Interim Guidelines. However, for the purposes of determining appropriate project and site-specific turbine-free buffers, I have also considered the public Draft Standards, which in turn reference Dr Veltheim's work to derive an appropriate radius of 600 m around nesting wetlands and to include any other wetlands within 2 km of the nesting wetland. I recognise that those figures differ from the figures adopted for the Golden Plains assessment in October 2018, but at that time Dr Veltheim's work had not yet been published. I have also relied upon the Action Statement no 119 for Brolga under the FFG Act, in particular with regard to threats including collisions with infrastructure and loss of nesting wetland habitat.

I note that in his assessment for the Golden Plains wind farm in October 2018 the then Minister for Planning made several recommendations to the then Minister for the Environment about information that should be gathered to support future decision-making about wind farm proposals relative to Brolga. I understand that a response to those recommendations has not yet been provided. I draw those recommendations to the attention of DEECA and the Minister for the Environment.

Given the potential that Brolgas choose not to use otherwise suitable wetlands for nesting due to the disturbance effects of nearby wind turbines, I endorse the former Minister's recommendation about research into selection of nesting wetlands by Brolgas in the context of the much greater number of turbines now operational within the Victorian breeding

8 See for example Jenkins A., Smallie J. & Diamond M. (2010*) Avian collisions with power lines: a global review of causes and mitigation with a South African perspective*. Bird Conservation International, 20, 263-278.

9 Moloney, P.D., Lumsden, L.F. and Smales, I. (2019) Investigation of existing post-construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates. Arthur Rylah Institute for Environmental Research Technical Report Series No. 302

10 Lumsden, L.F., Moloney, P. and Smales, I. (2019) Developing a science-based approach to defining key species of birds and bats of concern for wind farm developments in Victoria. Arthur Rylah Institute for Environmental Research Technical Report Series No. 301

distribution of Brolga. Empirical data about breeding site selection relative to turbine proximity will inform confirmation or otherwise of the 300 m disturbance allowance in the Interim Guidelines which was carried over into the Draft Standards.

I appreciate that wind farms are only one of several actual or potential threats to Brolga in Victoria. However, wind energy generation has expanded to address important renewable energy targets since 2003, when the FFG Act Brolga Action Statement was published. I understand that data collected on Victorian population numbers and breeding success over the subsequent 20 years have not demonstrated any improvement in the status of Brolga in Victoria, which is reflected in the assignment of endangered status to Brolga under the FFG Act in 2021. Accordingly, I recommend that the Minister for the Environment consider prioritising a review of the Brolga Action Statement and consider the option of appending any finalised Standard to the Action Statement.

Assessment

It is my assessment that:

- The project has potential for unacceptable residual impacts on Brolga if it is constructed and operated as proposed. However, subject to exclusion of turbines, meteorological masts and powerlines from Brolga breeding home ranges and disturbance buffers as recommended above, the effects of development and operation of the wind farm on Brolga can be managed acceptably.
- All wetlands for which historical Brolga breeding records exist or which meet the criteria for suitable breeding wetlands in the Draft Standards, and which have not been shown to have been permanently drained, are to be considered Brolga breeding wetlands for the purposes of mapping breeding home ranges.
- In consultation with DEECA BSW, Wind Prospect should map turbine free buffers for Brolga breeding wetlands within the proposed wind farm, adopting home range dimensions of 600 m from the margins of all breeding wetlands and extending up to 2 km in the direction of other wetlands, and applying a further 300 m disturbance buffer to aggregated home ranges thus mapped.
- Isolated breeding wetlands with no other wetland within 2 km should also be mapped on the basis of a 600 m home range from the margins of the breeding wetland and a further 300 m disturbance allowance.
- All parts of a wind turbine including the sweep of turbine blades should be excluded from turbine free buffers.
- Construction works are to be avoided during the Brolga breeding period of July-November to avoid disturbance effects.
- The collision casualty monitoring program proposed for the BBAM Plan and the proposed Brolga Compensation Plan should respond to the specific findings in this assessment.
- This assessment should be provided to the Minister for Environment to consider the findings with respect to defining “permanently drained” wetlands, finalising the Draft Standards and considering reviewing the FFG Act Brolga Action Statement.

5.2 Biodiversity and habitat

Evaluation objective

Avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species. Where relevant, offset requirements are to be addressed consistent with state and Commonwealth policies.

Assessment context

Biodiversity and habitat effects are addressed in Chapter 12 (Biodiversity and habitat) and Technical Appendix D (Flora and Fauna Assessment) of the EES and in Chapter 5 of the IAP Report. Supporting information is provided in Chapter 9 (Groundwater), Chapter 10 (Surface water), and Appendix B (Hydrology and Hydrogeology). Wind Prospect has proposed 13 management measures to deal with biodiversity and habitat effects and some of these have been the subject of recommendations by the IAP.

This section focuses on biodiversity and habitat matters, except for Brolga, which is discussed in detail within section 5.1 and wetlands, discussed in section 5.3. Consolidated assessment of MNES is also presented in Appendix B.

The EES notes that the project site has been used for agricultural purposes for the past 100 years, with the majority of the site now supporting introduced or planted vegetation. Wind Prospect undertook a range of assessments to determine the occurrence and current extent of native flora and fauna at the site between 2009 and 2021. This included assessments for native vegetation, birds, bats and reptiles, along with targeted surveys including bird utilisation surveys, and terrestrial and aquatic habitat surveys.

The EES identified a total of 103 fauna species recorded during field surveys for the project. These consisted of 19 mammals (including 11 bats identified to species level), 76 birds, three reptiles and five frogs. Five of the mammal species and five bird species observed were introduced species.

The EES also recorded 848 ha of native vegetation across the site, which included 501 ha of mapped wetlands. It states within Chapter 12 that the habitats across the project site and surrounding areas were assessed to be of low to moderate ecological quality. A total of 208 plant species were recorded, comprising 123 indigenous species and 85 introduced species.

Potential impacts of the project for biodiversity values were examined through the EES and inquiry process, in particular:

- loss or degradation of native vegetation and/or habitat for threatened fauna and flora species and communities listed under the EPBC Act and FFG Act;
- direct impacts on threatened species;
- impacts on non-threatened fauna; and
- disturbance effects from changes in hydrology (including surface and groundwater changes).

Discussion

Native vegetation

Nine Ecological Vegetation Classes (EVCs) were recorded within the wind farm project area, all of which have a bioregional conservation status of endangered. Six EVCs were identified in the over-dimensional transport route area. The EES assessment identified that up to 4.57 ha of native vegetation, including 4.13 ha of native vegetation from patches and six large trees would be removed from the wind farm area during construction. The amount of native vegetation to be removed in the wind farm area was subsequently revised down through further avoidance in response to feedback from DELWP BSW on the planning permit application for the wind farm. Vegetation removal for the over-dimensional route was predicted to result in the loss of 0.04 ha of native vegetation in patches.

The revised impacts to native vegetation as discussed in Wind Prospect's expert witness statement[11] and the DELWP BSW submission[12] were: 4.27 ha of native vegetation in patches (comprising 4.23 ha in the wind farm site and 0.04 ha along the over-dimensional transport route), and one scattered tree.

DELWP BSW submissions noted that further changes in the location and extent of native vegetation losses are possible as the detailed design and construction footprint is finalised, and this can be dealt with by way of permit conditions and secondary consent. DELWP BSW was satisfied that Wind Prospect had taken adequate steps to avoid and minimise native vegetation removal and that the required offsets can be secured. The IAP accepted DELWP BSW's suggested amendments to the planning permit conditions and recommended amending the conditions to make native vegetation management and offset related changes. I support the IAP's recommendation as it would provide greater clarity to Wind Prospect about the future requirements for a Native Vegetation Removal report and offsets.

Threatened ecological communities

The EES assessed the clearance of 0.49 ha of Seasonal Herbaceous Wetland of the Temperate Lowland Plains as having the potential to result in a significant impact (Table 25.5 Chapter 25) because the action was considered likely to reduce the extent of the ecological community. The proponent indicated in the EES this impact would be offset in accordance with commonwealth offset requirements[13] and that a suitable offset site has been located. EMM BH01 requires offsets to be secured in accordance with state and commonwealth legislation and policy prior to construction.

11 Tabled Document 30

12 Tabled Document 170

13 EPBC Act Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities, 2012)

The proposed planning permit conditions include a requirement for a native vegetation management plan that shows areas of Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains.

The IAP concluded that the EES has appropriately applied the avoid and minimise principles to reduce vegetation removal, and that the impact on EPBC Act-listed flora species and ecological communities will be minimised as far as practicable. The EES concludes that impacts from the project to Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains are significant, as per guidelines under the EPBC Act, and therefore Commonwealth offsets are expected to be required.

I am satisfied that the impacts on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains have been minimised and are acceptable, subject to appropriate offsets in accordance with commonwealth policy. Residual impacts can be acceptably managed through the recommended EMMs and required approvals. It is noted that the Department of Climate Change, Energy, the Environment and Water (DCCEEW) may seek further information regarding the proposed offsets, if they are determined to be required, prior to a final EPBC approval decision on the project.

Listed threatened flora species

The EES identified 19 state and nationally significant flora species, listed under the EPBC Act or FFG Act, as being likely to or having the potential to occur in the wind farm area. Targeted surveys recorded the presence of only two listed species, Swamp Everlasting (listed as vulnerable under the EPBC Act and threatened under the FFG Act) and Trailing Hop-bush (listed as vulnerable under the EPBC Act). The other 17 species initially assessed as either likely to occur or having the potential to occur were not recorded during the targeted assessment, but it was noted that they have the potential to occur in areas where their associated EVCs are mapped.

The EES noted that there is a 0.31 ha unsurveyed area of Plains Grassy Wetland that has the potential to provide habitat for Swamp Everlasting, and a 0.05 ha area of Basalt Shrubby Woodland proposed to be cleared that has the potential to provide habitat for Trailing Hop-bush. A commitment has been made in EMM BH01 to undertake pre-construction surveys for threatened species in the construction footprint. Although not captured in BH01, the EES stated that if these species are recorded in this area, Wind Prospect will develop species-specific management measures which may include micro-siting or directional drilling.

The IAP found that potential impacts to state and federally listed flora species have been assessed appropriately and that Wind Prospect has proposed appropriate management controls and mitigation measures to avoid and minimise impacts. I am satisfied that, through avoidance of the known locations of listed plants recorded on site and the framework provided by the proposed EMMs and proposed planning permit conditions, the project will not have a significant impact on threatened flora species. However, I recommend amendments to EMM BH01 to require areas to be avoided or otherwise addressed within the construction environmental management plan where threatened flora species are recorded during pre-clearance surveys within the previously unsurveyed areas.

Listed threatened fauna and migratory species

The EES identified 25 state and nationally significant fauna species, listed under the EPBC Act and/or the FFG Act, as being likely to occur within the project area. Surveys for the EES detected the following species in the project area: Fork-tailed Swift, Brolga, Sharp-tailed Sandpiper, Common Greenshank, Latham's Snipe, Southern Bent-wing bat and Yellow-bellied Sheathtail Bat, Growling Grass Frog, Swamp Skink, Glossy Grass Skink, Yarra Pygmy Perch and Little Galaxias. The EES also concluded there is little suitable habitat for most migratory shorebirds, but there is suitable habitat for Latham's Snipe, including along Back Creek and Shaw River. Despite not observing any individuals during surveys, the EES also considered there to be potential for Grey-headed Flying Fox, Striped Legless Lizard (due to observed habitat) and Hairy Burrowing Crayfish (due to burrow chimney observed in a section along Moyne River and adjacent wetland).

The IAP noted that birds make up the majority of fauna observed in the project area. DELWP BSW's submissions were primarily concerned with Southern Bent-wing Bat and Brolga.

Ten species of bats and four multi-species complexes[14] were recorded during targeted surveys, including Long-eared Bat, Forest Bat, and Freetail Bat complexes. These included two threatened species, the Southern Bent-wing Bat (listed as critically endangered under the EPBC Act and FFG Act) and Yellow-bellied Sheathtail-bat (listed as vulnerable under

14 Calls associated with multiple species that cannot be identified to a species level

the FFG Act). Grey-headed Flying-fox (listed as vulnerable under the EPBC Act and FFG Act) was also considered to have the potential to occasionally fly over the project site, despite not being recorded.

Wind Prospect has included a range of mitigation measures for bats in EMM BH05 to BH09 for a BBAM Plan. The IAP considered that the EES had not adequately included appropriate management controls and mitigation measures for bats. The IAP recommended a 200 m turbine-free buffer distance from potential foraging habitat should be adopted to protect a variety of bats from direct collision with turbines and from barotrauma (injury from flying in low-pressure regions close to operating turbine blades) and recommended the cut-in speed specified in the proposed BBAM Plan should be increased to at least 4.5 m/s to help reduce potential bat casualties. This is discussed below.

Southern Bent-wing Bat

Southern Bent-wing Bat is listed as critically endangered under the EPBC Act and under the FFG Act. The species is distributed from south-eastern South Australia (around Robe, Naracoorte and Port MacDonnell), where it is also listed as endangered under Schedule 7 of the South Australian *National Parks and Wildlife Act 1972*, to south-western Victoria[15]. There are known maternity caves at Naracoorte, Warrnambool and Portland. The project is located between the Naracoorte and Warrnambool maternity caves, with the closest maternity caves being Warrnambool and Portland which are around 40 and 50 km away from the site respectively. There are also at least 70 caves in the distribution area of the species that are known roosting (non-breeding) sites. Activity is highest during the warmer months of the year (October to March) when there are favourable wind speeds and temperatures and greater insect activity.

DELWP BSW provided information to the IAP on the current scientific understanding of Southern Bent-wing Bat. The information submitted indicates that Southern Bent-wing Bat movements occur between caves throughout the year, including back and forth movements over successive nights between caves 70 km apart. Although the bats generally conserve energy during winter in times of lower insect availability, significant Southern Bent-wing Bat activity have been detected across the winter period, including inter-cave movements, suggesting that some level of foraging activity also continues during this time. Findings in Victoria have also shown that the species regularly flies long distances, with tracked individuals flying up to 85 km (average 35 km) out from caves each night and regularly moving between roosts about 60 km apart. This recent research, by Bush *et al.*[16], has shown that bat activity was focused on native and exotic treed vegetation, such as planted linear strips and scattered paddock trees.

The project site is located within the reported potential maximum nightly travel distance (i.e. 85 km) from a number of Southern Bent-wing Bat roosting sites and a maternity cave and the site has the potential to support regular and seasonal movements of Southern Bent-wing Bat between foraging areas and both roosting and maternity caves. I note the IAP's statement that the project is about 35 km from eight roosting caves, including a cave identified by DELWP BSW at Codrington, about 17 km to the south-west.

Southern Bent-wing Bat studies undertaken for the EES were considered by the proponent to be extensive and included the most comprehensive baseline bat monitoring (via bat detector surveys) of any Victorian wind farm. Bat surveys were undertaken over five of the eleven years between 2009 and 2020 at over 100 separate survey sites. Out of tens of thousands of recorded bat calls, 150 were attributed to Southern Bent-wing Bat. Mapping provided in the EES (Appendix D, Figure 10) showed that the majority of Southern Bent-wing Bat observations were concentrated in the west of the project area, near Shaw River, and the east of the project area, near Moyne River. Appendix D of the EES noted that the highest recorded Southern Bent-wing Bat calls were recorded in Spring 2010 and Autumn 2011. However, calls attributed to the Southern Bent-wing Bat complex were also recorded through to May 2022. Calls were predominately recorded near areas of mapped vegetation and waterways, with DELWP BSW noting in their submission that the highest number of Southern Bent-wing Bat calls (35 calls across 12 nights of survey) occurred in the large area of scattered trees in the south-west corner of the wind farm. Wind Prospect submitted that ultrasonic detection equipment detected bats only up to 45 m above ground, with expert witness Mr Lane stating that the Southern Bent-wing Bat is unlikely to fly at heights above 45 m, and a minimum blade height 40 m above ground would be sufficient to protect bats during flight through the project area. While acknowledging the presence of the species in the project area, the EES concluded that the site does not support significant foraging habitat, and therefore concluded that the risks from the project to the species were low.

15 *Miniopterus orianae bassanii* (Southern Bent-wing Bat) Conservation Advice (Threatened Species Scientific Committee, 2021)

16 Bush A, Lumsden L, Prowse TAA (2022). GPS tracking reveals long distance foraging flights of Southern Bent-wing Bats in an agricultural landscape. Spoken paper presented at the 20th Australasian Bat Society Conference, Brisbane. Abstract available.

DELWP BSW, along with other submitters, did not agree with Wind Prospect's conclusion that the residual risk to Southern Bent-wing Bat is low, stating that the conclusion appeared to be based largely upon the height of Southern Bent-wing Bat activity and, at least partially, upon Wind Prospect's findings of a lack of foraging habitat at turbine locations. DELWP BSW's submission included information that, despite the EES studies not detecting the species at 45 m height, the species has been detected at and above these heights elsewhere, and that several limitations in height survey methodology severely limited the ability to reliably detect Southern Bent-wing Bat actively at heights above 45 m. They also underlined the inherent uncertainty involved with bat surveys and associated impact assessments, resulting in a need to apply the precautionary principle and use effective mitigation measures to address residual risk.

The IAP raised concerns with the EES' conclusions on the residual risks to Southern Bent-wing Bat from the project. The IAP formed the view that the residual risks were not acceptable without further mitigation, as the EES inadequately described the flight path Southern Bent-wing Bat used to frequent the foraging habitats in the vicinity of the project area and the evidence suggests the species could be using the project area as a seasonal movement or migratory path between roosting and maternity caves. The IAP agreed with DELWP BSW that despite Wind Prospect's reliance on the minimum blade clearance as an effective mitigation measure, the presence of Southern Bent-wing Bat at the height of the rotor swept area cannot be disregarded, given the current level of scientific uncertainty around the flight height of the species[17] and the limitations of the survey methods[18].

The IAP recommended strengthening Wind Prospect's proposed mitigation measures to further avoid and minimise potential significant impacts to Southern Bent-wing Bat, including increasing the proposed turbine-free buffer distance and adopting the proponent's proposed low speed curtailment strategy (i.e. increasing the lowest wind speed at which turbines start to turn). My recommendations in relation to these matters are discussed in detail in the following sections. The IAP concluded that, with these additional avoidance and minimisation measures, the project could proceed without significantly impacting the Southern Bent-wing Bat population.

I support the IAP's conclusions and their recommendations, subject to amendments detailed in my assessment in the following sections. It should be noted that my assessment is relevant to the specific environmental conditions of this location and the proposed project, including the project's location relative to Southern Bent-wing Bat maternity caves and roosting sites.

Turbine-free buffers for Southern Bent-wing Bat

Wind Prospect proposed a turbine free buffer of 120 m from foraging habitat for Southern Bent-wing Bat, noting that recorded bat activity was primarily associated with native riparian vegetation, a eucalypt plantation adjacent to the Shaw River west of the project site, and a planted grove of trees east of the site. As DELWP BSW pointed out, the proposed buffer in the EES (Figure 10, Appendix D) did not appear to buffer the large number of scattered trees in the south-west corner of the site where the highest number of bat calls were recorded as it was not marked as potential Southern Bent-wing Bat habitat.

DELWP BSW submitted that, in lieu of species-specific, scientifically robust information for suitable buffering distances for the Southern Bent-wing Bat, all potential Southern Bent-wing Bat habitat should be buffered to a minimum of 200 m from the rotor-swept area of turbines consistent with the Eurobat Guidelines[19]. DELWP BSW also noted that the Eurobat Guidelines recommend that turbine free buffer zones be applied to other habitats which are specifically important for bats, such as tree lines, hedgerow networks, wetlands, waterbodies and watercourses. DELWP BSW noted that there is a high degree of uncertainty around suitable buffering distances for Southern Bent-wing Bat, and recommended taking an informed, precautionary approach when applying turbine buffers.

The IAP sought additional information from Wind Prospect during the hearings about the potential implications of implementing a 200 m turbine-free buffer from foraging habitat. Wind Prospect provided a figure (tabled document 67) which identified areas of remnant and planted vegetation as potential foraging habitat and an associated 200 m turbine-free buffer. The IAP agreed with DELWP BSW that the 200 m turbine-free buffer from foraging habitat should be applied to all potential Southern Bent-wing Bat foraging habitat consistent with the Eurobat Guidelines. The IAP noted that the

17 Threatened Species Scientific Committee 2021. *Conservation Advice Miniopterus orianae bassanii Southern Bent-wing Bat.* Department of Agriculture, Water and the Environment, Canberra.

18 See for example Goerlitz HR (2018). *Weather conditions determine attenuation and speed of sound: environmental limitations for monitoring and analyzing bat echolocation.* Ecology and Evolution 8, 5090–5100. doi:10.1002/ece3.4088 and Voigt CC, Russo D, Runkel V, Goerlitz HR (2021). *Limitations of acoustic monitoring at wind turbines to evaluate fatality risk of bats*. Mammal Review, mam.12248. doi:10.1111/mam.12248

19 Eurobats Publication Series No. 6 *Guidelines for consideration of bats in wind farm projects* – Revision 2014

200 m turbine-free buffer will help to protect the variety of bats, including the Southern Bent-wing Bat and Yellow-bellied Sheathtail-bats, from direct collision with turbines and from barotrauma (injury from flying in low-pressure regions close to operating turbine blades). The mapping provided in tabled document 67 indicates that at least 13 turbines are proposed within 200m of this potential habitat, which would need to be relocated or removed from the project. I note that there is a discrepancy between the IAP's recommendation to buffer all potential Southern Bent-wing Bat habitat and the mapping provided by Wind Prospect, which only buffers remnant and planted vegetation. However, I am comfortable that the combination of the Brolga buffers I have recommended, the proposed 100 m buffers of watercourses and remaining wetlands, and low wind speed curtailment discussed below will reduce the residual risk to Southern Bent-wing Bat to an acceptable level.

I note that the IAP's finding that the project will not significantly impact the Southern Bent-wing Bat population included the conditional statement "*if a 200 m buffer is applied around remnant and planted vegetation to avoid all potential foraging habitat in the project area.*" In accordance with the principles of the mitigation hierarchy, I support the IAP's recommendation for further avoidance of potential impacts to Southern Bent-wing Bat by increasing the turbine-free buffer distance, and I agree with the IAP's recommendation that the 200 m turbine-free buffer distance from potential foraging habitat as shown in tabled document 67 should be adopted.

Turbine cut-in speed for Southern Bent-wing Bat

During the hearings, Wind Prospect provided a draft BBAM Plan that proposed curtailment at low wind speed as an additional precautionary measure for the Southern Bent-wing Bat. Curtailment entails increasing the lowest wind speed at which turbines start to turn (i.e. the cut-in wind speed). This measure was proposed as part of a draft BBAM Plan provided to the IAP with Wind Prospect's expert witness statement for ecology. In his expert witness report, Mr Lane noted that Wind Prospect committed to increasing the cut-in wind speed to 4.5 m/s for turbines that are closest to the areas where higher Southern Bent-wing Bat activity was recorded, as shown in the proposed BBAM Plan at Appendix 5 of his expert witness report. He noted the proposal within the draft BBAM Plan to consider the effects of cut-in wind speeds and, if it is proven to be effective in significantly reducing the number of bat casualties, this curtailment measure will be implemented for the life of the project. The BBAM Plan proposed a trial to assess the effectiveness of a cut in speed of 4.5 m/s at turbines close to potential suitable habitat where Southern Bent-wing Bat were recorded at higher levels in the south-west and eastern sections of the wind farm site.

DELWP BSW was not satisfied with the proposed trial of curtailment at a small number of turbines, stating that curtailment has been shown to be effective at reducing insectivorous bat mortality locally and internationally, and submitted that it should be adopted for the life of the facility. Referring to a recent study by Bennett *et al* 2022[20], the IAP noted that it showed that curtailment significantly reduced bat fatalities by 54%, with marginal reduction in annual power and revenue. This research describes curtailment as the primary mitigation strategy undertaken in the Northern Hemisphere to reduce turbine-associated mortality for bats. The authors recommend curtailment should be applied between dusk and dawn October to March (inclusive) to reduce impacts on bats from turbines at wind energy facilities, particularly at sites with known populations of endangered and threatened species. Highlighting this paper, the IAP recommended that turbines for the project should have a minimum cut-in speed of 4.5 m/s during spring and summer.

I note the IAP recommendation for the minimum 4.5 m/s cut-in speed to be reviewed as part of the proponent's proposed two-year trial. However, due to the demonstrated benefit of implementing low wind speed curtailment, including that reported by Bennett et al, and the uncertainty associated with potential impacts to Southern Bent-wing Bat, I recommend the minimum cut-in speed of 4.5 m/s be applied during periods of highest Southern Bent-wing Bat activity for the life of the project, noting that Wind Prospect proposed to continue curtailment for the life of the project if monitoring results showed it to be successful. I support this proposal, but I note that any finding that curtailment is not a successful mitigation measures, presumably through evidence of bird or bat mortality, should not result in an end to curtailment, but to an increase in the minimum cut-in speed to determine what cut-in speed is required to avoid Southern Bent-wing Bat impacts. Therefore, I recommend that the minimum cut-in speed should apply for the life of the project with its effectiveness reviewed through the monitoring proposed in the BBAM Plan. Investigations to inform proposed changes to the management strategy should consider which turbines present a higher risk to the species and the appropriateness of the selected mitigation measures (e.g. curtailment or changes to cut-in speed) should also be investigated and adjusted, as required.

20 Bennett, E.M., Florent, S.N., Venosta, M., Gibson, M., Jackson, A., Stark, E. (2022) *Curtailment as a successful method for reducing bat mortality at a southern Australia wind farm*, Austral Ecology 47, 1329-1339. doi:10.1111/aec.13220

As the EES recorded Southern Bent-wing Bat activity in the Willatook project area during autumn, I recommend that the minimum cut-in speed be applied between dusk and dawn over the entirety of spring and autumn (i.e. September to May, inclusive), to ensure that sufficient mitigation measures are in place during the months of known higher Southern Bent-wing Bat activity. I note there is also potential for Southern Bent-wing Bat to utilise the site outside of this time period, and I therefore recommend that curtailment be required in additional months should Southern Bent-wing Bat mortalities be recorded outside of September to May through the proposed monitoring program.

In relation to the proponent's proposed curtailment trial at a select number of turbines, I note that the EES studies recorded Southern Bent-wing Bat activity throughout the project area, including some records in proximity to turbines that were located in areas away from the 200m buffers mapped in tabled document 67 and significant call counts near turbines just outside of the buffered areas and between areas of mapped habitat. On the basis that Southern Bent-wing Bat are known to fly across open areas between foraging sites and are likely use the project site to move between feeding habitats and caves, I support the recommendation of submitters, including DELWP BSW, that the minimum cut-in speed should be applied to all turbines in the project to reduce the likelihood of potential impacts to the species from turbine collision as they move throughout the site. I recommend that these requirements for low wind speed curtailment to protect Southern Bent-wing Bat are captured in EMM BH05 to inform the BBAM Plan, which will require approval from DEECA prior to implementation.

I also note that DELWP BSW raised concern[21] with the justification used to determine the proposed 4.5 m/s cut in speed, noting that curtailment is typically applied between 5 to 7 m/s. Examples were provided of international wind energy facilities which utilise cut in speeds of 6.5 m/s and 6.9 m/s for federally listed species, noting that a meta-analysis found that cut-in speeds of 6.5 m/s was estimated to reduce bat mortality by 79%, and each additional 1 m/s curtailed resulted in an additional 33% reduction in mortality. DELWP BSW asserted that small changes to the specific curtailment adopted for this site is likely to be significant. However, I support the IAP's recommendation of the minimum cut-in speed of 4.5 m/s, provided it is applied to all turbines at the facility for the life of the project and implemented between September and May when bat activity is as its highest. Due to the residual uncertainty around potential impacts to Southern Bent-wing Bat, I support an adaptive approach to this mitigation measure with monitoring results informing any required increase in the minimum cut-in wind speed or changes to the management approach should other effective management strategies be developed during the operational life of the project. I recommend that the EMM BH05 be updated to include a requirement to increase the minimum cut-in speed above 4.5 m/s or consider additional or alternative mitigation measures should any mortalities of Southern Bent-wing Bat be recorded during the times when the cut-in speed is being implemented. The revised management response or cut-in speed must be approved by DEECA and DCCEEW.

I support the IAP findings that the project, as proposed in the EES, poses an unacceptable risk of significant impact on the Southern Bent-wing Bat. Due to this risk and the uncertainties associated with the potential impacts to Southern Bent-wing Bat from this project a precautionary approach is appropriate. Therefore, I support the IAP's findings, as amended by my assessment, to ensure the residual significant impacts to Southern Bent-wing Bat are minimised to acceptable levels.

I agree with the IAP's conclusion that, provided the recommended modifications to the project are implemented, the project will not significantly impact the Southern Bent-wing Bat population.

Yellow-bellied Sheathtail-bat

The Yellow-bellied Sheathtail-bat is known to visit Victoria in late summer and autumn. They are a high-flying species that usually flies fast and straight above the canopy but are known to fly lower over open spaces and at the forest edge. The EES recorded Yellow-bellied Sheathtail-bat at nine sites with a total of 16 calls attributed to the species. It identified that there are records of the species colliding with wind turbines interstate where the species is more abundant, however, analysis of post construction monitoring of bat deaths from turbine collisions at 15 Victorian wind farms between 2003 to February 2018 did not record any deaths of the species. It was noted by the IAP and submitters that there are limitations in detecting bat mortalities during post construction monitoring.

I support the IAP's conclusion that impacts to the species can be readily managed through the BBAM Plan and the monitoring and mitigation measures recommended for the Southern Bent-wing Bat. The curtailment strategy is ultimately a component of the BBAM Plan, which is discussed in further detail below.

21 Tabled document 170, pp.12-13

Grey-headed flying-fox

The EES identified that the Grey-headed Flying-fox has the potential to occasionally fly over the project site due to the proximity to the closest known roost site at Warrnambool, located greater than 30 km from the nearest turbine, and temporary camp at Mortlake, located greater than 45 km from the nearest turbine. There were no records of Grey-headed Flying-fox within the 10 km search region. The nearest record was located approximately 15 km away located at Kirkstall.

The EES concluded that the overall risk to the Grey-headed Flying-fox is very low and the incorporation of a turbine-free buffer around treed areas will act to further mitigate potential collision risk. I note that Grey-headed Flying-foxes are known to fly at heights of the rotor swept area, and Grey-headed Flying Fox mortalities have been recorded at wind farms, such as the nearby Salt Creek Wind Farm. To mitigate against potential risks to the species, I recommend that the BBAM Plan is updated to include suitable contingency measures should any Grey-headed Flying Fox mortalities be recorded during operation. I am satisfied that the recommended measures for other bat species, with the inclusion of specific contingency measures within the BBAM Plan, can ensure the project will not have a significant impact on Grey-headed Flying-fox.

Birds

A total of 96 species were identified in project area and surrounding areas between 2009 and 2020. Four listed species were observed during surveys for the EES: Fork-tailed Swift, which is listed as a migratory species under the EPBC Act Sharp-tailed Sandpiper, Common Greenshank and Latham's Snipe. The EES also found that Curlew Sandpiper and Red-necked Stint had the potential to occasionally visit wetlands on the wind farm site. The main threats to these species identified within the EES include removal of habitat and collision with wind turbines. Further assessment for Brolga can be found in section 5.1 of this assessment.

The EES stated that while not found during the targeted surveys, there is potential for the Black Falcon and the Little Eagle to occur occasionally within the project area. The Black Falcon is listed as critically endangered under the FFG Act and the Little Eagle is listed as vulnerable under the FFG Act. There are records of Black Falcon collisions with wind turbines at other wind farms in south-eastern Australia, and the species is at risk of collisions at the Willatook site. In addition, it is noted that the Little Eagle is known to fly at heights of wind turbines, putting it at risk of collision. The EES concluded that the project would have a low impact on the population of these species.

I note that listed migratory species are not a controlling provision for the project under the EPBC Act. However, Wind Prospect assessed potential impacts in the EES. Common Greenshank, Curlew Sandpiper, Fork-tailed Swift, Latham's Snipe, Red-necked Stint, Sharp-tailed Sandpiper and White-throated Needletail are listed as Migratory under the EPBC Act. Curlew Sandpiper is also listed as critically endangered, and White-throated Needletail is listed as vulnerable under the EPBC Act.

Sharp-tailed Sandpiper, Latham's Snipe and Common Greenshank were recorded during targeted surveys in 2018. All species were recorded in numbers that would not exceed the threshold significance levels of 0.1% of flyway population. Curlew Sandpiper and Red-necked Stint may be expected to occur in small numbers occasionally given the limited extent of suitable habitat on the project site. Such numbers would not exceed significance levels of a threshold of 0.1% of flyway population.

I note there have been records of White-throated Needletail mortalities at wind facilities in Tasmania, and that the species conservation advice lists mortality from wind turbines as a key threat to the species. To mitigate against potential risks to the species, I recommend that the BBAM Plan is updated to include suitable contingency measures should mortalities of this or other threatened migratory species be recorded during operation.

The EES found that suitable habitat for listed migratory shore birds was scarce, limited in extent and scattered. Far more extensive habitat that supports much higher numbers of all recorded or likely species of shorebird occur coastward from the wind farm search region. Suitable habitat for Latham's Snipe was identified along Back Creek and Shaw River and some deeper, more heavily vegetated wetlands. Latham's Snipe may occur in a wider variety of sites than other migratory shorebirds even though it has only been confirmed at one site on the proposed wind farm. Due to the limited extent of suitable habitat, numbers on the project site are unlikely to see the 0.1% of the population and no wetland is likely to support at least 18 individuals. The EES concluded that there will be no significant impacts on migratory shore birds.

On the basis that significant impact thresholds for the above species have not been reached and the inclusion of mitigation measures should migratory species be impacted by the project during operation, I am satisfied that the project will not have a significant impact on listed migratory species.

BBAM Plan

Wind Prospect proposed a BBAM Plan for the project in EMMs BH05 to BH09, which would require approval from DEECA, DCCEEW and the responsible authority. It was proposed that the plan would use an adaptive management approach where management measures are adapted over time to mitigate effects more effectively based on monitoring results. Although not included in the exhibited EES, a draft BBAM Plan was provided in Appendix 5 of the Expert Witness Report prepared by Mr Lane on behalf of Wind Prospect for the hearings. DELWP BSW raised concerns[22] with the information presented in the BBAM Plan, noting it had not been provided to the Technical Reference Group for review or comment during development of the EES. DELWP BSW's concerns included a lack of clarity around the roles and responsibilities for proposed mitigation measures in response to a trigger criterion and that the process does not effectively facilitate a precautionary approach to prevent significant impacts to threatened species. It also noted the high degree of uncertainty and lack of clear commitments to specific mitigation measures that will end up being incorporated into the final BBAM Plan adopted for the project. DELWP BSW also highlighted recent experience with existing wind farms in the BSW region that has demonstrated problems with similar BBAM plans that take an 'investigate and potentially mitigate' approach, which results in long response times and often no action being taken. Other submitters also considered the BBAM Plan to be inadequate.

In discussing the effectiveness of post-construction monitoring, the IAP noted that there is a degree of uncertainty surrounding the potential impacts to Southern Bent-wing Bat, particularly in reference to the recorded mortality rate likely only representing a subset of actual mortalities. This was supported by the IAP who referred to research by Van Harten *et al*. which reported that, although deceased bats are recovered at wind energy facilities, there is a high degree of uncertainty around mortality estimates and population level impacts are unknown. The IAP concluded that more frequent monitoring during periods of higher bat activity is required to assist with considering more appropriate cut-in speeds.

The EES discussed the results of post-construction monitoring of bird and bat mortality at Victorian wind energy facilities. The IAP noted that one of the mortalities was recorded at Macarthur Wind Farm, about 5 km north of the project area. In considering the effectiveness of such monitoring it was noted that there is a high degree of uncertainty around mortality estimates and population level impacts. The IAP recommended more frequent monitoring be undertaken during periods of higher bat activity. I agree with the IAP, but I note that additional surveys during the warmer months are already proposed in EMM BH07.

The IAP considered that the BBAM Plan will be important to monitor bird and bat impacts and that it should consider all species at risk and adopt monitoring and adaptive management for the range of species at risk. The IAP concluded that the BBAM Plan and ongoing monitoring should be audited by an independent qualified ecologist. Given the proposed approach in EMM BH05 for the BBAM Plan to be approved by DEECA, DCCEEW and the responsible authority, I do not agree that the plan should be audited separately. I am comfortable that any issues with the proposed BBAM Plan can be effectively dealt with through the proposed approval requirements. It is noted that DCCEEW may extend the EPBC statutory decision timeframes to appropriately consider the BBAM Plan to ensure it is appropriate to inform a final decision on the project under the EPBC Act.

However, I do support the IAP's recommendation for the involvement of an independent auditor during implementation of the plan, and I recommend that this be included in EMM BH05. As proposed by the IAP, the auditor's role should include periodic independent review of the BBAM Plan content and ongoing monitoring of the plan's implementation to ensure it reflects current operational obligations and relevant legislation and policy. The IAP also recommended that the BBAM Plan require ongoing monitoring for the life of the project to better understand and respond to any ongoing impacts, which I also endorse. It is my recommendation that the proponent should also promptly publish the results of the environmental performance and compliance auditing on their website, as I have recommended in a number of my recent assessments. This will ensure the community are aware of the environmental performance of the proponent.

Aquatic fauna

Two fish species were identified in aquatic field surveys for the EES: Little Galaxias and Yarra Pygmy Perch. Suitable habitat is present for the Yarra Pygmy Perch in Shaw River and Back Creek. Construction activities would result in

22 Tabled document 170, pp.13-14

physical disturbance to creek beds and associated aquatic habitats at two crossing points in Shaw River and Back Creek and resulting reduction in water quality (primarily increased suspended sediment) at these points. EMM BH13 addresses watercourse crossing measures to mitigate potential impacts to Little Galaxias and Yarra Pygmy Perch. Based on the ecology of both species, and the availability of refuge habitats the magnitude of construction, impacts on the species were assessed to be low. The EES predicted a very low impact on the Little Galaxias and Yarra Pygmy Perch during operations on the basis that detailed designs would be informed by detailed hydrological modelling with hydrological connectivity maintained. I agree that the project will not have a significant impact on Little Galaxias or Yarra Pygmy Perch.

The project generally avoids areas identified as Growling Grass Frog habitat. The two proposed crossings at Back Creek and Shaw River were identified to have potential impacts to Growling Grass Frog through removal of approximately 0.26 ha of habitat at waterway crossings. EMM BH11 proposed a range of management measures for a Growling Grass Frog management plan. Proposed mitigation measures include pre-clearance surveys for the species, implementing a salvage and translocation protocol, installing temporary frog exclusion fencing at crossing points, reducing the construction footprint within mapped habitats, adopting recommended crossing designs by DELWP[23] to ensure habitat connectivity is maintained, and promptly restoring and enhancing affected areas. A range of further measures would be carried out as part of the construction environmental management plan to minimise impacts to these watercourses, which are also relevant to minimising impacts to the Growling Grass Frog.

I note the importance of preventing impacts to Growling Grass Frog from Chytrid Fungus and support the specific management measure which requires good hygiene practices to prevent the spread of the fungus. The IAP agreed that potential impacts to this EPBC-listed species have been assessed appropriately and that Wind Prospect has proposed appropriate management controls and mitigation measures to avoid and minimise impacts. I am generally satisfied that the mitigation measures proposed by Wind Prospect address the impacts to these species, and I agree that there will not be significant impacts on Growling Grass Frog and that impacts can be acceptably managed through the recommended EMMs and required approvals.

Reptiles

No impacts were predicted to Swamp Skink and Glossy Grass Skink and, with the proposed mitigation measures in place, impacts on the Striped Legless Lizard from the project were assessed to be very low. I am generally satisfied that the mitigation measures proposed by Wind Prospect address the impacts to these species, which will be incorporated into the environmental management plan to be approved by DEECA, as required by the proposed permit conditions. With these measures in place, I am satisfied that there are unlikely to be significant impacts on these species.

Cumulative fauna impacts

The IAP noted that there is concentration of wind turbines within Moyne Shire, which may have a cumulative impact to some species across this region. Appendix D of the EES indicates between about 7 and 11 bat mortalities occur at a turbine each year in Western Victoria. The mortality rate for bats is not reported to be significantly different for different sizes of turbines. For birds, significantly more mortalities occur with larger turbines, with a small turbine recording between about 3 to 4 bird mortalities each year, while a large turbine has between about 5 to 7 each year.

The IAP was of the view that, based on available information, the Willatook Wind Farm combined with other operating and approved wind farms is unlikely to result in an unacceptable cumulative impact if recommended measures and permit conditions are applied. On balance, considering the likelihood that the project footprint will be reduced in size through the implementation of my recommendations, I support the IAP's findings.

Assessment

It is my assessment that:

- Impacts on native vegetation have been appropriately minimised and are acceptable and can be effectively managed through the proposed permit conditions and EMMs.
- Impacts on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains will be acceptable provided the recommended mitigation measures and proposed conditions are implemented effectively, and the residual impacts are offset in accordance with the EPBC Act Environmental Offsets Policy.

23 Growling Grass Frog Crossing Design Standards (DELWP, 2017)

- The project will have an acceptable impact on threatened flora species, subject to my recommended amendments to EMM BH01 to require that any threatened flora species recorded within the previously unsurveyed areas will be avoided and addressed within the construction environmental management plan.
- The project has potential for unacceptable residual impacts on Southern Bent-wing Bat if it is constructed and operated as proposed.
- The risk of residual impacts to Southern Bent-wing Bat are only considered acceptable and manageable provided:
    - the 200 m turbine-free buffer is applied to potential Southern Bent-wing Bat foraging habitat as shown in tabled document 67;
    - the cut-in wind speed specified in the BBAM Plan is increased to at least 4.5 m/s from dusk to dawn between September and May for the life of the wind farm to help reduce potential bat mortalities;
    - the cut-in wind speed requirements should be applied to all turbines for the project;
    - the cut-in speed of a minimum of 4.5 m/s should also be applied during additional months if any Southern Bent-wing Bat mortalities are recorded during winter;
    - any changes to turbine blade tip height to meet aviation safety requirements do not result in a reduction in the lower ground clearance for the rotor swept area; and
    - there is ongoing monitoring through the BBAM Plan and implementation of appropriate additional mitigation measures in response to observed bird and bat impacts, noting that monitoring results should inform the potential need to increase the minimum cut-in wind speed or consider other effective management strategies if Southern Bent-wing Bat mortalities are recorded.
- Impacts on birds and other bat species will be acceptable with the implementation of the proposed mitigation measures, including those recommended and amended within this assessment for the Southern Bent-wing Bat and Brolga.
- The project will have acceptable impacts on other threatened flora and fauna species.

I recommend the following amendments to the EMMs:

- Amend EMM BH01 to require that any threatened flora species recorded within the previously unsurveyed areas will be avoided and will be addressed within the construction environmental management plan required for the project.
- Amend EMM BH02 in line with the IAP's recommendation to recognise no-go areas for Brolga and bat habitat buffers.
- Amend EMM BH04 in line with the IAP's suggested wording for biosecurity measures.
- Amend EMM BH05 to capture the recommendations of the IAP and my assessment relating to the BBAM Plan, including:
    - curtailment requirements as outlined in my assessment;
    - contingency measures should mortalities of any threatened species be recorded during operation; and
    - the involvement of an independent auditor during implementation of the plan to periodically review the BBAMP Plan content and monitor its implementation.

5.3 Groundwater and surface water

Evaluation objective

Maintain the functions and values of aquatic environments, groundwater quality and avoid adverse effects on protected beneficial uses.

Assessment context

Surface water and groundwater effects are addressed in Chapter 9 (groundwater), Chapter 10 (surface water), and Technical Appendix B of the EES, and in Chapter 4 of the IAP report. Additional information related to groundwater and surface water is provided in Appendix E (biodiversity, including groundwater dependent ecosystems) and Attachment II

(Preliminary Draft Quarry Work Plan) of the EES. Technical appendices C1 (Brolga Impact Assessment) and Appendix E (Biodiversity) were informed by the findings of the surface water and groundwater assessments.

Wind Prospect has proposed EMMs SW01 to SW09 to manage surface water effects and GW01 to GW11 to manage groundwater effects. Of these, SW03, SW04, GW02, GW05 and GW07 have been the subject of recommendations relevant to surface water and groundwater by the IAP.

Surface water

The project area is located within the catchments of Shaw River and Moyne River. The main watercourses that pass through the project area are Shaw River and Back Creek with several smaller tributaries and drainage lines feed into Shaw River and Back Creek. In the north and central parts of the project area a series of low-lying areas form a series of ephemeral wetlands known as Cockatoo Swamp. Several ephemeral wetlands are located within the project area and to the south and west of the project area. Wild Dog Swamp (wetland 25816) is located to the east of the project area.

Key impact pathways during project construction and operation include physical disturbance, reduced water quality from construction runoff and altering the existing hydrology of the site. Two main crossings are proposed for Shaw River and Back Creek. Sedimentation is most likely to occur during periods of intense rainfall and would be caused from runoff from stockpiles or cleared areas including hardstand areas, access tracks and cable trenches.

The significance of the residual effects of watercourse crossings, alteration of existing drainage patterns and reduced water quality from construction and operation works were assessed in the EES to be very low to low. The EES predicts these impacts to be localised and temporary in nature.

An on-site quarry is proposed in the western part of the project area. The on-site quarry is proposed to be a 'zero discharge' site meaning all surface water is to be retained on site and managed using retention basins. The EES stated that surface water management at the on-site quarry would include the use of swale drains, bunding, sediment traps and sumps to ensure surface water is captured within the work authority area. Based on this proposed zero discharge design the EES has assessed the surface water impacts from potential discharge of water from the on-site quarry to be negligible.

Groundwater

Based on the findings of the hydrogeological assessment, three groundwater aquifers were identified within the investigation area: Quaternary Alluvium aquifer; Newer Volcanic Group basalts aquifer and Port Campbell Limestone aquifer. The main aquifer within the project area is the Newer Volcanic Group basalts aquifer.

Depth to groundwater across the region is influenced by seasonal rainfall. Groundwater is generally shallow across the project area with depths estimated to be between 1 and 12 m below surface level. Shallow aquifers that intersect the surface may also be present as small, saturated wetland areas or springs.

Groundwater flow in the project area is driven by recharge, predominantly via infiltrating rain during winter and spring. Groundwater discharge generally occurs through groundwater extraction from wells, at the edge of geological formations and topographic lows where surface expressions of groundwater are common. Groundwater depletion also occurs through evapotranspiration.

Groundwater within the project area is generally brackish and too hard for potable domestic use but is of sufficient quality to be used for irrigation, stock and some industrial processes. The EES classified groundwater as generally falling within Segments B to C (as detailed in the Environment Reference Standard) with a total dissolved solids (TDS) range of 1,001-3,500 mg/L with isolated areas falling within Segment A2 with TDS range of 501 to 1,000 mg/L. There are 9 groundwater bores registered (by Southern Rural Water) within the project area as unmetered bores for stock and domestic use. There are also several bores in proximity to the project area and there are potentially unregistered bores in operation within the project area.

Field surveys informing the EES identified four vegetation types within the project area that have the potential to be Type 2 terrestrial groundwater dependent ecosystems (GDEs) (ecosystems dependent on the surface expression of groundwater) and four vegetation types that could be Type 3 terrestrial GDEs (ecosystems dependent on subsurface presence of groundwater):

- Type 2
    - Plains Grassy Wetland (EVC 125)

- Tall Marsh (EVC 821)
- Aquatic Herbland (EVC 653)
- Swamp Scrub (EVC 53)

- Type 3
  - Stony Knoll Shrubland (EVC 649)
  - Higher-rainfall Plains Grassy Woodland (EVC 55_63)
  - Basalt Shrubby Woodland (EVC 642)
  - Heavier-soils Plains Grassland (EVC 132_61)

It is considered likely that the primary water source for these terrestrial vegetation types is rainfall.

Potential aquatic GDEs were also mapped using online databases and identified temporary freshwater marshes and meadows associated with the Cockatoo Swamp wetland complex and an area of the Shaw River, smaller isolated temporary freshwater marshes and meadows and areas of ephemeral wetlands within the project area. Surface water modelling conducted for the EES suggests that these systems are predominately surface water driven with inundation occurring during winter and spring months. It was observed that the systems are dry during summer, confirming that groundwater does not provide a permanent water source.

Key impact pathways during project construction and operation include localised lowering of the water table from groundwater dewatering during quarry operation and during wind turbine foundation excavation, altered groundwater recharge and flows from infrastructure foundations and hardstands (creating barriers to water movement), and reduced water quality from accidental spills of hazardous chemicals. The significance of the residual effects to groundwater users and groundwater quality from construction and operation works was assessed in the EES to be very low to low, as the impacts are expected to be localised and temporary in nature.

The proposed excavation depth for the on-site quarry extends below the water table level requiring dewatering during operation. The EES proposed the quarry to be a 'zero discharge' site and extracted groundwater would be managed onsite using retention basins. The EES proposed two water management dams with capacity to hold 22 ML and 20 ML each. Contingency measures include portioning a part of the excavation area for water retention once rehabilitation batters were developed. It is proposed that this water would then be used for process water for use in dust suppression. Groundwater dewatering will be managed under a Take and Use Licence, to be approved by Southern Rural Water as the delegated authority under the *Water Act 1989* and in accordance with the Environment Protection Regulations, as set out in EMM GW06.

Discussion

Surface water

The IAP report summarised the key issues related to the surface water assessment as:

- whether the EES and permit application have appropriately assessed surface water;
- whether impermeable hardstands and access tracks will result in acceptable on-site and offsite wetland hydrology (flow rate and volume) and water quality; and
- whether natural hydrological flows will be impeded across the landscape, impacting ephemeral wetlands.

Several parties raised concerns that the hydrological and hydraulic modelling did not include rainfall data between January 2020 and December 2022. Therefore, the extent of inundation modelled across the project area is not likely to be fully representative of conditions experienced at the site. During the hearing, parties presented evidence that showed this data would have modelled a far more expansive inundation area and would have likely resulted in a greater number of wetlands in the project area being identified as sustaining water for more than 120 consecutive days, which was the measure for which a wetland was defined as functional (particularly from a habitat/Brolga perspective). I note that the EES acknowledges this limitation and Wind Prospect noted during evidence tendered to the IAP that further assessment would be completed during the detailed design phase. The IAP agreed that the modelling would have benefited from including rainfall data between 2020 and 2022 to better determine current wetlands that meet the inundation criteria.

The IAP also found that the inclusion of additional LiDAR data could improve mapping of wetlands to the south and east of the project area. This improved mapping would help to better understand connectivity and extent of ephemeral wetlands that may interact with the project area and the potential for the project to impact offsite wetland hydrology. However, the IAP also found that the EES has appropriately considered surface water, including mapping of the

extensive wetlands that exist across the project area. The IAP found that the EES and permit application had, in general, appropriately assessed potential impacts to surface water given the EMMs and permit conditions set an appropriate framework for managing residual impacts to surface water in the context of final design. The suitability of wetlands as Brolga breeding habitat and the associated impacts are discussed in section 5.1 of this assessment.

A submission by EPA also raised that the EES did not sufficiently consider applicable and future surface water environmental values and suggested changes to the EMMs to include additional background water quality monitoring before construction commences and daily or real-time turbidity measurements to help better understand the potential surface water impacts. This has been proposed through updates to EMM SW03, relating to the construction environmental management plan, and EMM SW04, relating to the details of the sediment, erosion and water quality management plan. The IAP accepted the EPA's suggested changes to the EMMs, which I also support to mitigate surface water impacts.

The EES outlined several design and management measures to reduce the impact of alteration to hydrological patterns including siting and design of hardstand areas to maintain overland flow paths, scheduling of works during drier months of the year and including a 100 m buffer around all Victorian Wetland Inventory mapped wetlands and watercourses during construction. The IAP found that these set an appropriate framework for managing these impacts during construction. I support this finding.

The IAP also found that access tracks and hardstand areas can sensitively respond to drainage patterns and ecological values by avoiding construction works during periods of inundation. The IAP recommended changes to EMM SW03 to require construction to be avoided from July to end of November. While I support the recommendation to minimise Brolga impacts, given EMM SW03 relates to waterway crossings, I do not support the recommended changes to this EMM.

The IAP also proposed a planning permit condition requiring the construction environment management plan to include a measure requiring no construction from July to end of November. I do support this recommended requirement for the construction environmental management plan as this is the appropriate mechanism for implementing this requirement.

I agree with the IAP's findings that surface water impacts can be avoided through the proposed framework, which includes a sediment, erosion and water quality management plan under EMM SW04, with measures to schedule ground-disturbing works to drier periods and maintain waterway and wetland buffers.

Detailed design and engineering of access tracks and structures will be critical in maintaining natural hydrological flow paths within the project area. The Glenelg Hopkins CMA Works on Waterways Licence application will allow the Glenelg Hopkins CMA to assess and approve the engineered structures proposed to maintain the natural hydrology of designated waterways in the project area, including in the context of more representative modelling of the site's hydrological and hydraulic conditions. This is supported through the implementation of EMM SW01 and SW02, which I endorse.

Groundwater

Based on two scenarios of hydraulic conductivity, the EES predicts that there would be a negligible reduction in groundwater levels in the Newer Volcanic Group basalts aquifer from the quarry site at local groundwater bores and GDEs. The nearest groundwater bore is outside the predicted extent of drawdown under the worst-case scenario (1,080 m from the quarry). The EES identified that the GDEs within the drawdown area were predominately surface water driven and therefore do not rely on groundwater as a permanent water source. Moyne Council considered the EES had not adequately addressed the hydrogeological drawdown from the on-site quarry. The IAP considered that given the connectivity of the groundwater-surface water interactions, groundwater drawdown may reduce the availability of surface water in wetlands, resulting in reduced inundation time, and that this was not adequately explored in the EES. The EES notes uncertainties in the groundwater assessment around hydraulic connectivity and that further groundwater investigations prior to construction are proposed to improve confidence of groundwater drawdown predictions. These investigations will be conducted as part of the finalisation of the quarry's work plan and work authority under the MRSD Act. The EES stated that further investigations were required, and the IAP recommends that these investigations should consider the impact on groundwater drawdown and the ability for a wetland within the drawdown radius to remain inundated and support Brolga breeding. I accept the explanation in the EES and support the IAPs suggestions regarding further investigations. The updating of assumptions and inputs underpinning the predictions of groundwater drawdown from quarry dewatering are covered by EMM GW04. I recommend further changes to GW05 to require that the water management plan also include the management measures informed by EMM GW04, which must ensure that impacts associated with quarry dewatering do not adversely impact aquatic GDEs or Brolga wetlands beyond the predictions in

the EES. Potential impacts to Brolga are covered in section 5.1 of this assessment and further discussion of the quarry's impacts is provided in section 5.9.

Excavations for the wind turbine foundations, cable crossings and access tracks are likely to intersect the groundwater resource within the Quaternary Alluvium Aquifer. The IAP's finding on groundwater was that construction of turbine foundations and access tracks is unlikely to adversely impact groundwater values if there are no construction works from July to end of November, when groundwater levels are highest due to seasonal rain. The IAP recommended this restriction on construction activity be captured through changes to EMM SW03. While I agree with the IAP's finding, as discussed above, I do not support the proposed changes to SW03 as it is the wrong place to capture this restriction. I am satisfied that groundwater impacts will be acceptable, particularly with the moratorium on construction works from July-November to minimise potential impacts on Brolga, but I support this being applied through the IAP's proposed planning permit condition to require a measure in the construction environmental management plan for no construction from July to end of November.

A submission by EPA raised that the EES placed insufficient consideration on all applicable and future groundwater environmental values, given that TDS differs between Segment A2 and Segment C. The EES classified groundwater within the project area as generally falling within Segments B to C with isolated areas falling within Segment A2, however the EES only assessed impacts on groundwater within the Segments B to C in relation to the quarry. EPA suggested that, as a conservative approach, any future assessment should consider all applicable present and future groundwater values of Segment A2, including for groundwater fauna. EPA also suggested that the EMMs should be modified to include groundwater monitoring and remove the limitation of isolating assessments to existing groundwater bores. The IAP agreed with this approach and recommended that additional monitoring wells should be installed at least 1,000 m from the quarry. I support this recommendation by the IAP and recommend that EMM GW07 be amended to note this. The IAP also accepted EPA's recommended changes to EMMs GW04, GW05 and GW07 to include baseline groundwater inflow and quality monitoring to be conducted before and during quarry construction, which I support.

Assessment

It is my assessment that the effects of the project on surface water will be acceptable provided they are managed in accordance with the proposed design measures and in accordance with the EMMs and permit conditions recommended by the IAP. Further to that, I adopt the IAP's recommendations for amendments to EMMs SW03 and SW04 to strengthen the requirements of the construction environmental management plan and the sediment, erosion and water quality management plan.

This includes ensuring the detailed design and engineering maintains natural hydrological flows within the project area, to be addressed through the CMA Waterways Licence application, in the context of updated and sufficiently representative modelling of the site's hydrological and hydraulic conditions.

However, I do not support the IAP's recommended change to SW03 to avoid construction during July to November as SW03 is not the appropriate place to capture this requirement, which is best done via the construction environmental management plan.

It is my assessment that effects of the project on groundwater will be acceptable provided they are managed in accordance with the proposed design measures, proposed contingency measures and in accordance with the EMMs and permit conditions recommended by the IAP. I acknowledge that there are uncertainties in the assessment and support the recommendation that additional monitoring wells should be installed at least 1,000 m from the quarry to monitor and respond to potential impacts and this be reflected through amendments to EMM GW07.

I support the IAP's recommended amendments to EMMs GW04, GW05 and, GW07 (see Appendix A).

I acknowledge that further investigation on the impacts of the quarry on groundwater drawdown is required to refine this assessment and will be considered in the preparation and approval of the work plan under the MRSD Act. I support the IAPs recommendations that this should consider:

- impact to the groundwater resource and the extent of groundwater drawdown;
- the extent of reduced groundwater levels which may impact aquatic GDE and potential wetlands within the Brolga home range; and

- impact from the reduced water table, and the degree of impact which would depend on the reliance that existing users and GDE have on groundwater and the extent, timing and duration of impacts resulting from project activities.

I recommend further changes to GW05 to require that the water management plan also include the management measures informed by EMM GW04, which must ensure that impacts associated with quarry dewatering do not adversely impact aquatic GDEs or Brolga wetlands beyond the predictions in the EES.

Further discussion about the potential impacts from the on-site quarry is covered in section 5.9 of this assessment.

5.4 Noise and Vibration

Evaluation objective

Minimise and manage adverse air quality and noise and vibration effects on residents and local communities as far as practicable during construction, operation and decommissioning having regard to applicable limits, targets or standards.

Assessment context

Noise and vibration effects are addressed in Chapter 13 and Technical Appendices E1, E2 and E3 of the EES and in section 6 of the IAP Report. Wind Prospect has proposed 15 EMMs to deal with noise and vibration impacts. Noise and vibration impacts have been the subject of recommendations by the IAP.

Noise and vibration effects will be generated as part of the construction, operation and decommissioning of the wind farm. The key sources of noise and vibration during construction are the activities associated with construction of infrastructure, establishment and operation of the on-site quarry and construction traffic. During operation of the facility, the main sources of potential noise impacts are the wind turbines, on-site substation and the battery energy facility.

Construction noise

The EES noted the construction phase is predicted to take about two years. During this time, some sources of construction-related noise would be in fixed locations (e.g., the concrete batching plants and the quarry) and others would move across the project area (e.g. access track construction, turbine and hardstand foundations, etc.).

Construction noise needs to be managed in accordance with EPA Publication 1834 *Civil construction, building and demolition guide* (November 2020). Noise from wind farm construction activities is predicted to be up to 35 dB(A) at the nearest dwelling. Noise form construction of the substation and battery facility is predicted to be up to 40 dB(A) at the nearest dwelling.

The temporary quarry and concrete plants proposed for the construction phase are classified as commercial, industrial and trade premises and noise must be managed in accordance with the *Environment Protection Regulations 2021* (EP Regulations) and the Noise Protocol[24]. Assessments for the EES determined the most stringent applicable limit for quarry noise to be 36 dB(A)(L_{Aeq}), which equates to the night-time (10pm-7am) limit for a 24-hour operation. There is one dwelling located within 3 km of the proposed quarry site, which is about 1,400 m away. Predicted noise levels in the EES associated with the quarry were shown to be compliant at all sensitive receivers with the most stringent noise criteria provided in the Noise Protocol. Quarry noise levels are predicted to be less than 25 dB(A) at the nearest non-stakeholder dwelling. Noise from concrete batching plants was predicted to be up to 37 dB(A) at the nearest dwelling.

Construction vibration

Sources of vibration during construction include earth moving equipment and quarry blasting. Vibration effects from quarry blasting must be managed in accordance with Earth Resources Regulation's (ERR) *Ground vibration and airblast limits for mines and quarries.* The vibration and airblast limits for blasting in the ERR guidelines are:

- vibration – 5 mm/s (95% of blasts) and 100 mm/s (for all blasts); and
- airblast – 115 dBL (95% of blasts) and 120 dBL (for all blasts).

Vibration limits for blasting effects on buildings were derived for the EES from the Australian Standard AS2187.2-2006 *Explosives - Storage and Use - Use of Explosives*. The assessment for the EES predicted a maximum ground vibration

24 EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (EPA 2021)

level from blasting of up to 0.63 mm/s peak particle velocity, around one-tenth of the ERR vibration limit and about 3% of the threshold for cosmetic building damage in AS2187.2.

The EES predicted vibration from other non-blasting construction activities is unlikely to be detectable beyond 100 m from the activities and that impacts would be negligible.

Operational noise

In 2022, the *Environment Protection Amendment (Wind Turbine Noise) Regulations 2022* amended the EP Regulations to make EPA the single regulator of operational wind turbine noise from wind energy facilities. The method for determining noise limits at a premises differs depending on whether there is a noise agreement in place with the landowner or not. For the purpose of this assessment, dwellings where an agreement is in place or is planned to be in place are referred to as 'stakeholder dwellings' and those with no agreement are referred to as 'non-stakeholder dwellings'.

In accordance with Regulation 131B of the EP Regulations, the relevant noise standard for the facility is NZS 6808:2010 *Acoustics – Wind Farm Noise* (NZ Standard). The relevant noise limit for the facility must be determined in accordance with the NZ Standard. In accordance with the NZ Standard, the level of sound from a wind farm, when heard outside a home, should not exceed the greater of either 40 dB $L_{A90(10min)}$[25] or the background sound level plus 5 dB at non-stakeholder dwellings. For stakeholder dwellings, the EP Regulations state that, for new wind energy facilities, the noise limit is the greater of either 45 dB(A) or the background sound level plus 5 dB.

Under section 5.3 of the NZ Standard, a high amenity noise limit of 35 dB $L_{A90(10min)}$ may be justified in special circumstances. The NZ Standard identifies circumstances where a more stringent "high amenity" noise limit may be justified to afford a greater degree of protection during the evening and night. The high amenity noise limit should be considered where a planning scheme promotes a higher degree of protection of amenity relating to the sound environment. The high amenity noise limit specified by the NZ Standard is 35 dB or background sound level plus 5 dB, whichever is greater.

Section 5.3 of the NZ Standard outlines the approach to determining whether high amenity noise limits apply. The first step is to determine whether the area is a high amenity area. If it is determined to be a high amenity area, the second step, described in C5.3.1 of the Standard, outlines the approach to determine if a high amenity noise limit is justified for the area based on whether the area falls within the predicted 35 dB L_{A90} wind farm sound level contour and the night-time background noise level is about 8 dB lower than the predicted noise levels from the wind farm. As pointed out by the Wind Energy Facility Guidelines[26], further guidance on the application of the high amenity noise limit can be found in the VCAT determination for the Cherry Tree Wind Farm[27].

The EES identified 141 non-stakeholder dwelling noise sensitive receivers within 6 km of proposed turbines. All dwellings of non-stakeholders (i.e., those not hosting wind farm infrastructure) are more than 1,500 m from a proposed wind turbine. Twenty-nine stakeholder dwellings were identified within 6 km of proposed wind turbines.

Operational wind farm noise was assessed for the EES in accordance with the NZ Standard. Wind farm noise was assessed for a single candidate turbine model, the Vestas V162 wind turbine. Background noise measurements were taken at 12 locations within and outside of the project area between September and November 2010.

Predictive modelling found that for all non-stakeholder dwellings, turbine noise levels are predicted to be up to 39 dB(A). The highest predicted noise level at a stakeholder dwelling was 45 dB(A). Modelled noise levels at the town of Orford were all below 30 dB.

Noise from all other operational sources at the facility, including the on-site substation and battery facility, must be managed in accordance with the EP Regulations and the Noise Protocol. Assessments for the EES determined the relevant noise limits to be:

- 45 dB(A) (L_{Aeq}) during the day (7am to 6pm);
- 39 dB(A) (L_{Aeq}) during the evening (6pm to 10pm Monday to Saturday; 7am to 10pm Sunday and public holidays); and
- 34 dB(A) (L_{Aeq}) during the night (10pm to 7am).

25 $L_{A90(10min)}$ is the A-weighted sound level which is equalled or exceeded for 90% of the measurement time, in this case, 10 minutes.

26 Development of Wind Energy Facilities in Victoria, policy and planning guidelines (DELWP 2021)

27 *Cherry Tree Wind Farm v Mitchell Shire Council* (2013).

The closest dwelling to the substation and battery facility is approximately 890 m away.

With the inclusion of a reduced noise level transformer, the highest predicted noise levels from these facilities are 36 dB(A) during the day and evening and 34 dB(A) at night.

Discussion

Construction noise – general

Some submitters raised concerns with the background noise data used to inform the noise criteria. EPA submitted that EMMs related to construction noise, NV01-NV04, should be revised. The IAP recommended changes to EMM NV01 to ensure that justification and approval of out-of-hours work, as defined by EPA Publication 1834, involves local community engagement. I support this recommendation. EMM NV02 was revised to include consultation during construction, which I support. The IAP did not amend EMMs NV03 in relation to monitoring or NV04 in relation to a complaints procedure. I am satisfied with the EPA's suggested changes to EMMs NV03 to remove reference to blasting outside of normal working hours and to clarify that monitoring should be undertaken at the most impacted receptor (not just the closest) and to NV04 to clarify the purpose and details of the complaints procedure, and I recommend these changes are adopted in the draft EMMs.

The IAP found that the predicted construction noise impacts would be low at less than 40 dB(A) and that they can be managed to acceptable levels. I agree with the IAP's findings.

Construction noise and vibration – quarry

Quarry blasting must be undertaken in accordance with ERR's *Ground vibration and airblast limits for mines and quarries.* Vibration impact assessment in support of the EES predicted a maximum vibration level at the nearest dwelling to be up to 0.63 mm/s peak particle velocity, approximately one-tenth of the 5 mm/s limit in the guidelines.

No assessment was undertaken of noise within the audible range associated with blasting. The EES stated that audible noise levels from blasting are not currently subject to regulation in Victoria. The IAP found that it was not possible to determine whether quarrying activities will have a negative impact on surrounding residents and recommended changes to EMM NV08 to include an assessment of audible blasting noise prior to approval of the work plan. I support the inclusion of an audible blasting noise assessment as part of the work plan approval process to inform the details in the work plan, but I note that the appropriate EMM is NV06 for a blast management plan, which deals with quarry noise (EMM NV08 deals with wind turbine noise).

EPA also proposed amendments to EMM NV06 to ensure it reflects the requirements of the EP Act to minimise risks to the environment and human health so far as reasonably practicable and to limit all blasting activities to normal working hours. I note this is consistent with the requirements of the ERR guideline which states that blasting at quarries should only occur during the hours of 9am-5pm Monday to Saturday. I also recommend amendments to EMM NV06 to require appropriate community consultation and notification of planned blasting times and duration.

Although I support further assessment to understand specific noise impacts from blasting, as part of the quarry work plan approval process, I am required to make an assessment of the acceptability of the project's noise impacts at this point in time. It is my assessment that the noise impacts from blasting are likely to be acceptable with the implementation of my recommendations. Further consideration as part of the work plan approval will also assist in ensuring blasting and related noise impacts are managed effectively.

Should Wind Prospect proceed with the proposed on-site quarry, Wind Prospect should finalise its work plan for the quarry in accordance with direction from ERR to ensure noise and vibration effects are appropriately managed and should demonstrate it has taken all practicable measures to reduce noise as far as practicable in line with the GED.

Operational noise – wind turbine noise

The IAP considered several issues relating to wind turbine noise, including the appropriate noise limits for the facility, background noise measurements, noise modelling, special audible characteristics, compliance monitoring and cumulative noise impacts from the proposed facility and surrounding wind energy facilities.

Appropriate noise limits

There was some discussion in submissions and the IAP hearing about what the appropriate noise limits should be for the facility. The IAP concluded the appropriate noise limits stem from the EP Regulations, which only reference the NZ

Standard. The IAP also found that the EP Regulations, as amended in 2022 for wind turbine noise, take precedence over the Wind Energy Facility Guidelines.

Wind Prospect's modelling results showed wind turbine noise to be below 40 dB(A) at all non-stakeholder dwellings and Wind Prospect proposed a planning permit condition with a noise limit of 40 dB(A) ($L_{A90(10\ min)}$). The IAP found that Wind Prospect's selection of the more stringent 40 dB L_{A90} noise limit, relative to the option of a background level plus 5 dB limit, is in keeping with the principles of the GED by achieving a higher standard than required by the regulations. The IAP recommended changes to the planning permit conditions to apply a noise limit of 40 dB $L_{A90\ (10min)}$ at all wind speeds. As the EES did not sufficiently characterise current background noise measurements to inform any other noise limit, I support the IAP's conclusion to apply a noise limit of 40 dB $L_{A90\ (10min)}$ at all wind speeds. However, I recommend this limit only be applied at non-stakeholder dwellings to differentiate it from the noise limits at stakeholder dwellings (45 dB(A) or background plus 5 dB as specified in the EP Regulations). I also recommend that it be captured in the noise management plan required by both EMM NV11 and the EP Regulations rather than the planning permit conditions for the facility to ensure that compliance is regulated by the EPA, in keeping with the intent of the recent reforms.

Some submissions argued for the application of a high amenity noise limit to the project. Most of the project area and its surroundings are in the Farming Zone. The township of Orford, approximately 3 km to the southwest, includes areas zoned as Township Zone. The IAP found that the Township Zone of Orford should be defined as high amenity for the purpose of the standard and the calculations for a high amenity limit should be undertaken according to the standard. I note that the modelling results for the Orford Township Zone were within the contour band of 25-30 dB L_{A90}, below the high amenity limit of 35 dB L_{A90}. However, as the IAP noted, the modelling was based on a candidate turbine model and the actual turbine chosen may result in higher turbine noise at Orford so the high amenity limit should be considered under the NZ Standard. The potential movement and micrositing of wind turbines following this assessment also needs consideration prior to construction. Consideration of the Township Zone in Orford as a high amenity area would be consistent with previous Minister's Assessments (e.g., Golden Plains Wind Farm) and the latest EPA guidance[28], and I support the IAP's recommendation on this basis. I note that the requirement is also consistent with the mandatory noise assessment requirement of Clause 52.32 of the Moyne Planning Scheme, which requires that the pre-construction (predictive) noise assessment report includes an assessment of whether a high amenity noise limit is applicable under section 5.3 of the NZ Standard. I recommend this requirement also be captured in EMM NV08 relating to the pre-construction noise assessment.

Background noise measurements

The adequacy of the background noise monitoring for the EES was raised by several submitters. Background noise monitoring was undertaken at 12 locations within and outside of the project area in 2010. Council was concerned that the background monitoring did not reflect the current landscape, including the influence of current vegetation on noise levels. Wind Prospect's noise experts argued that the monitoring undertaken was sufficient for informing noise limits and pre-construction measurements should be undertaken closer to the construction period of the wind energy facility.

The IAP concluded that the data measurements of background noise, being over ten years old, should be updated before construction. I note that Wind Prospect also suggested in the EES that additional background noise monitoring is proposed to be conducted prior to construction to assist with identifying the component of noise from the wind farm during operational compliance monitoring.

The IAP recommended additional data be provided with any future noise measurements to address deficiencies in the background data for the EES. The auditor report provided at Appendix E2 of the EES highlighted deficiencies in the background monitoring data and recommended improvements for future data collection, including in relation to seasonal variability, consideration of noise in the night period, and the need for background measurements at Orford. The IAP found that there is insufficient information in the background monitoring data to establish seasonal or diurnal variation in the background noise levels, including an absence of separate night-time background noise measurement. To these findings, the IAP recommended changes to the background noise measurement reporting requirements in the planning permit conditions, including a requirement for time series noise plot data to capture background noise variability across day and night. I support the recommendations of the IAP to provide more prescriptive detail on the requirements for future background noise monitoring to ensure the requirements align with the suggestions made in the audit report

28 Wind Energy Facility Turbine Noise Regulation Guidelines (EPA, 2022).

exhibited with the EES. I support the IAP's finding and recommend that it is most appropriately captured in the relevant EMM, i.e. NV08 for a pre-construction (predictive) noise assessment.

The use of the 2010 background monitoring data to inform noise limits was also examined by the IAP, which found that, the measurement of older background noise levels to determine noise criteria is of lesser importance. Wind Prospect has committed to adopting the more conservative noise criterion of 40 dB $L_{A90(10min)}$ rather than using background measurements to inform noise limits, which negates this issue. I am satisfied that further monitoring required for the predictive noise assessment can inform both the pre-construction noise assessment and post-construction compliance assessments.

Noise modelling

Some submissions were concerned with the noise modelling of wind turbine noise. The key issues examined by the IAP were the appropriateness of the type and model of wind turbine used as an input to the noise modelling and the appropriateness of the noise modelling software used. The IAP also considered the modelling undertaken for the quarry, substation and battery energy facility.

The IAP was satisfied with the modelling and the modelled noise levels. I agree with the IAP's finding and its rationale, including that noise modelling will need to be undertaken again when the final wind turbine has been chosen, and that the pre-construction noise assessment report needs to demonstrate compliance with the EP Regulations before development commences.

Special audible characteristics

Submitters also raised concerns about special audible characteristics (SACs) of noise (such as tone) that can make noise more intrusive and suggested that it would be appropriate to apply a noise penalty of up to 6 dB to the predictive noise modelling as a conservative approach to the assessment.

The noise experts agreed that SACs must be assessed as part of compliance testing at the start of operation. The IAP found that turbine models with inherent SACs should not be considered for the project and that SACs are a significant issue and should be considered in the modelling of turbine noise levels during the pre-construction assessment. The IAP recommended changes to the planning permit conditions to require noise level penalties for the presence of SACs. It is my assessment that the appropriate time to consider SACs is during commissioning and operational compliance testing in accordance with the NZ Standard, not at the approval stage.

I note that the EPA has recently become the regulator of wind turbine noise. Therefore, such requirements are no longer required or appropriate as planning permit conditions. For this reason, I do not support the addition of planning permit conditions requiring noise level penalties for the presence of SACs as compliance testing is now required to be undertaken in accordance with the EP Regulations and, subsequently, the NZ Standard. Appendix B of the NZ Standard provides a methodology for considering SACs when comparing measured levels with noise limits, which includes the addition of penalties where required. If SACs are observed in compliance testing, the operator will need to apply the penalty and modify operating conditions to ensure wind turbine noise is compliant with the noise limits. Although already implicitly required through the EP Regulations, I propose an amendment to EMM NV09, which captures the explicit requirement for a post-construction noise assessment in accordance with the EP Regulations, to make it clear that the assessment must consider SACs.

Compliance Monitoring

The IAP considered whether the draft planning permit conditions are appropriate for future compliance monitoring. Wind Prospect committed in the EES to monitoring compliance in accordance with the EP Regulations through EMMs NV09 to NV12. The requirements for compliance monitoring are outlined in regulations 131D and 131G and require assessment in accordance with the NZ Standard. Some submitters referenced precedents from other wind farm facilities that required compliance testing to go beyond the requirements of the NZ Standard, including requirements for the night period to be assessed separately and requirements for noise to comply with the noise limit for at least 90% of the night period as a way of protecting against sleep disturbance.

The IAP discussion of compliance monitoring identified deficiencies in the compliance procedure outlined in the NZ Standard regarding its application to the night period. The IAP recommended amending the permit conditions to include a requirement to report time series noise levels (i.e., noise level versus the time of day) for the duration of all compliance measurements in units of L_{Amax}, L_{Aeq} and L_{A90} for all future compliance measurements. The IAP also recommended a

requirement to report the percentage of the night-time period when turbine noise levels exceed the noise limit. I note that Wind Prospect proposed a draft permit condition to require night-time compliance to be assessed separately.

The IAP's recommendations for monitoring data provide additional guidance beyond what is specified in the EP Regulations and the NZ Standard. I support the intent of the IAP's recommendations, but I note that the EP Regulations already include compliance monitoring requirements. In line with the government's intent to make the EPA the sole regulator of operational wind turbine noise, I propose these monitoring requirements should be captured in relevant EMMs relating to the compliance monitoring requirements under the EP Regulations, not in planning permit conditions. The requirements would need to be included in the Noise Management Plan required by EMM NV11, which corresponds with the requirement for a noise management plan under regulation 131E of the EP Regulations.

The required data would need to be provided in the reports to EPA under regulation 131D (Post-construction noise assessment) and 131G (Wind turbine noise monitoring) of the EP Regulations. I note that these additional requirements for compliance monitoring would not change the test of whether wind turbine noise complies with the noise limit for the facility, which needs to be determined in accordance with the regulations and the NZ Standard, nor would monitoring in itself reduce the impacts. However, the data may help to provide transparency for the community experiencing wind turbine noise and could be useful to inform mitigation measures in the case of future noise complaints about the facility.

Cumulative noise impacts

The IAP considered whether noise impacts from Willatook and surrounding wind energy facilities, most notably, Macarthur wind farm, will result in an acceptable cumulative impact. Moyne Shire Council submitted that it was concerned about the proliferation of wind turbines and that some dwellings will be surrounded by turbines, meaning that they could be affected by turbine noise regardless of which way the wind is blowing. The modelling undertaken for the EES found that cumulative wind turbine noise levels at dwellings in between the project site and Macarthur wind farm would be below the noise criteria for either facility. The IAP found that the cumulative noise impacts of the project and the operating Macarthur wind farm to the north can acceptably comply with noise limits. Although I acknowledge the concerns of Moyne Shire Council about potential cumulative noise impacts from multiple wind energy facilities, I am satisfied that in this case the cumulative noise impacts can be acceptably managed.

Operational noise – Substation and Battery Energy Storage System

The IAP considered whether noise levels from the substation and battery energy storage system will result in an acceptable impact. Noise sources from these facilities include transformers, inverters and cooling systems. The closest dwelling is about 890 m away. The assessment in support of the EES found that, in the absence of any noise mitigation measures, four dwellings could be impacted by noise from these facilities. Additional measures were proposed to reduce noise impacts to meet the Noise Protocol, including the use of a quieter transformer and the use of noise barriers should the pre-construction noise assessment results show noise would still exceed the Noise Protocol limits.

The IAP found that there are opportunities to further reduce noise during detailed design of the facilities, including through final equipment selection (e.g., transformers and fans) and noise mitigation (e.g., barriers) as required. I agree with the IAP's assessment that there are opportunities to further reduce noise emissions from the facilities during detailed design and agree that the priority should be to reduce noise at the source through the selection of quieter equipment. As such, I recommend changes to EMM NV13 to broaden its scope to require consideration of all available options to reduce noise at the source (i.e. not just from the transformer as proposed by NV13). The IAP found that noise impacts from the substation and battery energy facility can be acceptably managed. During detailed design noise would be remodelled and, should the results show noise is still above the noise limits, noise barriers would need to be adopted in accordance with EMM NV14. I recommend amendments to EMM NV14 to capture EPA's suggested changes to remove Wind Prospect's reference to the requirements of the Environmental Assessment Report exhibited with the EES and refer to the requirements of the EP Regulations. Subject to these amendments, I support the IAP's findings that noise impacts from the substation and battery energy facility can be acceptably managed.

Assessment

It is my assessment that Wind Prospect has demonstrated that the project is capable of being developed and operated in compliance with the applicable noise standards to an appropriate level of confidence.

In accordance with the IAP's findings, it is my assessment that the areas zoned Township Zone within and surrounding Orford, should be considered a high amenity area for the purposes of applying the NZ Standard and Wind Prospect should assess whether a high amenity limit should apply to this area. Even though modelling showed Orford to be

outside of the 30 dB contour, I support this recommendation to address the possibility that noise from the chosen turbine, or from movement of turbines in response to my assessment, is higher than that modelled for the EES.

I support the recommendation of the IAP for a 40 dB noise limit at non-stakeholder dwellings consistent with what Wind Prospect volunteered. This commitment should be captured in the noise management plan required by both EMM NV11 and the EP Regulations.

I support the recommendation of the IAP that a pre-construction noise assessment will need to be prepared in accordance with clause 52.32 of the Moyne Planning Scheme, including requirements to:

- acknowledge that the area in and around Orford that is zoned Township Zone is a high amenity area for the purposes of the NZ Standard;
- assess whether a high amenity limit should apply to this area in accordance with clause 5.3.1 of the NZ Standard; and
- conduct background noise monitoring, analysed by 24-hour and night-time (10pm to 7am) periods.

I recommend the following amendments to the proposed EMMs and permit conditions:

- amend NV05 noise requirements for the temporary concrete batching plants to reflect requirements of the EP Act regarding the general environmental duty, consideration of cumulative noise when calculating compliance with noise limits and not emitting unreasonable noise, as defined by the Act;
- amend NV06 to include IAP's recommendation for an impact assessment of audible blasting noise, to include community notifications of planned blasting and to include EPA's proposed amendments limiting blasting to normal working hours;
- amend NV08 to include an explicit requirement for consideration of the Orford Township Zone as a high amenity area;
- amend NV08 to include more prescriptive detail on the requirements for future background noise monitoring to ensure the requirements align with the recommendations made in the verification report exhibited as Appendix E2 to the EES, including the need for time series noise plots for the 24-hour period;
- amend NV09 to include an explicit requirement for the post-construction assessment to consider SACs, although I do not support the IAP's recommendation for a planning permit condition to require noise penalties for SACs as this is a compliance monitoring issue that is already required by the NZ Standard and implemented through the EP Regulations;
- amend NV10, NV11 and NV12 to refer to the requirements of the EP Regulations rather than the Environment Protection Amendment (Interim) Regulations 2021;
- delete the proposed planning permit conditions requiring time series data for compliance measurements and the percentage of time that the noise limit is exceeded at night and insert those requirements into EMM NV11 to be captured in the noise management plan for EPA;
- revise NV13 to broaden the requirements to considering all options for reducing noise at the source, not just from the transformer; and
- revise NV14 to reference the requirements of the EP Regulations, not the requirements included in the EES documentation.

5.5 Landscape and visual

Evaluation objective

Minimise and manage potential adverse effects for the community with regard to landscape and visual amenity.

Assessment context

Landscape and visual amenity effects are addressed in Chapter 14, Technical Appendix F1 of the EES and Chapter 7 of the IAP Report. Wind Prospect has proposed four EMMs, LV01 to LV04, to deal with landscape and visual amenity effects and two of these have been the subject of recommendations by the IAP.

The project site is located in a modified agricultural landscape within the Mount Rouse lava flows. The proposed project's wind turbines, overhead transmission lines and meteorological masts have the potential to have landscape and visual effects. There could be up to 59 wind turbines with a maximum tip height of 250 m above ground level, as well as overhead transmission lines, an on-site substation, and operation and maintenance buildings. During construction there would also be temporary infrastructure works such as upgrading and construction of new access tracks, concrete batching plants and assembly of the various turbine components in hardstand areas and an on-site quarry.

The EES noted that both the permanent and temporary infrastructure of the project will change the landscape character through the introduction of new visual elements as well as constrain views, mainly from nearby residential properties with fixed vantage points and the view from public roads within 3 km.

Three existing windfarms (Macarthur, Yambuk and Codrington) fall within the 20 km of the project site, and a further three approved windfarms (Woolsthorpe, Hawkesdale and Ryan Corner) fall within 10 km of the project site. The potential number of turbines across all these existing, approved and proposed projects could number over 600. However, vegetation and topography provide landscape screening which would limit the potential visual impact of simultaneous views.

The EES assessed cumulative impacts both from the point of sequential and simultaneous views. The combination of the project being constructed in an extensively modified area with views both limited and filtered by distance, vegetation, and topography, confines the views of the wind turbines to the blade tips or in the background for more distant views. The EES concluded that landscape and visual impacts were expected to be low or negligible.

The project's landscape and visual impacts will be mitigated through the application of EMMs, such as development of an off-site landscaping plan, as well as detailed design and micro-siting of wind turbines. This plan needs to be approved by the responsible authority after consultation with Moyne Shire Council.

The EES found that mitigation measures such as landscape screening and turbine-free buffers will effectively reduce the potential landscape and visual effects noting the proposed project is in an area that has a low sensitivity to visual change.

Discussion

Wind Prospect did not dispute that the proposed project could have a high visual impact where there are uninterrupted views to the turbines. However, the EES described the project area as having been extensively modified for agriculture and expert evidence from Mr Burge presented during the public hearing described factors such as distance, topography, vegetation and buildings and/or structures that would serve to screen the landscape and limit impacts. The IAP took into account that none of the dwellings assessed had key views to protected features or landscapes, and that landscape screening by way of new vegetation may effectively reduce visual impacts for views from those dwellings. The IAP found Mr Burge's assessment to be sound. Some submissions from landowners stated why they would prefer not to have additional landscaping surrounding their dwellings. The IAP recommended that proposed landscape screening should allow for a flexible, opt-in or out approach to cater for individual stakeholder dwelling preferences. I support this recommendation from the IAP for a flexible and tailored approach.

As set out in the EES and IAP report, the project will result in greater cumulative visual and landscape impact from wind energy facilities in the Moyne Shire. However, as concluded by the IAP and supported by expert evidence, these cumulative impacts are considered acceptable as they will be reduced and restricted by factors such as distance, vegetation and topography. If the project is modified with further buffers as recommended in my assessment to protect biodiversity values, this would further limit the extent of the wind turbines across the project area and would also result in a reduced landscape and visual impacts.

A wind energy facility of this scale would have unavoidable visual impacts in the current landscape and project context. However, overall, I am satisfied that these impacts are acceptable and that they can be sufficiently mitigated through the EMMs, detailed design, the off-site landscaping plan, consistent with the recommendations of this assessment.

Assessment

It is my assessment that:

- The project will have visual impacts on residential properties and from public roads, but I agree with the IAP that with implementation of EMMs LV01-LV04, these impacts are acceptable, and even more so with a reduced project footprint recommended elsewhere in this assessment to address biodiversity matters.
- Wind Prospect has appropriately identified and assessed the cumulative impacts and that these landscape and visual effects are acceptable.

5.6 Land use

Evaluation objectives

Avoid and minimise adverse effects on land use (including agricultural and residential), social fabric of the community (with regard to wellbeing, community cohesion), local infrastructure, electromagnetic interference, aviation safety and to neighbouring landowners during construction, operation and decommissioning of the project.

Assessment context

Land use issues are addressed in Chapter 16 and Technical Appendix H of the EES and in Chapter 10 of the IAP Report. Wind Prospect has proposed three EMMs to address land use effects. None of these have been the subject of recommendations by the IAP.

This project is located in the Farming Zone, with small areas of Special Use Zone, where most of the land has already been cleared for cattle and sheep grazing. There are some properties that are used for dairy farming and crop farming.

The key legislation, policies and guidelines included in Chapter 16 of the EES have been considered in assessing how the project will affect land uses and planning. To provide context for my consideration of the planning of the area, I have considered the State and Regional planning provisions such as the *Planning and Policy Guidelines for Development of Wind Energy Facilities in Victoria* (Policy and Planning Guidelines, DELWP 2021), Clause 52.32 of the Moyne Planning Scheme and the Planning Policy Framework of the Victoria Planning Provisions.

Discussion

The EES concluded in Chapter 16 that this project will avoid and minimise adverse effects on agricultural and residential land use during construction, operation and decommissioning. The IAP found that the project's land use impacts are minimal, as only 2.4% of the land is to be occupied by project infrastructure. This is anticipated to have no adverse impact on farming operations on the land. I accept the conclusion in the EES, which is also supported in the IAP report, that Wind Prospect has sought to minimise impacts on agricultural lands by designing the project in consultation with landowners to minimise impacts of the project to agricultural activities, including grazing, and retaining access to properties.

The EMF in Chapter 26 of the EES report proposes three EMMs to reduce the impact of the project to existing land uses. The IAP stated that Wind Prospect had sought to identify potential adverse effects, and, if there will be adverse effects, implement management measures through the EMF. I agree with the IAP's findings that the impacts on land use associated with project construction activities are acceptable and appropriate for this project and its setting.

Some submitters supported renewable energy but raised concerns about the “industrialisation of farmland” when wind energy facilities are built and were concerned the wind energy facilities would be incompatible with farming operations, affecting farming families as the “backbone of communities”. As the IAP discussed, there are planning policy objectives that seek to protect productive agricultural land, and there are also policy objectives that seek to encourage and implement wind energy facilities. Consistent with the IAP’s findings, I conclude that existing farming practices would not be affected in any significant way and the proposed project would not compromise the productive use of agricultural land. I also support the IAP’s finding that the land use objectives for this area are not compromised by the project.

Assessment

It is my assessment that the land use and planning effects of the project are acceptable in the context of relevant policy guidance and that the proposed EMMs are appropriate to ensure that impacts are minimised to acceptable levels during construction and operation, to the extent reasonably practicable.

5.7 Traffic and roads

Evaluation objective

Avoid and minimise adverse effects on roads and road users during construction, operation and decommissioning of the project.

Assessment context

Traffic and road impacts are addressed in Chapter 15 and Technical Appendix G of the EES and in section 10.2 of the IAP Report. Wind Prospect has proposed twelve EMMs to deal with traffic and road impacts. Traffic and road impacts have been the subject of recommendations by the IAP.

Construction of the project will intensify the demand on the surrounding road network through increased traffic and use of over-size and over-mass vehicles. The increased demand on the road network necessitates both upgrades and mitigation measures to appropriately accommodate construction.

Existing roads surrounding the project site vary in capacity and quality. The roads anticipated to be used by the project include unsealed and sealed local access roads that are suited to accommodating the low traffic volume associated with general farm access in the area. Other roads anticipated to be used by the project are Arterial C and Sub-Arterial roads between one and two-lanes wide.

Sensitive road users were identified in the EES as public buses and school buses. Though the roads immediately adjacent to the project site are infrequently used, anticipated transport routes from the Port of Portland will intersect with these users and with busier roads.

The source of coarse aggregate (for establishing internal roads, hardstands and potentially concrete production) has not been finalised. However, establishing an on-site quarry has been proposed to minimise effects on local roads. There are four external quarries that could also be used if required. External sourcing of coarse aggregate would significantly increase traffic volume on external roads during the construction phase of the project.

The Port of Portland is the preferred port of entry for turbine generators and associated components. As such, three possible routes from this location to the site have been identified. The 75 km “Option 1” route is preferred and will require upgrades to five intersections on the route to accommodate the over size and over mass transport vehicles.

Construction staff are expected to be accommodated in Port Fairy, Warrnambool and possibly Koroit. Staff will use arterial roads to access the project site from accommodation locations.

Road and hardstand materials, if accessed from an external quarry, and turbine components will be delivered to a central point within the site, at which point the materials and components will be distributed on internal access roads. External road use by internal construction traffic will be limited to movement of construction materials that cannot be stored at each work area or for movements between the central construction compound and work sites that cannot be accessed by internal access tracks.

Traffic impacts during operation of the facility will be caused by small daily and weekly/fortnightly maintenance teams and associated equipment and componentry plus visitors to the site.

Decommissioning of the site will require transport of required equipment and back haulage of turbines and associated componentry.

There is expected to be an increase in local congestion and limitations to access to some properties, degradation of roads and some increased safety risk to road users.

Peak construction activity will produce an additional 299 to 357 vehicle movements per day on Woolsthorpe-Heywood Road depending on the source of coarse aggregate. The EES assessed that the affected section of road can accommodate this additional traffic volume.

Mitigation measures proposed by Wind Prospect include maintenance of external roads where required and upgrades of specific road sections and intersections where necessary. A traffic management plan will be developed through engagement with Moyne Shire Council, Glenelg Shire Council and Regional Roads Victoria. This plan will include green travel plans and road maintenance agreements.

Discussion

The EES assessment of traffic impacts determined that relevant roads are capable of accommodating the increased traffic volume and road requirements through the life of the project, based on existing traffic volume and usage, and through proposed upgrades and mitigation measures. The EES also concludes that local traffic impacts can be appropriately managed through the life of the project.

Mr Walley's (Ratio Consultants) expert evidence on these issues noted that the on-site quarry option produced a more broadly spread and lower magnitude traffic impact, compared to the external quarry alternative. However, Mr Walley was satisfied that, in the event that offsite material is required, the existing roads will be able to accommodate the increased traffic volume. Regardless, Wind Prospect would need enter into road maintenance and management agreements with Moyne Shire Council and Department of Transport. On that this basis, it my assessment that the likely adverse effects on local road conditions as a result of using an external quarry can be acceptably managed.

However, I acknowledge the submissions made by Moyne residents regarding the increased traffic movements and acknowledge that there will be increased traffic volumes and this increase will be greater if off-site aggregate sourcing is required.

It also my assessment that the traffic volumes and cumulative impacts predicted in the Traffic Impact Assessment, generated by Willatook, Woolsthorpe and Mt Fyans facilities, can be managed and comfortably accommodated by the local road network.

I concur with the IAP's conclusion that Department of Transport's more prescriptive conditions are more appropriate and take precedence given the Department's position as a statutory referral authority for this matter.

I accept the IAP's recommendation that the measures detailed in the EES Traffic Impact Assessment are appropriate for managing the traffic impacts in the immediate area through a traffic management plan and that the EMMs TT11 and TT12 should remain as exhibited in the EES.

Assessment

It is my assessment that traffic and transport effects of both the on-site quarry and the off-site quarry scenarios will be acceptable if managed in accordance with the EMMs proposed in the EES and generally in accordance with the proposed planning permit conditions in Appendix G of the IAP's report.

I note that, should the recommendations outlined in my assessment result in a smaller project than proposed in the EES, the traffic and road impacts of an off-site quarry, if used, are likely to be lower than predicted in the EES.

5.8 Aboriginal Cultural Heritage

Evaluation objective

Avoid or minimise adverse effects on Aboriginal and historic cultural heritage and associated values.

Assessment context

Aboriginal cultural heritage effects are addressed in Chapter 18 and Technical Appendix J of the EES and in Chapter 8 of the IAP Report. Wind Prospect has proposed three EMMs to deal with Aboriginal cultural heritage effects.

The project is within the boundaries of two Registered Aboriginal Parties (RAPs), Eastern Maar Aboriginal Corporation and Gunditj Mirring Traditional Owners Aboriginal Corporation. When Wind Prospect lodged its notice of intent to prepare a CHMP for the project in 2009, neither RAP was in place. Wind Prospect lodged its notice of intent with Aboriginal Victoria (now First Peoples–State Relations). Since then, RAP boundaries have been established and now include Eastern Maar Aboriginal Corporation and Gunditj Mirring Traditional Owners Aboriginal Corporation. While First Peoples–State Relations retains statutory responsibility for determining the CHMP, it will undertake this function in close consultation with both RAPs concerned.

There are no current Aboriginal Places within the project area. A mound site, VAHR Registered 1 (Earth Feature) was previously recorded, however, during EES investigations, it could not be relocated and there was no evidence of a mound in the area, despite intensive searching by specialists.

The World Heritage Listed Budj Bim Cultural Landscape and the National Heritage Listed Budj Bim National Heritage Landscape – Mt Eccles Lake Condah Area are situated about 16 km from the project site.

EES investigations took place within the project area as well as within a 5 km buffer of the project site. Both standard and complex assessment were undertaken, with excavation and subsurface testing undertaken within the project area, including the proposed quarry site.

Subsurface testing was undertaken in 2010, 2017, 2020 and 2021. The EES investigations identified one previously unrecorded Aboriginal heritage place (VAHR Registered 2) within the western section of the project site boundary. An artefact scatter was found at this place and is now listed in the Victorian Aboriginal Heritage Register (VAHR).

Potential residual impacts to Aboriginal places, Aboriginal cultural heritage and management of these impacts are to be addressed through CHMP (no. 11090) to be assessed by First Peoples – State Relations under the *Aboriginal Heritage Act 2006*.

Discussion

Wind Prospect noted in the EES that project design has been iteratively updated in earlier stages during the EES process, following the identification and avoidance of environmental, cultural, and social values, with broad coverage of complex assessments undertaken across the site in instances where turbine locations were moved into areas not previously assessed. There is still the possibility of unexpected finds during construction, operation and commission, and the CHMP's contingency plans, as proposed by Wind Prospect in EMM AH03, adequately manages any discovery and ensures compliance with the CHMP.

With respect to the newly recorded Aboriginal heritage place (VAHR Registered 2), Wind Prospect proposed a 'no-go' area consisting of a 10 m buffer zone, to be maintained from construction until commissioning (EMM-AH01). The IAP agreed that the construction no-go zones would avoid potential negative impacts. Wind Prospect also proposed that key personnel and supervisors undergo a cultural heritage induction prior to construction commencing. I support this EMM requirement (AH02) as an effective measure.

Moyne Shire Council raised concerns about the preservation of historical values of world heritage listed Budj Bim Cultural Landscape and the nationally-listed Mt Eccles Lake Condah Area in the surrounding area. The IAP acknowledges that further work in the future may be done to define and declare a World Heritage Environs Area buffer, but with the sites more than 10 km away from the project, the IAP found that the EES and permit applications have appropriately considered impacts on Aboriginal cultural heritage.

Assessment

It is my assessment that the likely impacts on Aboriginal cultural heritage values from the project can be adequately managed and that the implementation of the CHMP under the *Aboriginal Heritage Act 2006* is an appropriate mechanism for addressing residual risks, including putting in place appropriate contingencies. I strongly support active engagement continuing with Traditional owners, Eastern Maar Aboriginal Corporation and Gunditj Mirring Traditional Owners Aboriginal Corporation, during the approvals as well as detailed design and construction.

I support the IAP conclusion that the EES and permit applications have appropriately considered world heritage listed Budj Bim Cultural Landscape and the nationally-listed Mt Eccles Lake Condah Area based on their existing recognised boundaries.

5.9 Quarry

Evaluation objective

Evaluation objectives for biodiversity and habitat, catchment values and hydrology, landscape and visual amenity, geoheritage values, amenity, cultural heritage, traffic and roads, and land use and socio-economic are all relevant to the quarry as a component of the project.

Assessment context

Environmental effects from the quarry are addressed in each of the relevant EES effect-themed chapters. A preliminary draft quarry work plan is appended to the EES as Attachment 2. The quarry is addressed in Chapter 9 of the IAP report.

The project includes a potential temporary on-site quarry to service the project during construction. The proposed quarry site is located in the western part of the project site, east of Old Dunmore Road and about 4 km north-east of Orford. As described in the EES, the quarry is expected to provide about 80% of the required 450,000 m^3 of crushed rock for the construction of project infrastructure such as access tracks, hardstands, the temporary construction compound and may be used in the wind turbine foundations.

The proposed quarry work authority area is about 30 ha, and the proposed extraction area is about 10.5 ha, with a maximum depth of 14 m. The total disturbance area is predicted to be about 25 ha, including 10 ha of hardstand. Operational hours of the quarry are proposed to be during those defined as normal working hours in EPA Publication 1834[29] (i.e., Monday to Friday 7am-6pm and Saturday 7am-1pm) with blasting typically restricted to 10am-4pm weekdays. The closest residence to the quarry site is about 1.4 km to the southeast of the quarry extraction area. Other dwellings are more than 3 km for the quarry site.

Using an on-site quarry was estimated to remove up to 60 heavy vehicles per day (120 heavy vehicle movements) from public roads during the construction phase. However, during its establishment, there would be heavy vehicle movements over an approximate two-week period.

Air quality effects from the quarry were assessed for the EES. The predictive air quality modelling undertaken for the quarry found that no exceedances of particulate matter size classes $PM_{2.5}$ or PM_{10}, respirable silica or deposited dust are predicted to occur at the nearest residential dwelling to the site.

Discussion

Moyne Council and EPA considered the EES had not adequately addressed groundwater drawdown from the quarry and the associated effects on environmental values. The key issues of concern for the IAP were impacts on surface water and groundwater, including whether the proposed quarry would impact the groundwater resource in the area and the associated effects on groundwater dependent ecosystems, include Brolga breeding wetlands. Surface water and groundwater effects associated with the quarry are covered in further detail in section 5.3 of this assessment.

I am satisfied that the potential effects of groundwater drawdown on aquatic GDEs and wetlands surrounding the quarry can be acceptably managed through the proposed EMMs GW03, GW04 and GW05 as modified by the IAP and my recommendations. These EMMs can be appropriately implemented as conditions of the quarry work plan to ensure that the effects are no greater than those predicted in the EES. I note that although the IAP recommended amendments to EMM SW06, the proposed amendments were not apparent. As SW06 relates to management of acid sulfate soil and rock, I do not support amending SW06.

The IAP also noted that, should the proposed turbine-free buffers for Brolga of 900 m be applied around all wetlands within 2 km of Brolga breeding wetlands, the location of the quarry would be within the buffers for wetlands 25974, W7 and W10. The Interim Guidelines discuss the importance of establishing *turbine-free* buffers to avoid and minimise impacts on Brolga breeding and non-breeding habitats. The Interim Guidelines discuss this in relation to the risk of direct effects from collisions with wind turbines and powerlines and indirect disturbance. They do not discuss the application of buffers to quarries. The Draft Standards, however, do discuss the need to exclude infrastructure, including quarries, from the breeding habitat buffer. While such buffers may become a requirement for future wind energy facilities when the Draft Standards are finalised, it is my assessment at this time that, on balance, potential indirect disturbance impacts on Brolga from quarry activities will be acceptably managed for this facility through the recommended condition to restrict construction works during July to November. For these reasons, I am satisfied that the quarry can be located in its proposed location.

Other biodiversity effects associated with the quarry are covered in further detail in section 5.1 and 5.2 of this assessment. The quarry location was selected to avoid known ecological constraints, including native vegetation and DELWP mapped wetlands. As such, I am satisfied that all quarry-related effects on other biodiversity matters will be acceptable.

The project area, including the quarry, is not within an area designated to be of special landscape significance under the Moyne Planning Scheme or any other relevant planning instrument. The quarry site would not be visible from the road and is 1.4 km from the nearest private dwelling.

29 EPA publication 1834: Civil construction, building and demolition guide (EPA, 2020)

Noise and vibration effects associated with the quarry are covered in further detail in section 5.4 of this assessment. The noise and vibration study in the EES predicted that noise levels produced from operating the on-site quarry were predicted to be well below the noise criteria without the need for any specific noise treatments. Blasting is proposed to occur at the quarry no more than twice a month over a two-year operation period. Maximum ground vibration levels at the nearest dwelling were predicted to be one-tenth of the ERR limits of 5 mm/s and around 3% of the threshold for cosmetic damage to buildings. The IAP recommended that Wind Prospect submit an impact assessment of audible blasting noise to ERR in support of its work plan. The quarry is proposed to be just over 2 km from the nearest Brolga breeding wetland. Potential impacts to Brolga from blasting would be managed through the requirement for a blast management plan in accordance with EMM BR05. This can be given effect through the quarry work plan.

Traffic and transport effects associated with the quarry are covered in further detail in section 5.7 of this assessment. The traffic and transport assessment for the EES considered multiple scenarios, including an on-site quarry and optional existing quarries in the region. The inclusion of an on-site quarry in the project to supply crushed rock for project construction would remove a substantial number of heavy vehicle movements from the public road network, which would reduce the volume of off-site traffic and risks of potential damage to local roads. It would also mitigate potential significant economic effects such as reduced supply from local quarries during project construction.

Aboriginal and historic cultural heritage effects associated with the quarry are covered in further detail in sections 5.8 and 5.10 of this assessment. No Aboriginal heritage was identified at the quarry site during assessments for the CHMP. The IAP found cultural heritage effects can be managed through management measures in the CHMP for the project. The historic heritage assessment for the EES found there are no heritage issues related to the proposed quarry location.

The geoheritage assessment for the EES found that the proposed location for the quarry coincides with a major feature of lava flows which is of high regional significance. To mitigate effects, the quarry layout was changed as part of the assessments for the EES to avoid specific elongated lava ridges. The IAP was not provided with any policy or statutory reference recognising or protecting the geological features of the quarry site and considered the potential impacts on geoheritage to be acceptable. I agree with their findings.

Assessment

While there is the potential for residual impacts on groundwater resources through water table drawdown and the effects of drawdown on wetlands, including those suitable for Brolga, it is my assessment that the likely environmental effects on these wetlands will be acceptable. I support the IAP's suggestions that the work plan approval process under the MRSD Act provides the appropriate means for addressing the residual impacts.

These effects can be acceptably managed through the proposed EMMs, particularly EMM GW05, which will be further informed through the assessments to be undertaken to inform statutory processes under the MRSD Act. I am satisfied that these further assessments can inform effective management measures for the quarry, incorporated into the water management plan required by EMM GW05, that would be given statutory weight through the quarry work plan.

Although there are three functional wetlands within approximately 1 km of the quarry, I am satisfied that the quarry could be located in its proposed location.

Should the project go ahead without an on-site quarry, it is my assessment that the impacts on traffic and roads from using an external quarry have been assessed appropriately and would be acceptable. I note that, should the recommendations in my assessment result in a smaller project than proposed in the EES, the traffic and roads effects of an external quarry are likely to be lower than predicted in the EES.

5.10 Localised effects

In line with the published reasons for requiring an EES, the EES was to focus primarily on potential effects of the project on threatened fauna, especially Brolga and Southern Bent-wing Bat, threatened flora, geoheritage values of the area and visual amenity values. The EES was also to assess the potential for cumulative adverse effects related to other operating wind farms within 20 km and three approved wind farms within 10 km and the potential to avoid and minimise effects.

The EES also examined potential effects on other aspects of the environmental and social setting, including effects on historic heritage, socio-economics, electromagnetic interference, bushfire risk and amenity effects related to air quality, shadow flicker and blade glint.

These more localised and less significant effects are discussed in EES Chapters 8, 16-17 and 19-22 and were informed by Technical Reports A, H, I, K, L, M and N. The panel discussed these issues in Chapters 8 and 10 of its report.

Table 2 outlines the panel's assessment of these localised effects and discusses the overall significance of effects against the management regime proposed. Generally, I support the findings of the EES and the IAP in relation to these localised effects. It is my assessment that these effects are indeed localised, acceptable and can be effectively managed using well-established practices including the mitigation measures in the EMF that would be given statutory weight through conditions on approvals under the *Heritage Act 2017* and the Planning and Environment Act.

Table 2 Localised social and heritage effects

Panel findings and recommendations	Assessment
Historic heritage The two key values in the project area are the Woolsthorpe-Heywood Road ruin (VHI H7321-0105) and the Landers Lane dry stone wall (protected under Clause 52.33 of the Moyne Planning Scheme). The panel considered whether the EES and planning permit applications have appropriately considered historic heritage and whether the project is likely to have adverse impacts on these values. The panel found that the EES and planning permit applications have appropriately considered historic heritage and the dry stone wall management plan and associated permit conditions will ensure works respond sensitively to dry stone walls. Wind Prospect has committed to avoiding impacts to the Woolsthorpe-Heywood Road ruin, including through consultation with Heritage Victoria. An application would be made to Heritage Victoria in accordance with the requirements of the *Heritage Act 2017* if impacts are unavoidable.	I support the panel's findings and agree that the project's historic heritage effects are acceptable and manageable through implementation of the proposed mitigation measures.
Geoheritage The key value of most relevance to the geoheritage of the local region is Mount Rouse. The geoheritage assessment for the EES found that the proposed location for the quarry coincides with a major feature of lava flows which is of high regional significance. To mitigate effects, the quarry layout was changed as part of the assessments for the EES to avoid specific elongated lava ridges. The IAP noted that it was not provided with any policy or statutory reference recognising or protecting the geological features of the quarry site, and it accepted that the project is consistent with the objective of Clause 12.05-2S, particularly the strategy to *"ensure development does not detract from the natural qualities of significant landscape areas*."	I accept the IAP's findings that the potential impacts on geoheritage are acceptable and that the proposal will not compromise the significant landscape's integrity.

Panel findings and recommendations	Assessment
Socio-economics Social and economic effects of the project will be both positive and negative. The EES estimated $120 million of investment would be retained in the region during construction with ongoing economic stimulus during operation. The EES proposed 15 EMMs for socio-economics. A Neighbour Benefit Sharing Program has been developed by Wind Prospect to provide 'goodwill' payments to neighbours. Some local submitters were concerned about social fabric decline resulting from a division in the community between supporters and opponents of the project. The IAP did not provide any findings or recommendations specific to socio-economics. However, the IAP found that the project appropriately responds to the draft land use and planning objective of the EES scoping requirements, including social elements and that the project would have a net community benefit.	I support the IAP's conclusion that the socio-economic effects of the project are acceptable and manageable through implementation of the proposed mitigation measures.
Air quality Air quality effects from the quarry were assessed for the EES to be the primary source of air quality impacts from the project. The closest sensitive receptor to the quarry is 1.4 km and to any of the concrete batch plants is approximately 1.2 km. The predictive air quality modelling undertaken for the quarry found that no exceedances of particulate matter size classes $PM_{2.5}$ or PM_{10}, respirable silica or deposited dust are predicted to occur at the nearest residential dwelling to the site. Dust emissions from the operation of the project's concrete batching plants were assessed to be of relatively short duration with low dust generation. Concrete batching is not expected to contribute significantly to the overall air emissions. Potential dust impacts would be managed through a site-specific dust management plan. The IAP did not provide any recommendations regarding air quality effects.	I agree with the IAP's finding that the air quality effects of the project are acceptable and manageable through implementation of the proposed mitigation measures.
Shadow flicker and blade glint The Policy and Planning Guidelines for wind energy facilities require that shadow flicker must not exceed 30 hours per year in the area immediately surrounding dwellings and fenced garden areas.	It is my assessment that shadow flicker and blade glint effects are acceptable and manageable through implementation of the proposed mitigation measures.

Panel findings and recommendations	Assessment
The IAP found that the proposed EMMs SF01 and SF02 for shadow flicker in the EMF accord with relevant guidelines, including ensuring shadow flicker must not exceed 30 hours each year. These EMMs are given statutory weight through the recommended planning permit conditions for shadow flicker. Blade glint refers to the reflection of sunlight of the wind turbine blades. The Policy and Planning Guidelines recommend blades should be finished with a surface treatment of low reflectivity to ensure that glint is minimised. The EES stated this is not an issue for the project as modern turbines are finished with low-reflectivity treatment to avoid blade glint nuisance.	
Electromagnetic interference Electromagnetic interference (EMI) occurs when a signal between a transmitter and receiver is disturbed. The EES assessed potential EMI effects and proposed eleven EMMs to manage EMI. The IAP found that electromagnetic interference is managed appropriately through the proposed mitigation measures. The proposed EMMs are given statutory weight through the IAP's proposed planning permit conditions for environmental management plans.	I support the IAP's findings and agree that the project's electromagnetic effects are acceptable and manageable through implementation of the proposed mitigation measures.
Bushfire risk The panel found that the EES and permit applications have appropriately considered external bushfire risk to the proposed facility. The IAP also found that the facility and the battery storage will result in an acceptable bushfire risk to the community subject to the inclusion of planning permit conditions proposed by Country Fire Authority and Moyne Shire Council requiring a fire prevention and emergency response plan. The IAP found no evidence that the project infrastructure would negatively impact on aerial firefighting. It also found that the proposed vegetation for screening visual impacts would not present an unacceptable bushfire risk.	I support the recommendation for a fire prevention and emergency plan and I agree with the IAP's findings that, subject to the inclusion of these proposed conditions, the project will result in an acceptable bushfire risk.

6 Conclusion

My conclusion is that the environmental effects of the project as proposed in the EES has the potential for unacceptable residual impacts on listed threatened species, specifically Brolga and Southern Bent-wing Bat. However, the project's impacts can be acceptable if it is modified, constructed and operated in accordance with the recommendations of my assessment, particularly those relating to appropriate buffers and mitigation measures for Brolga and Southern Bent-wing Bat. The recommended project modifications and mitigation measures set out within this assessment are essential for achieving acceptable environmental outcomes.

The project location coincides with the distribution of the Victorian Brolga population in south-west Victoria and is in an important area for the critically endangered Southern Bent-wing Bat, being relatively close to the Warrnambool and Portland maternity caves and a number of non-breeding roost sites. Due to the topography and hydrology of the project area, it is also surrounded by a complex of wetlands, which provide habitat for a range of fauna species, including these endangered species.

Consistent with the IAP's findings, I conclude that the project as proposed in the EES does not appropriately buffer wetlands and other habitat and has the potential for unacceptable impacts on Brolga and Southern Bent-wing Bat. Therefore, my assessment includes recommendations to incorporate a 900 m turbine-free buffer for Brolga wetlands and a 200 m turbine-free buffer around habitat for Southern Bent-wing Bat. I have also recommended that Brolga buffers are applied to additional wetlands to those proposed in the EES to include those identified as potential Brolga breeding wetlands. I acknowledge that these recommendations will reduce the amount of land available for development of the wind energy facility and have requested that Wind Prospect engage with DEECA to map the recommended buffers before refining the project design. These modifications will affect the potential renewable energy generation from the proposed wind farm. While the transition to renewable energy generation is a policy and legislative priority for Victoria, protection of declining biodiversity values is also a priority. I am satisfied that the approach adopted in my assessment of the Willatook Wind Farm is appropriate in the context of current relevant policy guidance and the critically endangered status of Southern Bent-wing Bat and endangered status of Brolga.

It is my assessment that the effects of the project on the Southern Bent-wing Bat will be acceptable provided my recommendations are implemented to ensure appropriate wetland buffers and for adaptive mitigation through curtailment below wind speeds of 4.5 m/s between dusk and dawn during September to May, when bat activity is as its highest. These curtailment requirements should apply to all turbines over the life of the project and be subject to ongoing monitoring and adaptive management to ensure the protection of the species, along with other bird and bat species.

Subject to the recommendations of my assessment to ensure no turbines penetrate the minimum safe altitude for Warrnambool airport operations, the project infrastructure will have acceptable effects on aviation safety and aircraft operations. Noise from the facility will be acceptable and can be managed in accordance with the proposed EMMs and relevant regulatory requirements. While the visual impacts of the project on some residential properties cannot be mitigated, these effects are acceptable in light of the net community benefit from the project.

The project is expected to provide a significant net social and economic benefit to the local and regional communities, even in the refined state where the footprint of the project is reduced to mitigate environmental effects to acceptable level, as supported by my assessment. The project is also likely to make significant contributions to achieving state and Commonwealth policies with regard to reducing greenhouse gas emissions.

My assessment with regard to the proposed on-site quarry is that despite some residual uncertainty about the potential effects of groundwater drawdown on surrounding wetlands and related ecosystems, the effects have been assessed sufficiently in the EES to inform my assessment and are likely to be localised and temporary. These effects can be acceptably managed through the proposed EMMs, which will be further informed through assessments to be undertaken to inform statutory processes under the MRSD Act. I am satisfied that these further assessments can inform effective management measures for the quarry that would be given statutory weight through the quarry work plan required under that MRSD Act to ensure that effects are no greater than predicted in the EES.

Although there are five wetlands within 1 km of the quarry, I am satisfied that the quarry could be located in its proposed location in light of the recommended condition to avoid construction activities during the Brolga breeding season, which would help to offset any potential residual impacts to the species during the construction phase of the project.

Should Wind Prospect decide not to proceed with the on-site quarry, it is my conclusion that the environmental effects of using any of the existing quarries that were assessed in the EES, particularly the associated effects on traffic and roads, will be acceptable. I note that any such effects are likely to be less than predicted in the EES given my recommended modifications to the project.

6.1 Summary of response to IAP recommendations

The IAP made three key recommendations within the Executive Summary of its report and 21 other recommendations throughout the main body of the report. Table 3 summarises my responses to the IAP's recommendations. Some of the IAP's recommendations relate to the proposed planning permit conditions. Although I have responded to the IAP's recommendations, I note that the proposed permit conditions may require further updating to reflect project changes following my assessment. My responses to the proposed changes to EMMs and any additional EMMs recommended by the IAP are presented in Appendix A.

Table 3: Response to IAP recommendations

Inquiry recommendation		Minister's response
Primary IAP recommendations		
1	Include Wetlands W1, W3, W4, W7, W10, W12 (26028), W13, 25241, 25710, 25721, 25729, 25731, 25741, 25816, 25932, 25941, FD2, FD16, FD21 and 12a as suitable brolga breeding wetlands within the brolga breeding home range unless they are permanently drained	Supported, noting that wetland W4 is a synonym for wetland 25721. W7 is a synonym for wetland 25936. 26028 is a synonym for wetland W12e (part of the Cockatoo Swamp complex). 25241 appears to be an error as no such number is assigned to any wetland in the EES.
2	Before a permit decision, Wind Prospect conduct additional assessments for: a) wetland 25698 to confirm if it is hydrologically unsuitable for brolgas or permanently drained b) wetland 25668 to determine the reasons for the LiDAR assessment reducing its extent	Supported in the context that the recommended information, when gathered, should be discussed with DTP (Planning) and with DEECA BSW and should be provided to me as the responsible authority for consideration along with the planning permit application. If either wetland is found to be suitable for Brolga breeding, home range mapping should be provided similar to that recommended for other suitable breeding wetlands.
3	Following the outcome of assessments in Recommendation 2, the Minister for Planning issue: a) Planning Permit PA2201620 (Moyne Planning Scheme) for the Willatook wind energy facility with the conditions shown in Appendix G and subject to b) Planning Permit P22065 (Moyne Planning Scheme) for native vegetation removal with the conditions shown in Appendix H	Supported, subject to Wind Prospect's submitting a revised permit application incorporating changes to the wind farm design that respond appropriately to provision of turbine free buffers to protect habitat for Brolga and for Southern Bent-wing Bat which this assessment recommends.

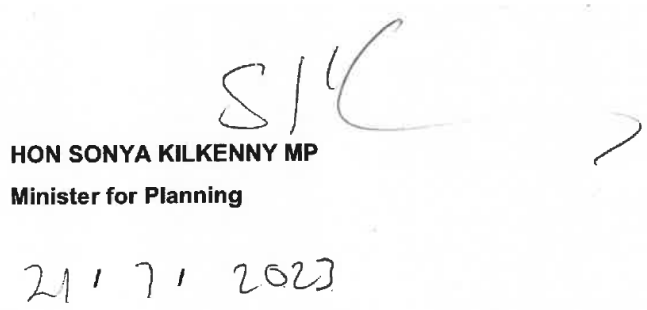
Other IAP recommendations		
Groundwater and surface water		
1	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to make groundwater related changes to measures GW02, GW05 and GW07	Supported, noting that GW02 should read GW04. The IAP's recommended changes to GW02 were editorial. I support editorial changes to GW02 in line with my recommendations in Appendix A. I support the recommended changes to GW05 and GW07, subject to my amendments in Appendix A.
2	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to make surface water related changes to measures SW03 and SW04	Partially supported, subject to my recommended changes to SW03 in Appendix A. Amendments to SW03 regarding avoidance of construction works in July-November are not supported (this has been supported as a requirement in the construction environmental management plan).
Biodiversity and habitat		
1	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to require the brolga breeding wetland buffer to be: a) measured from the edge of the wetland b) increased from 700 metres to 900 metres from the 95-metre rotor blade length setback for any wetland within the 2-kilometre breeding home range of a wetland that holds water for at least 120 consecutive days at least once every 10 years (includes W1, W3, W4, W7, W10, W12 (26028), W13, 25710, 25731, 25741, 25816, 25932, 25941, FD2, FD16, FD21, 12a shown in Figure 9 of the Environmental Effects Statement Appendix C1) c) 1369 metres plus a disturbance buffer of 300 metres, and a 95-metre blade length setback for isolated wetlands that hold water for at least 120 consecutive days at least once every 10 years.	Generally supported, consistent with responses to primary recommendations 1, 2 and 3 above and subject to detailed comments below. Recommendation a) is supported. Recommendation b) is generally supported, with the inclusion within home ranges of all other wetlands within 2 km of identified historic or suitable breeding wetlands, and with the addition of a 300 m allowance for disturbance to constitute the overall turbine free buffer for Brolga breeding home ranges. Recommendation c) is not supported. The same principle should apply to isolated breeding wetlands as for other breeding wetlands, that the home range should be considered to extend 600 m from the edge of the wetland, and a further 300 m disturbance allowance added to

Other IAP recommendations		
		constitute the turbine free buffer for that home range. NOTE: Turbine towers should be set back from the boundaries of turbine free buffers as far as necessary to ensure that blades at any orientation do not enter the turbine free buffer.
2	Include Wetlands W1, W3, W4, W7, W10, W12 (26028), W13, 25241, 25710, 25721, 25729, 25731, 25741, 25816, 25932, 25941, FD2, FD16, FD21 and 12a as suitable brolga breeding wetlands within the brolga breeding home range unless they are permanently drained.	See response to primary recommendation 1 above.
3	Before a permit decision, Wind Prospect conduct additional assessments for: a) wetland 25698 to confirm if it is hydrologically unsuitable for brolgas or permanently drained b) wetland 25668 to determine the reasons for the LiDAR assessment reducing its extent.	See response to primary recommendation 2 above.
4	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to revise SW03 so that the environmental management plan includes a measure for avoiding construction from July to end of November.	Not supported as an amendment to SW03. The measure for avoiding construction from July to end of November is best implemented as requirement in the construction environmental management plan (see next row).
5	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to: a) avoid works from July to end of November b) require a brolga monitoring and compensation plan in consultation with the Department of Energy, Environment and Climate Action and to the satisfaction of the responsible authority.	Recommendation a) to include a measure within the construction environmental management plan requiring no construction from July to end of November is supported. Recommendation b) is supported.
6	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to: a) apply a minimum 200-metre turbine free buffer from potential foraging habitat b) revise conditions for the bird and bat adaptive management plan.	Supported.
7	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to make flora and fauna related changes to measures BH02 and BH03.	Amendments to BH02 are supported, subject to the inclusion of the requirement of developing clear mapping which identifies these areas, to the approval of DEECA. The suggested amendments to BH03 were not reflected in Report 2, Appendix F. However, changes

Other IAP recommendations		
		were proposed to BH04 and BH07, which I support (further discussion provided in section 5 and Appendix A).
8	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to make native vegetation management and offset related changes.	Supported.
Noise and vibration		
1	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to: a) change the reporting requirements for background noise measurements b) require the reporting of the noise measurements as a time series noise plot for the 24 hour period.	Not supported as amendments to the proposed planning permit conditions. I recommend it is most appropriately addressed in the relevant EMM, i.e. NV08 for a pre-construction (predictive) noise assessment (see Appendix A).
2	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to change the requirements of NV08 (in relation to wind turbine modelled noise).	Not supported, noting that no amendments were made by the IAP to the wording of NV08 in relation to noise modelling.
3	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to change the requirements of NV08 (in relation to special audible characteristics).	Not supported, noting that no amendments were made by the IAP to the wording of NV08 in relation to special audible characteristics.
4	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to require noise level penalties for the presence of Special Audible Characteristics.	Not supported as a planning permit condition. I recommend an amendment to EMM NV09, which captures the explicit requirement for a post-construction noise assessment in accordance with the EP Regulations, to make it clear that the assessment must consider SACs.
5	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to apply a noise criterion of 40 dB $LA_{90\ (10min)}$ at all wind speeds, consistent with what Willatook Wind Farm Pty Ltd volunteered to achieve,	Not supported as a planning permit condition. I recommend this limit only be applied at non-stakeholder dwellings to differentiate it from the noise limits at stakeholder dwellings (45 dB(A) or background plus 5 dB as specified in the EP Regulations). I also recommend that it be captured in the noise management

Other IAP recommendations		
		plan required by both EMM NV11 and the EP Regulations rather than the planning permit conditions for the facility to ensure that compliance is regulated by the EPA.
6	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to change the reporting requirements for the compliance noise measurements.	Not supported as a planning permit condition. I recommend these monitoring requirements be captured in the Noise Management Plan required by EMM NV11.
7	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to change the requirements of NV01 to address local community engagement.	Supported.
8	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to include an audible blasting noise assessment in NV08.	Supported, noting that the requirement should be applied to EMM NV06 (not NV08) to inform the blast management plan.
Quarry		
1	Amend Environmental Management Measures, as shown in Report 2 Appendix F, to make quarry related changes to measure SW06.	Supported, noting that changes should be applied to EMM GW05 (not SW06) for the water management plan. Further assessment of wetland impacts from quarry dewatering and groundwater drawdown is required to inform assessment under the MRSD Act and findings need to inform the details of the water management plan under EMM GW05 to also be captured in the quarry work plan.
Aviation		
1	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to: a) require wind turbines T39, T48, T49, T51 and T54 not intrude into the Minimum Safe Altitude for the Warrnambool Airport b) require the mast guy wires to be treated so that the base section of the wires and the area around the base attachment point is a contrasting colour to the ground.	Supported.

Other IAP recommendations		
Bushfire risk		
1	Amend Planning Permit PA2201620, as shown in Report 2 Appendix G, to: a) require a fire prevention and emergency response plan as part of the endorsed environmental management plan b) require through the fire prevention and emergency response plan, local CFA brigades and Moyne Shire Municipal Emergency Management representative to be initially inducted and updated before each declared fire season.	Supported.



HON SONYA KILKENNY MP

Minister for Planning

21 / 7 / 2023

Appendix A Environmental Management Measures

The IAP recommended specific changes to several environmental management measures (EMMs) in response to submissions and through their analysis of the issues. I support the inquiry's recommended version of the EMMs except where qualified in Table B1. Further details regarding my responses summarised in this table are contained in the relevant sections of this report.

The IAP also included other minor editorial amendments to the EMMs in Appendix F of its report. I generally endorse all changes proposed unless otherwise discussed in Table B1.

Table B1: Recommended changes to environmental management measures

IAP recommendation		Minister's response
1	Amend GW02 as follows: *Consult with relevant landowners about potential impacts to bores that would occur before commencing construction.*	I support this EMM subject to the following amendments: *Consult with relevant landowners about potential impacts to bores ~~that would occur~~ before commencing construction.*
	Amend GW04[30] as follows: *If any assumptions underpinning predictions of groundwater drawdown from the quarry change, update drawdown predictions and complete a site-specific risk analysis for relevant current and future environmental values outlined in the Environmental Reference Standard 2021.*	Supported, subject to further changes being made to extend the requirements beyond an update of drawdown predictions and a site-specific risk assessment to specify that management measures should be implemented through the approvals under the MRSD Act and Water Act. The management measures must ensure that impacts associated with quarry dewatering do not adversely impact aquatic GDEs or Brolga wetlands beyond the predictions in the EES. See also GW05
2	Amend GW05 as follows: *Prepare a Water Management Plan and carry out its requirements to the approval of the responsible authority, before project construction commences. The Water Management Plan should respond to any final design details and ensure all risks are appropriately managed.* *The Water Management Plan should include, but not be limited to:* • *dewatering procedures (including discharge location and quality of water, pollution control and management of sediment) in line with EPA Victoria approval processes* • *procedures for groundwater inflow and quality monitoring in accordance with EPA Victoria Publication 669: Groundwater sampling guidelines (as amended or replaced from time to time)* • *groundwater level and quality triggers for further management measures, if needed.*	Supported, subject to further changes to include management measures informed by EMM GW04, which must ensure the impacts associated with quarry dewatering do not adversely impact aquatic GDEs or Brolga wetlands beyond the predictions in the EES.
3	Amend GW07 as follows: *Conduct further groundwater monitoring and mapping before and during construction to establish local groundwater levels and groundwater quality.*	Supported, subject to the inclusion of a requirement for monitoring wells to be installed at least 1,000 m from the quarry to monitor and respond to potential impacts as recommended by the IAP.

30 Note the IAP report referred to GW02

IAP recommendation		Minister's response
4	Amend SW03 as follows: *Where essential wind farm infrastructure (e.g., access tracks and electrical cables) crosses a creek, measures for avoiding and minimising impacts would be documented in the Construction Environmental Management Plan, including:* *• avoiding construction from July to end of November* *• avoiding undertaking of works when high rainfall events are expected* *• maintaining adequate flow rates and water levels in waterway to be crossed (as determined in consultation with the relevant authorities) to minimise impacts on aquatic ecosystem and environmental values* *• restoring temporarily disturbed waterways and vegetation (removing any obstructions to waterway flow) as soon as practicable following the open cut trenching works to at least its pre-construction condition* *• minimising future erosion in areas where trenching occurred (e.g., use of riprap made of stones to stabilise the waterway, geofabric to prevent erosion and scour until establishment of vegetation* *• avoiding the creation of continuous rows of stockpiled materials and providing gaps to allow flow* *• establishing a water quality monitoring and adaptive management program to check the effectiveness of controls that are implemented to mitigate potential risks to surface waters, and detail additional and/or improved measures that would be implemented should those controls fail or are not effective to eliminate or minimise risks of harm to surface waters. Monitoring of surface waters will be conducted upstream and downstream of works areas before construction, during construction and post-construction at the appropriate frequency (i.e., weekly during watercourse crossings works) to understand any changes to environmental values in line with EPA publication 1896: Working within or adjacent to waterways.*	Generally supported, subject to changes to replace the first dot point with the original wording, i.e.: *"preferentially schedule works during drier months of the year and lowest flow of the waterway"*
5	Amend SW04 as follows: *Develop and implement a Sediment, Erosion and Water Quality Management Plan, in consultation with Glenelg Hopkins Catchment Management Authority and EPA Victoria. Adopt a treatment train approach to erosion and sediment control measures within the construction site would includes:* *• phasing of ground-disturbing works to periods of lower rainfall, where possible* *• maintaining watercourse and wetland buffers of 100 metres (except for watercourse crossings) and adopt other measures consistent with EPA Victoria Publication 1896: Working within or adjacent to waterways* *• minimising clearance of vegetation, particularly along drainage lines, waterways and steep slopes. Vegetation, including within the watercourse and riparian zones, would be reinstated as quickly as practicable as open cut trenching works are completed* *• installation of primary, secondary and tertiary treatment control measures before construction based on site-specific hazards consistent with EPA Victoria Publication 1893: Erosion, sediment and dust: treatment train*	Supported

IAP recommendation		Minister's response
	• *designing and designating an area for stockpiles before construction commences ensuring that stockpiles and batters are designed with slopes no greater than 2:1 (horizontal/vertical)* • *implementing management controls for stockpiles consistent with EPA Victoria Publication 1895: Managing stockpiles* • *stabilising exposed soils and implement other management controls for managing ground disturbance in accordance with EPA Victoria Publication 1894: Managing soil disturbance* • *installing sediment fencing within the waterway downstream of any culvert crossing construction site for the duration of the construction works and 3 months thereafter* • *installing sediment treatment control measures as appropriate (including around stockpiles) to adequately capture sediment loads* • *managing vehicle movements to designated roads and access areas* • *directing stormwater within a constructed lined channel or sediment basin where applicable to reduce the velocity of runoff water* • *monitoring surface water quality upstream and downstream from the works area. If an adverse change in water quality is detected, the works are to be immediately ceased and inspected. If works are determined to be the cause of such adverse water quality changes, modify work practices, confirm effectiveness of newly established controls and if environmental values are being protected* • *constructing silt fences (where are employed for sediment control), with a centre section lower than the ground levels at either end of the silt fence to avoid outflanking during storm events* • *developing contingency measures for works within a waterway or floodplain, including controls to be implemented when a storm event is forecast.*	
6	Amend BR02 (monitoring and compensation plan) *Before development starts, a Brolga Monitoring and Compensation Plan is to be approved by DELWP and the responsible authority.*	Supported
7	Amend BR03 as follows: *As part of the Bat and Avifauna Management Plan, develop a mortality monitoring program of at least five years' duration that commences when the first turbine is commissioned.*	Generally supported, noting that the requirements may change following input from DEECA and DCCEEW.
8	Amend BH01 *Measures to manage native vegetation during construction would include:* • *obtaining appropriate approvals and permits before any vegetation removal* • *securing appropriate offsets in accordance with state and Commonwealth legislation and policy* • *locating temporary infrastructure areas (parking areas, stockpiles, laydowns etc) in already cleared areas* • *ensuring all construction personnel are appropriately briefed before works start*	I recommend changes to BH01 to require that if any threatened flora species are recorded within the previously unsurveyed areas that these areas will be avoided, and subsequently addressed within the construction environmental management plans for the project, including the mapping required by my recommendations for BH02.

IAP recommendation		Minister's response
	• *ensuring no construction personnel, machinery or equipment are placed inside vegetation/tree protection zones (see BH02)* • *conduct seasonally dependent pre-clearance surveys for threatened flora species in areas of suitable habitat proposed to be disturbed and not already surveyed for threatened species.*	
9	Amend BH02 as follows: *The approved vegetation clearing extent, including retained patches of vegetation within the construction footprint, would be clearly demarcated and identified during the construction stage as follows:* • *All project personnel would need to attend an induction that outlines environmental management requirements. This would include information on the biodiversity values of the project area specifically areas of threatened flora and fauna habitat.* • *Erecting flagging, bunting and signage, construction fencing or fauna-specific temporary fencing in areas of special concern and appropriate buffers as follows:* - *Growling Grass Frog habitat* - *patches of Plains Grassy Wetland* - *areas of mapped Ecological Vegetation Classes* - *brolga and Southern bent-wing habitat* - *tree protection zones* - *any other areas of special concern noted during pre-clearance inspections.* • *Clearly mark accessways to prevent establishment of secondary tracks and disturbance to native vegetation.*	Supported, subject to the inclusion of the requirement to develop clear mapping which identifies these areas, to the approval of DEECA.
10	Amend BH04 to insert a requirement that: *construction machinery shall be washed down before entering and (where required) exiting the site*	Supported, subject to incorporating the proposed requirement with the exhibited requirement in BH04 for: *inspection and certification of all vehicles and construction machinery upon arrival at site. Vehicles and construction machinery cannot access the site until certified as clean.*
11	Amend BH05 *Implement a Bird and Bat Adaptive Management Plan to be approved by DELWP Environment, DAWE and the responsible authority.* *The objectives of the bird and bat adaptive management plan would be to:* • *implement a monitoring program to estimate the impact of the project on at-risk birds and/or bats that can reasonably be attributed to the operation of the project, as an indicator of population impact* • *directly record impacts on birds and bats through carcass searches* • *document an agreed decision-making framework that identifies impact triggers requiring a management response to reduce impacts and the management activities that will be considered; and*	I recommend changes to BH05 to reflect the recommendations of my assessment, including: • Inclusion of low wind speed curtailment to mitigate potential impacts on Southern Bent-wing Bat, including: o the cut-in speed specified in the BBAM Plan is increased to at least 4.5 m/s between September and May for the life of the wind farm to help reduce potential bat mortalities. o the cut-in speed requirements should be applied to all turbines for the project

IAP recommendation		Minister's response
	• *identify matters to be addressed in periodic reports on the outcomes of monitoring, the application of the decision-making framework, mitigation measures and their success.* *Strategies to be employed to ensure that any impact triggers are detected would include the following:* • *operational phase bat utilisation surveys (see BH06)* • *carcass searches under turbines (see BH07)* • *scavenger and detectability trials (see BH08,09)* • *statistical analysis of the results of carcass searches to derive estimates of mortality levels and rates* • *reporting.* *The Bird and Bat Adaptive Management Plan would use an adaptive management approach where management measures are adapted to manage and mitigate impacts more effectively based on the findings of the monitoring program. It is intended that the results of the initial monitoring program would inform the requirements of the ongoing monitoring program, depending on detected bird and bat impacts, and identify additional targeted carcass searching and surveys to be carried out to inform ongoing management and mitigation strategies* *The design and implementation of the bird and bat mortality monitoring program would be comprehensive and science-based. It would involve frequent monitoring of a sample of turbines for a minimum of two years duration, that begins when the first turbine is commissioned.* *Impact triggers for threatened species would occur if a threatened bird or bat species (or recognisable parts thereof) listed under the EPBC Act or FFG Act are found dead or injured within the search area under a turbine, or within 100 metres of it, either during any formal mortality search or incidentally by wind farm personnel. Once triggered, an appropriate response would be initiated, and reporting requirements outlined in the decision-making framework would occur. The proposed decision-making framework for identifying and mitigating impacts on threatened bird and bat species is shown in Figure 12-13, Chapter 12 – Biodiversity and habitat*	○ the cut-in speed of at least 4.5 m/s should be applied during additional months if any Southern Bent-wing Bat mortalities are recorded during winter ○ monitoring results should inform the potential for increasing the cut-in speed or the need to consider other effective management strategies if Southern Bent-wing Bat mortalities are recorded. • The BBAM Plan should be updated to include suitable contingency measures should any Grey-headed Flying Fox mortalities be recorded during operation. • The BBAM Plan should include suitable contingency measures should mortalities of other threatened birds, including threatened migratory species be recorded during operation. • The BBAM Plan and its implementation should be subject to ongoing (post-construction) review by an independent auditor. • The BBAM Plan must be provided to DEECA and DCCEEW for approval, noting this is likely to be required prior to approval of the project under the EPBC Act.
12	Amend the 2nd paragraph of BH07 as follows: *Monitoring would consist of searches of 20 randomly selected turbines out to a distance of 120 metres at least once every month for a period of five years. A second follow-up search, a 'pulse search', would be undertaken to 60 metres during the warmer months (September to April) when microbats are more active.*	Generally supported, noting that the requirements may change following input on the BBAM Plan from DEECA and DCCEEW prior to its approval.
13	Amend NV01 (consult during construction, including outside hours) *All construction activities will be managed and occur in accordance with the Noise and Vibration Management Plan, which would be developed and endorsed by the responsible authority before construction commences. The Noise and Vibration Management Plan would:* - *be developed before commencing construction, and be reviewed and updated as necessary at least before each key construction phase* - *be prepared from documented reviews of the construction activities and consider iteratively work practices, equipment selection and EMMs, and*	Supported

IAP recommendation		Minister's response
	specify the actions that will be taken to minimise construction noise and vibration and their impacts, so far as reasonably practicable - *include contingency measures to address, wherever relevant, the risk of impact from noise that could not be sufficiently mitigated at source or during propagation* - *include a requirement to verify, via inspections or audits, practices and actions to minimise impacts and that continual improvement is effectively in place* - *include a framework for justification and approval of out-of-hours works that is established in consultation with the relevant stakeholders. Such a framework should:* o *include a clear rationale for the justification of both unavoidable works and managed impact works, and response strategies with EMMs to reduce noise and vibration and their impacts, so far as reasonably practicable, consistent with EPA publications 1834 and 1820.1 (as amended or replaced from time to time)* o *detail noise requirements for managed-impact works that are consistent with the definition from EPA publication 1834 (as amended or replaced from time to time), including that:* ▪ *the noise does not have intrusive characteristics such as impulsiveness, tonality, intermittency or high energy in the low frequency range; and* ▪ *the risk of impacts is addressed adequately by limiting the emergence of construction noise levels LAeq above the background noise level LA90 at the time of noise impact* - *ensure that all assessments for out-of-hours works and their approval are conducted by a suitably qualified independent person, such as the Independent Environmental Auditor, who is able to make decisions free from influence or pressure related to the delivery of the project* - *ensure that, in respect of unavoidable works:* o *the necessity for such works to be carried out outside of normal working hours is assessed and documented by a person with skills and expertise in risk/safety assessments* o *the EMMs to reduce noise and vibration are assessed and documented by a person with skills and expertise in noise and vibration control* o *contingency measures will be taken to address the residual noise and vibration impacts from unavoidable works (for example respite periods or alternative accommodation) and the conditions in which they will apply.*	
14	Amend the first sentence of NV02 to require community consultation during construction, as well as before commencement, as follows: *The following community consultation would occur with nearby residents prior to and during construction activity*	Supported
15	Amend NV03 as follows:	Supported, subject to additional amendment to clarify that contingency measures are to

IAP recommendation		Minister's response
	Conduct noise monitoring whenever a new construction activity is occurring outside of normal working hours and if other earthmoving construction activities are required within 100 metres of a dwelling (with the permission of the dwelling owner). This would include: *• measurement of background noise levels at the closest dwelling before construction works occur or at a location representative of the closest dwelling* *• measurement of noise level from construction works at the closest (or most impacted) dwelling (or at a location representative of the closest dwelling) during the night under conditions that are conducive to noise propagation towards the measurement location* *• measurement of noise level at an intermediate location and extrapolated using a recognised noise model if a measured level cannot be satisfactorily achieved at the closest dwelling (or at a location representative of the closest dwelling).* *• background noise levels to inform the assessment of construction noise (for example requirements for the weekend/evening period in EPA publication 1834 (as amended or replaced from time to time)) are measurements of LA90 that represent the background at the time of noise impact* *If the measured noise level exceeds the relevant criteria in EPA Victoria Publication 1834: Civil construction, building and demolition guide, further mitigation measures would be implemented to reduce the risk of harm so far as reasonably practicable, and the testing repeated to confirm compliance with the criteria.*	be adopted wherever noise monitoring shows that: • the noise and vibration EMMs adopted do not provide the reduction in noise or vibration level or in noise character, consistent with the acoustic performance specified in the CNVMP; or • managed impact works do not meet the noise requirements set in the CNVMP; or • construction noise levels exceed the criteria for weekend/evening hours set in Table 4.3 of EPA publication 1834 (as amended or replaced from time to time), established based on the background noise level that represents the background at the time of impact.
16	Amend the first paragraph of NV04 as follows: *Implement a noise complaints response process before construction commences to eliminate the cause of a complaint or otherwise minimise the related impact so far as reasonably practicable. This process would identify any feasible and reasonable measures that may further reduce impacts following a complaint, and to provide feedback to the community on the above process within a reasonable timeframe.*	Supported, subject to amendments to clarify that the procedure must ensure that all reasonable steps are taken to address the cause of complaints related to construction noise from the project by: • first minimising the generation of noise and vibration so far as reasonably practicable, consistent with the GED; and • then implementing suitable contingency measures to address the risk of harm from exposure to residual noise and vibration (for example respite period or relocation). NV04 should also clarify that investigations into noise complaints should consider not only noise and vibration levels, but also character (impulsiveness, intermittency, and tonality) and other factors that can contribute to the impacts. When the cause of a complaint has been identified, corrective EMMs or contingency actions to address it should be implemented to minimise the risk of harm from noise and vibration so far as reasonably practicable.

IAP recommendation		Minister's response
		These should not be contingent to noise or vibration criteria being exceeded (unless it is demonstrated that these criteria are set at levels at which there is no risk of harm). Neither should they be designed for minimum compliance with such criteria.
17	Amend NV05: *The design and operation of the temporary concrete batching plants would be in accordance with the control measures outlined in EPA Victoria Publication 1806: Reducing risk in the premixed concrete industry to minimise industrial noise emissions and prevent harm to nearby sensitive receptors.*	I recommend changes to NV05 to reflect the relevant requirements under the EP Act 2017 and the Regulations, and require that design and operation of these premises be supported by documented evidence, that: • the risk of harm from their noise emissions is minimised so far as reasonably practicable, consistent with the GED; • the noise limits set in Division 3 of Part 5.3 of the Regulations are not exceeded by the effective noise levels calculated to include, wherever relevant, the cumulative noise from all commercial, industrial and trade premises at noise sensitive areas affected by the project; and • unreasonable noise, is not emitted having regard to the factors in part (a) of the definition of unreasonable noise in section 3(1) of the EP Act 2017 – this includes considering the risk associated with low frequency noise as assessed in the Noise guidelines: assessing low frequency noise (EPA publication 1997) (as amended or replaced from time to time).
18	Amend NV06[31] *Control measures for mitigating the risks and impacts posed by blasting would be contained in the Blast Management Plan. The Blast Management Plan, to be prepared by the proponent and approved by the responsible authority before construction commences, would outline the procedures and controls required to conduct blasting operations safely and achieve compliance with the relevant standards and thresholds to minimise risk of harm to human health and the environment so far as reasonably practicable, consistent with the GED.* *A noise monitoring regime would be implemented when blasting is required to ensure compliance with relevant blasting criteria.* *Should the noise level from any of the project aspects exceed the requirements detailed in the blasting report, the size of the charge mass would be reduced.*	Supported, subject to inclusion of the notification requirements that are referred to in EMM SE01. NV06 should be amended to include: • IAP's recommendation for an impact assessment of audible blasting noise as part of the work plan assessment process • to include community notifications of planned blasting (including time and duration), and • to include EPA's proposed amendments limiting blasting to normal working hours.
19	Amend NV07	I recommend changes to NV07 to reflect the relevant requirements under the EP Act 2017

31 Note that the IAP report referred to NV08

IAP recommendation		Minister's response
	All quarry operations would be undertaken in accordance with the Work Authority. Before construction commences, the draft Quarry Work Plan (provided in Attachment II) would be finalised and submitted to Earth Resources Regulation (Department of Jobs, Precincts and Regions) for approval, as required under the Mineral Resources (Sustainable Development) Act 1990.	and the Regulations, and require that design and operation of these premises be supported by documented evidence, that: • the risk of harm from their noise emissions is minimised so far as reasonably practicable, consistent with the GED; • the noise limits set in Division 3 of Part 5.3 of the Regulations are not exceeded by the effective noise levels calculated to include, wherever relevant, the cumulative noise from all commercial, industrial and trade premises at noise sensitive areas affected by the project; and • unreasonable noise, is not emitted having regard to the factors in part (a) of the definition of unreasonable noise in section 3(1) of the EP Act 2017 – this includes considering the risk associated with low frequency noise as assessed in the Noise guidelines: assessing low frequency noise (EPA publication 1997) (as amended or replaced from time to time).
20	Amend NV08 *Before construction commences, a pre-construction noise assessment would be completed and approved by the responsible authority. This assessment would be undertaken to assess the final project layout and equipment selection to ensure that the noise criteria are achieved at all non-stakeholder dwellings under all wind speeds prior to construction commencing.* *The pre-construction noise assessment would be verified in accordance with the requirements of the New Zealand Standard by an EPA Victoria accredited auditor.*	Supported, subject to further amendments to NV08 to include: • an explicit requirement for consideration of the Orford Township Zone as a high amenity area. more prescriptive detail on the requirements for future background noise monitoring to ensure the requirements align with the recommendations made in the verification report exhibited as Appendix E2 to the EES, including the need for time series noise plots for the 24-hour period.
21	Amend NV09 *A post-construction noise assessment would be undertaken in accordance with the New Zealand Standard 6808:2010 Acoustics – Wind Farm Noise and regulations under the Environment Protection Act 2017 to demonstrate that the project is compliant. This assessment would be provided to the EPA within 10 business days of completion.*	I recommend changes to this EMM to include an explicit requirement for the post-construction noise assessment to consider penalties for Special Audible Characteristics.
22	Amend NV10 *Additional noise monitoring would be undertaken at intervals required by the Environment Protection Act 2017 (currently every five years as specified in the Environment Protection Amendment (Interim) Regulations 2021).*	I recommend changes to NV10 to refer to the requirements of the EP Regulations rather than the Environment Protection Amendment (Interim) Regulations 2021
23	Amend NV11	I recommend changes to this EMM to capture:

IAP recommendation		Minister's response
	A noise management plan including complaints management would be prepared and implemented, as required by the Environment Protection Act 2017 (as specified in the Environment Protection Amendment (Interim) Regulations 2021). *Should the noise level from wind turbine operation exceed the requirements detailed in the planning permit, a wind turbine curtailment regime under specific wind speeds and directions will be implemented.*	• The IAP recommendation for a 40dB noise limit at non-stakeholder dwellings in the Farming Zone consistent with what the proponent volunteered. • IAP's recommended permit conditions for compliance noise monitoring, including that compliance measurements must include time series data in units of LA_{90}, LA_{eq} and LA_{max} and the percentage of time that the noise limit is exceeded at night. • NV11 should refer to the requirements of the EP Regulations rather than the Environment Protection Amendment (Interim) Regulations 2021
24	Amend NV12 *An annual statement would be prepared detailing the actions undertaken to ensure compliance, as required by the Environment Protection Act 2017 (as specified in the Environment Protection Amendment (Interim) Regulations 2021).*	I recommend changes to NV12 to refer to the requirements of the EP Regulations rather than the Environment Protection Amendment (Interim) Regulations 2021
25	Amend NV13 *Adopt 'reduced' sound power levels for the substation transformer as specified in the Australian/New Zealand Standard AS/NZS60076.10:2009, Power transformers – Determination of sound levels.*	I recommend changes to NV13 to broaden the requirements to considering all options for reducing noise at the source, not just from the transformer.
26	Amend NV14 as follows: *Should the noise level from the substation and battery exceed the requirements detailed in the Environmental Noise Assessment report, measures must be taken to reduce the noise levels to avoid causing unreasonable noise.*	Supported, subject to additional changes to replace reference to "the requirements detailed in the Environmental Noise Assessment report" with "the requirements of the EP Act and the Regulations" and to require that design and operation be supported by documented evidence that: • the risk of harm from their noise emissions is minimised so far as reasonably practicable, consistent with the GED; • the noise limits set in Division 3 of Part 5.3 of the Regulations are not exceeded by the effective noise levels calculated to include, wherever relevant, the cumulative noise from all commercial, industrial and trade premises at noise sensitive areas affected by the project; and • unreasonable noise, is not emitted having regard to the factors in part (a) of the definition of unreasonable noise in section 3(1) of the EP Act 2017 – this includes considering the risk associated with low frequency noise as assessed in the Noise guidelines: assessing low frequency noise (EPA publication 1997)

IAP recommendation		Minister's response
		(as amended or replaced from time to time).
27	Amend AVI01 *Maintain marking of meteorological monitoring masts in accordance with the National Airports Safeguarding Framework Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation and marking on the base around the outer guy wires to improve visibility of these structures for low-flying aircraft such as aerial agricultural operations.*	I recommend changes to this EMM to capture the IAP's recommended permit conditions for marking of mast guy wires, including that the base section of the wires and the area around the base attachment point is a contrasting colour to the ground.
28	Amend AVI02 as follows: *Notification to relevant stakeholders about the location and heights of wind turbines and meteorological monitoring masts, including:* *• Vertical Obstacle Database, managed by Airservices Australia, as per the procedure for reporting tall structures contained in AC139.E-01v1.0 Reporting of tall structures* *• ensure a Notice to Airmen that provides the height and location of the turbines and meteorological monitoring masts is issued.*	Supported
29	Amend LV01 as follows: *Siting and design of project infrastructure such as O&M Facility, laydown area and supporting structures along the overhead transmission lines from sensitive viewing areas and key view lines.*	Supported
30	Amend LV04 as follows: *Permanent project lighting associated with the O&M facility and terminal station and temporary lighting associated with construction areas is to be installed in accordance with Australian Standard AS 4282: Control of the obtrusive effects of outdoor lighting. These measures include:* *• ensuring lighting is baffled and directed to the ground* *• installing motion-trigger mechanisms to reduce the duration of lighting* *• installing perimeter landscaping to intervene in views to lighting from identified sensitive receptors (residential dwellings).*	Supported
31	Amend LP03 *A Risk Management Plan, Fire Management Plan and Emergency Management Plan would be prepared in accordance with the CFA's Design Guidelines and Model Requirements – Renewable Energy Facilities (v3, March 2022), in conjunction with the CFA, prior to commissioning.* *The Fire Management Plan would outline measures for design, defendable space, construction, water supply and access, awareness actions, preparedness levels and fire response procedures for the site to address any concerns relating to bushfire risk.*	I recommend changes to this EMM to capture the IAP's recommended permit conditions for bushfire risk, including to: • require a fire prevention and emergency response plan as part of the environmental management plan • require through the fire prevention and emergency response plan, local CFA brigades and Moyne Shire Municipal Emergency Management representative to be initially inducted and updated before each declared fire season.
32	Amend TT03 as follows: *Site access gates would be designed and constructed in accordance with Guideline Drawing GD4010A – Typical Access to Rural Properties'.*	Supported

Appendix B Matters of national environmental significance

Under the EPBC Act bilateral agreement between the Australian and Victorian governments, the Willatook Wind Farm project EES and this assessment examines the project's likely impacts on matters of national environmental significance (MNES), relevant to the controlling provisions identified in the Commonwealth EPBC Act controlled action decision, i.e. listed threatened species and communities (sections 18 and 18A).

This appendix consolidates information on the likely effects of the proposal on MNES protected under the EPBC Act, drawing upon the assessment of specific matters discussed in other sections of my assessment. This includes assessment findings on biodiversity and habitats (section 5.2) and surface and groundwater (section 5.3).

Potential impacts on MNES are summarised in Chapter 25 and Technical Appendix D of the EES. More detailed information about potential impacts that relate to my assessment of impacts on MNES can be found in Chapter 12 of the EES where biodiversity effects of the project are discussed. The EES identified the key issues for MNES as being the potential significant impacts on the ecological community Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains. These significant impacts are proposed to be offset. The EES stated that impacts on other threatened species and communities listed under the EPBC Act will not be significant.

Section 12 of the IAP report summarised the likely impacts on MNES, with detailed discussion of evidence and submissions related to MNES provided in section 5 of the IAP's report. The IAP considered that the project, if developed as proposed in the EES, would have a significant impact on the Southern Bent-wing Bat and recommended additional avoidance and minimisation measures for the species. However, the conclusion of the IAP was that the residual impact on this nationally threatened species is unlikely to be significant providing the recommended changes to the project, including proposed EMMs and permit conditions are implemented. I support the IAP's findings and have recommended further amendments to strengthen the IAP's recommendations, as set out below.

B.1 Listed threatened species and communities

The EES identified ten EPBC Act-listed threatened flora species as being likely to occur or having the potential to occur within the project area: Basalt Peppercress, Button Wrinklewort, Clover Glycine, Dense Leek-orchid, Gorae Leek-orchid, Maroon Leek-orchid, Matted Flax-lily, Swamp Everlasting, Swamp Fireweed and Trailing Hop-bush. Two of these were observed within the project area: Swamp Everlasting and Trailing Hop-bush.

Four EPBC Act-listed ecological communities were identified as having potential to occur within the project area. However, only two were identified within the project area: Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains and Grassy Eucalypt Woodland of the Victorian Volcanic Plain.

The EES identified eight EPBC Act-listed threatened fauna species as having the potential to occur in the project area. This includes two bird species (Curlew Sandpiper and White-throated Needletail), two bat species (Southern Bent-wing Bat and Grey-headed Flying-fox), one frog species (Growling Grass Frog), one reptile species (Striped Legless Lizard) and two fish species (Yarra Pygmy Perch and Little Galaxias[32]).

Listed threatened flora

Table A.2 below provides a summary of the species discussed within the EES as having the potential occur within the project area, grouped by the ecological vegetation classes (EVCs) they are associated with. Impacts in Table A.2 below are based on EVCs that have the potential to support the species. Basalt Peppercress, Button Wrinklewort, Clover Glycine and Matted Flax-lily are associated with the Heavier-soils Plains Grassland, Higher-rainfall Plains Grassy Woodland and Basalt Shrubby Woodland EVCs. Dense Leek-orchid, Gorae Leek-orchid, Maroon Leek-orchid and Swamp Fireweed are all associated with Plains Grassy Wetland EVC. These species were not recorded in the patches

32 Formerly known as the Dwarf Galaxias (*Galaxiella pusilla*)

proposed for removal, but it was noted that they have the potential to occur in areas where their associated EVCs are mapped.

Surveys for the EES identified 24 Swamp Everlasting plants in a single patch of Plains Grassy Wetland EVC, which has been avoided. The project will have a direct impact on 1.3 ha of Plains Grassy Wetland EVC, reducing potential habitat for the species. Swamp Everlasting was not detected within the construction footprint for the project, however, the EES noted that there is a 0.3 ha unsurveyed area of Plains Grassy Wetland EVC that has the potential to provide habitat for Swamp Everlasting.

Three individual Trailing Hop-bush plants were identified in two patches of Basalt Shrubby Woodland EVC along Old Dunmore Road, which would not be impacted by the project. A small (0.05 ha) area of Basalt Shrubby Woodland proposed to be cleared has the potential to provide habitat for Trailing Hop-bush and has not been surveyed.

A commitment has been made in EMM BH01 to undertake seasonally dependent pre-clearance surveys for threatened flora species in areas of suitable habitat that have not already been surveyed in the construction footprint. Although not captured in BH01, the EES stated that if these species are recorded in this area, Wind Prospect will develop species-specific management measures which may include micro-siting or directional drilling. I recommend amendments to EMM BH01 to require that if any threatened flora species are recorded during pre-clearance surveys within the previously unsurveyed areas that these areas will be avoided and subsequently addressed within the construction environmental management plan for the project (see Appendix A).

Table B.1 Predicted impacts to threatened flora

Species	Impact to associated EVC (area ha)	Associated EVC avoided (area ha)	Associated EVC avoided (%)
Swamp Everlasting	1.3	248.7	99.5%
Trailing Hop-bush	2.01	37.2	95%
Basalt Peppercress, Button Wrinklewort, Clover Glycine and Matted Flax-lily	2	37.152	95%
Dense Leek-orchid, Gorae Leek-orchid, Maroon Leek-orchid and Swamp Fireweed	1.3	248.7	99.5%

DELWP BSW submissions noted that further changes in the location and extent of native vegetation losses are possible as the detailed design and construction footprint is finalised, and that this can be dealt with by way of permit conditions and secondary consent. DELWP BSW was satisfied that Wind Prospect had taken adequate steps to avoid and minimise native vegetation removal. The IAP found that potential impacts to EPBC-listed flora species have been assessed appropriately and that Wind Prospect has proposed appropriate management controls and mitigation measures to avoid and minimise impacts.

Chapter 25 of the EES included an assessment of potential impacts to each of these species in accordance with the Significant Impact Guidelines[33], which determined that the project is unlikely to have a significant impact. The IAP considered the impact on EPBC Act listed flora species would be minimised as far as practicable and was satisfied with the attempts to avoid and minimise vegetation removal. I agree that, through avoidance of the known locations of listed plants recorded on site and the framework provided by the proposed EMMs and proposed planning permit conditions, the project is unlikely to have a significant impact on EPBC-listed threatened flora species.

33 Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (Australian Government Department of the Environment, 2013).

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains.

Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains is a threatened ecological community which is listed as critically endangered under the EPBC Act. Field surveys identified areas of Plains Grassy Wetland EVC which met the threshold criteria for this ecological community. The project will remove 0.49 ha of this ecological community, representing 2.6% of the mapped ecological community within the investigation area. The EES included an assessment of potential impacts to Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains in accordance with the Significant Impact Guidelines as having the potential to result in a significant impact because the action was considered likely to reduce the extent of the ecological community. The proponent indicated in the EES this impact would be offset in accordance with Commonwealth offset requirements[34] and that a suitable offset site has been located. EMM BH01 requires offsets to be secured in accordance with state and Commonwealth legislation and policy prior to construction. The proposed planning permit conditions include a requirement for a native vegetation management plan that shows areas of Seasonal Herbaceous Wetland (Freshwater) of the Temperate Lowland Plains.

The IAP concluded that the EES has appropriately applied the avoid and minimise principles to reduce vegetation removal, and that the impact on EPBC Act-listed ecological communities will be minimised as far as practicable. I agree that the residual impacts to this ecological community are potentially significant, but I am satisfied that the impacts have been minimised and will be acceptable, subject to being appropriately offset in accordance with Commonwealth policy. The residual impacts can be acceptably managed through the recommended EMMs and required approvals.

I note that the Department of Climate Change, Energy, the Environment and Water may seek further information from Wind Prospect regarding the proposed offsets prior to a final EPBC approval decision on the project.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

Grassy Eucalypt Woodland of the Victorian Volcanic Plain is a threatened ecological community which is listed as critically endangered under the EPBC Act. Field surveys identified two patches of Higher Rainfall Plains Grassy Woodland EVC (EVC 55_63) within the investigation area that were found to meet the condition thresholds for this EPBC Act listed ecological community. These patches were approximately 0.836 ha in size and would not be impacted by the development footprint. The EES also noted that a further 2.2 ha of native vegetation within the site could potentially qualify as Grassy Eucalypt Woodland of the Victorian Volcanic Plain; however, this is not located within the development footprint and is not proposed to be impacted. The IAP supported this finding and I also agree that the project is unlikely to have a significant impact on Grassy Eucalypt Woodland of the Victorian Volcanic Plain.

Curlew Sandpiper

Curlew Sandpiper is listed as critically endangered under the EPBC Act. The EES states that suitable habitat from listed migratory shore birds, including Curlew Sandpiper, is scarce, limited in extent and scattered. Far more extensive habitat that supports much higher numbers of all recorded or likely species of shorebird occur coastward from the wind farm area.

Curlew Sandpiper was not recorded during surveys undertaken for the EES but may be expected to occur in small numbers occasionally given the limited extent of suitable habitat on the project site. Such numbers would not exceed significance levels of a threshold of 0.1% of flyway population. Considered together with other mitigation measures such as the minimum rotor blade height and habitat buffers for bats and Brolga, the EES concluded that the project is unlikely to have a significant impact on Curlew Sandpiper.

On the basis that significant impact thresholds for the species have not been reached and the proposed mitigation through habitat buffers and a BBAM Plan, as strengthened through my assessment, I agree that the project is unlikely to a significant impact on Curlew Sandpiper.

White-throated Needletail

White-throated Needletail is listed as vulnerable under the EPBC Act. The EES states that there is potential for the White-throated Needletail to pass through the site based on its range. It is an aerial species that forages on wing, often at

34 EPBC Act Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities, 2012)

rotor swept height area. It was not recorded during the surveys undertaken for the project, and the EES concluded that this project is unlikely to have a significant impact on the species.

I note there have been records of White-throated Needletail mortalities at wind facilities in Tasmania, and that the species conservation advice lists mortality from wind turbines as a key threat to the species. To mitigate against potential risks to the species, I recommend that EMM BH05 is updated to require that the BBAM Plan must include suitable contingency measures should mortalities of this or other threatened migratory species be recorded during operation of the project. With these additional measures, I agree that the project is unlikely to have a significant impact on White-throated Needletail.

Grey-headed Flying-fox

Grey-headed Flying-fox is listed as vulnerable under the EPBC Act. The EES identified that the Grey-headed Flying-fox has the potential to occasionally fly over the project site due to the proximity to the closest known roost site at Warrnambool, located greater than 30 km from the nearest turbine, and temporary camp at Mortlake, located greater than 45 km from the nearest turbine. There were no records of Grey-headed Flying-fox within the 10 km search region. The nearest record was located approximately 15 km away located at Kirkstall.

The EES concluded that the overall risk to the Grey-headed Flying-fox is very low and that the incorporation of a turbine-free buffer around treed areas will act to further mitigate potential collision risk. I note that Grey-headed Flying-foxes are known to fly at heights of the proposed rotor swept area, and Grey-headed Flying Fox mortalities have been recorded at wind facilities, such as the nearby Salt Creek Wind Farm.

The EES included an assessment of potential impacts to the species in accordance with the Significant Impact Guidelines, which determined that the project is unlikely to have a significant impact on Grey-headed Flying Fox. To mitigate against potential risks to the species, I recommend that EMM BH05 is updated to require that the BBAM Plan must include suitable contingency measures should any Grey-headed Flying Fox mortalities be recorded during operation. I am satisfied that with the proposed mitigation measures for habitat buffers and a BBAM plan, as strengthened by my assessment, the project is unlikely to have a significant impact on the Grey-headed Flying-fox.

Southern Bent-wing bat

Southern Bent-wing Bat is listed as critically endangered under the EPBC Act. The species is distributed from south-eastern South Australia (around Robe, Naracoorte and Port MacDonnell) to south-western Victoria[35]. There are known maternity caves at Naracoorte, Warrnambool and Portland. The project is located between the Naracoorte and Warrnambool maternity caves, with the closest maternity caves being Warrnambool and Portland, which are around 40 and 50 km away from the site, respectively. There are also at least 70 caves in the distribution area of the species that are known roosting (non-breeding) sites, with four of the known non-breeding roost caves within 30 km of the investigation area. Activity is highest during the warmer months of the year (October to March) when there are favourable wind speeds and temperatures and greater insect activity.

DELWP BSW provided information to the IAP on the current scientific understanding of Southern Bent-wing Bat. The information submitted indicates that Southern Bent-wing Bat movements occur between caves throughout the year, including back and forth movements over successive night between caves 70 km apart. Although the bats generally conserve energy during winter, in times of lower insect availability, significant Southern Bent-wing Bat activity have been detected across the winter period, including inter-cave movements, suggesting that some level of foraging activity also continues during this time. Findings in Victoria have also shown that the species regularly undertakes large movements, with tracked individuals flying up to 85 km (average 35 km) out from caves each night and regularly moving between roosts about 60 km apart. Recent research by Bush et al[36] has shown that such bat activity is focused on native and exotic treed vegetation, such as planted linear strips and scattered paddock trees.

35 *Miniopterus orianae bassanii* (Southern Bent-wing Bat) Conservation Advice (Threatened Species Scientific Committee, 2021)

36 Bush A, Lumsden L, Prowse TAA (2022). GPS tracking reveals long distance foraging flights of Southern Bent-wing Bats in an agricultural landscape. Spoken paper presented at the 20th Australasian Bat Society Conference, Brisbane. Abstract available.

The project site is located within the reported potential maximum nightly travel distance (85 km) from a number of Southern Bent-wing Bat roosting sites and a maternity cave and the site has the potential to support regular and seasonal movements of Southern Bent-wing Bat between foraging areas and both roosting and maternity caves. I note the IAP's statement that the project is about 35 km from eight roosting caves, including a cave identified by DELWP BSW at Codrington, about 17 km to the south-west.

Southern Bent-wing Bat studies undertaken for the EES were noted by the proponent to be extensive and included over 4,500 detector nights of survey over five of the eleven years between 2009 and 2020 at over 100 separate sites with bat analysis over 500 survey nights using ultrasonic detection equipment. Survey results for the EES indicated that Southern Bent-wing Bat was identified in and adjacent to the project area within a limited range of treed areas. Mapping provided in the EES (Appendix D, Figure 10) showed that the majority of Southern Bent-wing Bat observations were concentrated in the west of the project area, near Shaw River, and the east of the project area, near Moyne River. Appendix D of the EES noted that the highest recorded Southern Bent-wing Bat calls were recorded in Spring 2010 and Autumn 2011, however calls attributed to the Southern Bent-wing Bat complex were also recorded through to May 2022. Calls were predominately recorded near areas of mapped vegetation and waterways, with DELWP BSW noting in their submission that the highest number of Southern Bent-wing Bat calls (35 calls across 12 nights of survey) occurred in the large area of scattered trees in the south-west corner of the wind farm. Wind Prospect submitted that ultrasonic detection equipment detected bats only up to 45 m above ground, with Mr Lane stating that the Southern Bent-wing Bat is unlikely to fly at heights above 45 m, and a minimum blade height 40 m above ground is sufficient to protect bats during flight. The EES concluded that the site does not support significant foraging habitat (while also acknowledging the presence of the species in the project area) and concluded that the risks from the project to the species was low.

The EES included an assessment of potential impacts to the species in accordance with the Significant Impact Guidelines, which determined that the project is unlikely to have a significant impact on Southern Bent-wing Bat. DELWP BSW, along with other submitters, did not agree with Wind Prospect's conclusion that the residual risk to Southern Bent-wing Bat is low, stating that the conclusion appeared to be based upon the height of Southern Bent-wing Bat activity and, at least partially, upon Wind Prospect's findings of a lack of foraging habitat at turbine locations. DELWP BSW's submission included information that, despite the EES studies not detecting the species at 45 m height, the species has been detected at these heights and above elsewhere, and that there are several limitations in height survey methodology, severely limiting the ability to reliably detect Southern Bent-wing Bat at height. They also underlined the inherent uncertainty involved with bat surveys and bat impact assessments, resulting in a need to apply the precautionary principle and use effective mitigation measures to account for residual risk.

The IAP concluded that the risks to Southern Bent-wing Bat from the project, as proposed in the EES, were unacceptable without further mitigation and raised concerns with the conclusions reached in the EES. The IAP considered that the EES inadequately described the flight path Southern Bent-wing Bat used to frequent the foraging habitats in the vicinity of the project area and concluded that the evidence suggests Southern Bent-wing Bat could be using the project area as a seasonal movement or migratory path between roosting and maternity caves. The IAP agreed with DELWP BSW that that despite Wind Prospect's reliance on the minimum blade clearance as an effective mitigation measure, the presence of Southern Bent-wing Bat at the height of the rotor swept area cannot be disregarded, given the current level of scientific uncertainty around the flight height of the species and the limitations of the survey methods. I support the IAP's findings.

The IAP recommended strengthening Wind Prospect's proposed mitigation measures, namely increasing the proposed 120 m turbine-free buffer distance to 200 m and strengthening the proposed BBAM Plan, to ensure the project will not significantly impact the Southern Bent-wing Bat.

I support the IAP's recommendation for further avoidance of potential impacts to Southern Bent-wing Bat by increasing the turbine-free buffer distance, and I agree with the IAP's recommendation that the 200 m turbine-free buffer distance from potential foraging habitat as shown in tabled document 67 should be adopted.

During the hearings, Wind Prospect proposed curtailment at low wind speed as an additional precautionary measure for the Southern Bent-wing Bat. Curtailment entails increasing the lowest wind speed at which turbines start to turn (i.e. the cut-in wind speed). This measure was proposed as part of a draft BBAM Plan provided to the IAP with Wind Prospect's expert witness statement for ecology. The BBAM Plan proposed a trial to assess the effectiveness of a cut in speed of 4.5 m/s at turbines close to potential suitable habitat where Southern Bent-wing Bat were recorded at higher levels in the

south-west and eastern sections of the wind farm site. DELWP BSW was not satisfied with the proposed trial of curtailment at a small number of turbines, stating that curtailment has widely been shown to be effective at reducing insectivorous bat mortality locally and internationally, and submitted that it should be adopted for the life of the facility.

Referring to a recent study by Bennett *et al* 2022[37], the IAP noted that it showed that curtailment significantly reduced bat fatalities by 54%, with marginal reduction in annual power and revenue. The IAP recommended that turbines should have a minimum cut-in speed of 4.5 m/s during spring and summer. I note the IAP recommendation for the minimum 4.5 m/s cut-in speed to be reviewed as part of the proponent's proposed two-year trial. However, due to the demonstrated benefit of implementing low wind speed curtailment, including that reported by Bennett et al, and the uncertainty associated with potential impacts to Southern Bent-wing Bat, I have recommended the minimum cut-in speed of 4.5 m/s be applied during periods of highest Southern Bent-wing Bat activity for the life of the project. Wind Prospect proposed to continue curtailment for the life of the project if monitoring results showed it to be successful, which I support. I note that any finding that curtailment is not a successful mitigation measure, presumably through evidence of bird or bat mortality, should not result in an end to curtailment. Therefore, I have recommended that the minimum cut-in wind speed of 4.5 m/s should apply for the life of the project, with its effectiveness reviewed through the monitoring proposed in the BBAM Plan. Investigations to inform proposed changes to the management strategy should consider which turbines present a higher risk to the species and the appropriateness of the selected mitigation measures (e.g. curtailment or changes to cut-in speed) should also be investigated and adjusted, as required.

Due to the residual uncertainty around potential impacts to Southern Bent-wing Bat, I support an adaptive approach to this mitigation measure with monitoring results informing any required increase in the minimum cut-in wind speed or changes to the management approach should other effective management strategies be developed during the operational life of the project.

To deal with the potential collision risk to the species at other turbines, other than those proposed for curtailment in the draft BBAM Plan, and in months other than October to May, I have recommended that low wind speed curtailment should apply at all turbines and be implemented from dusk to dawn in the months of September to May, inclusive. The appropriate minimum cut-in speed is to be reviewed through monitoring required by EMM BH05 for the BBAM Plan. I recommend that the EMM BH05 be updated to include a requirement to increase the minimum cut-in speed above 4.5 m/s or consider additional or alternative mitigation measures should any mortalities of Southern Bent-wing Bat be recorded during the times when the cut-in speed is being implemented. The revised management response or cut-in speed must be approved by DEECA and DCCEEW.

The IAP recommended changes to the BBAM Plan to increase the amount of monitoring required during the months of higher bat activity (i.e., during spring to autumn) and to require the involvement of an independent auditor during implementation of the BBAM Plan to undertake periodic independent review of the BBAM Plan content and ongoing monitoring of the plan's implementation to ensure it reflects current operational obligations and relevant legislation and policy.

I support the IAP's recommendations for strengthening the proponent's BBAM Plan, as amended by my assessment, and have recommended that EMM BH05 be updated to capture the requirements around low wind speed curtailment, monitoring and independent review (see Appendix A). The BBAM Plan required by EMM BH05 must be provided to DEECA and DCCEEW for approval, noting this is likely to be required prior to approval of the project under the EPBC Act.

The IAP concluded that, with these additional avoidance and minimisation measures, the project could proceed without significantly impacting the Southern Bent-wing Bat population. I agree and conclude that the project is unlikely to have a significant residual impact on Southern Bent-wing Bat provided the project is modified and there is implementation of the recommended mitigation measures set out within this assessment.

37 Bennett, E.M., Florent, S.N., Venosta, M., Gibson, M., Jackson, A., Stark, E. (2022) *Curtailment as a successful method for reducing bat mortality at a southern Australia wind farm*, Austral Ecology 47, 1329-1339. doi:10.1111/aec.13220

Growling Grass Frog

Growling Grass Frog is listed as vulnerable under the EPBC Act. The EES identified that some wetlands and creek lines in the project area met the requirements for potential Growling Grass Frog habitat. The project generally avoids areas identified as Growling Grass Frog habitat. The two proposed crossings at Back Creek and Shaw River were identified to have potential impacts to Growling Grass Frog through removal of approximately 0.26 ha of habitat. EMM BH11 proposed a range of management measures for a Growling Grass Frog Management Plan. Proposed mitigation measures include pre-clearance surveys for the species, implementing a salvage and translocation protocol, installing temporary frog exclusion fencing at crossing points, reducing the construction footprint within mapped habitats, adopting recommended crossing designs by DELWP[38] to ensure habitat connectivity is maintained, and promptly restoring and enhancing affected areas. A range of further measures would be carried out as part of the Construction Environmental Management Plan to minimise impacts to these watercourses, which are also relevant to minimising impacts to the Growling Grass Frog. I note the importance of preventing impacts to Growling Grass Frog from Chytrid Fungus and support the specific requirement in EMM BH11 to prevent the spread of the fungus.

The EES included an assessment of potential impacts to the species in accordance with the Significant Impact Guidelines, which determined that the project is unlikely to have a significant impact. The IAP agreed that potential impacts to this EPBC-listed species have been assessed appropriately and that Wind Prospect has proposed appropriate management controls and mitigation measures to avoid and minimise impacts to the species. I am generally satisfied that the mitigation measures proposed by Wind Prospect address the impacts to these species, and I agree that the project is unlikely to have a significant impact on Growling Grass Frog.

Striped Legless Lizard

Striped Legless Lizard is listed as vulnerable under the EPBC Act. Targeted assessments were undertaken for Striped Legless Lizard and no individuals were recorded in the project area. The species was considered unlikely to occur within the broader study area due to the lack of historical reports and the degraded, isolated and fragmented state of any potential habitat.

In the unlikely event the species is discovered during the project's construction, the EES proposed management measures in EMM BH12 to minimise potential impacts. The IAP generally supported the mitigation measures proposed for threatened species in the EES.

The EES included an assessment of potential impacts to the species in accordance with the Significant Impact Guidelines, which determined that the project is unlikely to have a significant impact on Striped Legless Lizard. I am comfortable that residual impacts can be managed through the proposed mitigation measures, and I agree that the project is unlikely to have a significant residual impact on Striped Legless Lizard.

Little Galaxias and Yarra Pygmy Perch

Little Galaxias and Yarra Pygmy Perch are listed as vulnerable under the EPBC Act. The EES states that the Little Galaxias is endemic to south-eastern Australia from Barwon Downs in western Victoria to near the Coorong in south-eastern South Australia. Aquatic field surveys have recorded the Little Galaxias in Shaw River, an upstream tributary Kangaroo Creek, Back Creek and the Moyne River. These surveys recorded the Yarra Pygmy Perch in the Moyne River and confirmed suitable habitat is present for the species in Shaw River and Back Creek.

Construction activities would result in physical disturbance to creek beds and associated aquatic habitats at two crossing points in Shaw River and Back Creek and resulting reduction in water quality (primarily increased suspended sediment) at these points. EMM BH13 addresses watercourse crossing measures to mitigate potential impacts to Little Galaxias and Yarra Pygmy Perch. Based on the ecology of both species, and the availability of refuge habitats the magnitude of construction, impacts on the species were assessed to be low. The EES predicted a very low impact on the Little Galaxias and Yarra Pygmy Perch during operations on the basis that detailed designs would be informed by detailed hydrological modelling with hydrological connectivity maintained.

38 Growling Grass Frog Crossing Design Standards (DELWP, 2017)

The EES included an assessment of potential impacts to these species in accordance with the Significant Impact Guidelines, which determined that the project is unlikely to have a significant impact. I am comfortable that residual impacts can be managed through the proposed mitigation measures, and I agree that the project is unlikely to have a significant impact on Little Galaxias or Yarra Pygmy Perch.

B.2 Assessment

It is my assessment that, taking account of the IAP report and findings detailed within this assessment, the project will have a significant residual impact on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains and therefore offsets will be required. Residual impacts on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains are acceptable provided they will be offset in accordance with the EPBC Act *Environmental Offsets Policy*, as required by EMM BH01.

It is also my assessment that:

- The project will have an acceptable impact on threatened flora species, subject to my recommended amendments to EMM BH01 to require that any threatened flora species recorded within the previously unsurveyed areas will be avoided and addressed within the construction environmental management plan.
- The project as proposed will likely have a significant impact on Southern Bent-wing Bat if it is constructed and operated as set out within the EES. However, residual impacts to the Southern Bent-wing Bat are unlikely to be significant provided the project modifications and mitigations recommended within this assessment are adopted and implemented by the proponent, including:
    - The 200 m turbine-free buffer is applied to potential Southern Bent-wing Bat foraging habitat as shown in tabled document 67.
    - The cut-in wind speed specified in the BBAM Plan is increased to at least 4.5 m/s from dusk to dawn between September and May for the life of the project to help reduce the risk of potential bat mortalities, with its effectiveness reviewed through the monitoring proposed in the BBAM Plan. Investigations to inform proposed changes to the management strategy should consider which turbines present a higher risk to the species and the appropriateness of the selected mitigation measures (e.g. curtailment or changes to cut-in speed) should also be investigated and adjusted, as required.
    - The cut-in wind speed requirements should be applied to all turbines for the project.
    - The cut-in speed of a minimum of 4.5 m/s should also be applied during additional months if any Southern Bent-wing Bat mortalities are recorded during winter.
    - Any changes to turbine blade tip height to meet aviation safety requirements do not result in a reduction in the lower ground clearance for the rotor swept area.
    - Ongoing monitoring through the BBAM Plan and implementation of appropriate additional mitigation measures in response to observed bird and bat impacts, noting that monitoring results should inform the potential need to increase the minimum cut-in wind speed or consider other effective management strategies if Southern Bent-wing Bat mortalities are recorded.
- Impacts on EPBC-listed threatened birds, Curlew Sandpiper and White-throated Needletail, and on Grey-headed Flying-fox are unlikely to be significant with the implementation of the proposed mitigation measures, including those recommended and amended within this assessment for the Southern Bent-wing Bat and Brolga.
- The project is unlikely to have a significant impact on other EPBC-listed threatened fauna species, including Growling Grass Frog, Striped Legless Lizard, Little Galaxias and Yarra Pygmy Perch with the implementation of the proposed EMMs.

I support amendments to EMMs as recommended by the IAP and further strengthened by my assessment to assist in avoiding and minimising impacts on MNES, as detailed in Appendix A of my assessment.