WIND PROSPECT

ENERGY FORMS

WILLATOOK WIND FARM

Planning Application Report

June 2022

www.willatookwindfarm.com.au

Prepared for Willatook Wind Farm Pty Ltd

Prepared by

Energy Forms
Level 8, 91 William St, Melbourne VIC 3000
PO Box 16164 Collins Street West, VIC 8007

Contents

Abbreviations i

Glossary iii

Acknowledgement to Traditional Owners viii

Executive summary ix

Chapter 1 Introduction 1

Chapter 2 Project site and context analysis 2

2.1 The surrounds 2

2.2 The project site 5

Chapter 3 Project description 10

3.1 Overview 10

3.2 Components and layout 18

3.2.1 Wind turbine generators 18

3.2.2 Access tracks and project site access from public roads 20

3.2.3 Signage 22

3.2.4 Electrical reticulation and distribution 22

3.2.5 Battery energy storage system 25

3.2.6 Operations and maintenance facility 27

3.2.7 Meteorological monitoring masts 27

3.2.8 Temporary infrastructure components and layout 28

3.3 Project phases 29

3.3.1 Construction 30

3.3.2 Operation 36

3.3.3 Decommissioning and rehabilitation 37

Chapter 4 Design response influences 38

4.1 Design response 38

4.2 Stakeholder engagement 43

Chapter 5 Legislative context 52

5.1 Project approvals process 52

5.2 Principal approvals 54

5.2.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) 54

5.2.2 Planning and Environment Act 1987 55

5.2.3 Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2018 55
5.2.4 Mineral Resources (Sustainable Development) Act 1990 56

5.3 Other relevant legislation 56
5.3.1 Environmental Protection Act 2017 56
5.3.2 Heritage Act 2017 57
5.3.3 Water Act 1989 57
5.3.4 Flora and Fauna Guarantee Act 1988 and Flora and Fauna Guarantee Amendment Act 2019 57

5.4 Relevant policies and guidelines 57
5.4.1 Policy and planning guidelines for development of wind energy facilities in Victoria 57
5.4.2 Guidelines for the removal, destruction or lopping of native vegetation 58
5.4.3 Design Guidelines and Model Requirements for renewable energy installations 59
5.4.4 Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria 59
5.4.5 Interim Brolga Guidelines 60

5.5 Relevant plans and strategies 60
5.5.1 Victoria's Climate Change Strategy 60
5.5.2 Great South Coast Regional Growth Plan 2014 60
5.5.3 Moyne Shire's Council Plan 2021–2025 61
5.5.4 Renewable Energy Action Plan (DELWP 2017a) 61
5.5.5 Victoria's Regional Statement 61
5.5.6 Renewable Energy Zones 62

5.6 Other planning schemes 63

Chapter 6 Planning provisions 64

6.1 Land use definition 64

6.2 Moyne Planning Scheme 65
6.2.1 Planning Policy Framework 65
6.2.2 Local Planning Policy Framework 69
6.2.3 Zones 70
6.2.4 Overlays 72
6.2.5 Other permit triggers 73
6.2.6 Particular provisions 76
6.2.7 General provisions 78
6.2.8 Operational provisions 79

6.3 Permit triggers summary 79

6.4 Referral agencies 80
6.4.1 Department of Transport 80

6.4.2 Secretary to DELWP 80
6.4.3 AusNet Services 80
6.4.4 Workcover 80

Chapter 7 Assessment 81

7.1 Planning and land use 81
7.1.1 Contribution to achieving government policy objectives 81
7.1.2 Consistency with planning provisions 82

7.2 Amenity impacts 86
7.2.1 Noise and vibration 86
7.2.2 Blade glint, shadow flicker and electromagnetic interference 95
7.2.3 Air quality 98
7.2.4 Landscape and visual impact 99

7.3 Physical and natural environment 114
7.3.1 Surface water 114
7.3.2 Groundwater 117
7.3.3 Biodiversity 121
7.3.4 Brolga 142

7.4 Heritage 150
7.4.1 Aboriginal cultural heritage 150
7.4.2 Historical cultural heritage 152

7.5 Community and safety 153
7.5.1 Aircraft safety 153
7.5.2 Traffic and road impacts 156
7.5.3 Blade drop 164
7.5.4 Fire prevention and safety 165

7.6 Economic and social aspects 167

7.7 Environmental management 170
7.7.1 Detailed design plans 170
7.7.2 Environmental Management Plan 170
7.7.3 Construction Environmental Management Plan 171
7.7.4 Decommissioning Plan 173
7.7.5 Other management plans 173

Chapter 8 Conclusion 174

References 176

Tables

Table 2-1	Population centres near the project site	2
Table 2-2	Operating and approved wind farms within 15 kilometres of the project site (boundary to boundary)	3
Table 2-3	Local roads within the project site	5
Table 3-1	Summary of the main project features	10
Table 3-2	Project phases	30
Table 4-1	Sensitive areas and constraints	39
Table 4-2	Engagement in relation to technical studies	43
Table 4-3	Summary of responses to key issues and concerns raised by stakeholders	48
Table 6-1	Summary of zoning permit triggers	70
Table 6-2	Summary of overlay permit triggers	72
Table 6-3	Other planning permit triggers	73
Table 7-1	Wind energy provisions assessment	84
Table 7-2	Magnitude of change assessment description	102
Table 7-3	Publicly accessible viewpoints within the project viewshed	103
Table 7-4	Operating and approved wind farms within the project viewshed	107
Table 7-5	Visual impact assessment from significant landscape and vantage points within the project investigation area	109
Table 7-6	Dwelling visual impact assessment summary	112
Table 7-7	Project offset requirements	126
Table 7-8	Impact assessment summary – birds	137
Table 7-9	Impact assessment summary – bats	139
Table 7-10	Impact assessment summary – frogs and reptiles	140
Table 7-11	Impact assessment summary – aquatic fauna	141

Figures

Figure 2-1	Context plan	4
Figure 2-2	Dwelling locations within and surrounding project site	6
Figure 2-3	Woolsthorpe-Heywood Road, east of Tarrone North Road	8
Figure 2-4	Shaw River within the project site	8
Figure 2-5	Aerial view of volcanic lava flows and stony rises	8
Figure 2-6	Depressions within the landscape that form ephemeral wetlands	9
Figure 2-7	Typical landscape of the project site	9
Figure 2-8	Example of patch of Basalt Shrubby Woodlands within the project site	9
Figure 3-1	Project overview	13
Figure 3-2	Project overview western sector	14
Figure 3-3	Project overview northern sector	15
Figure 3-4	Project overview southern sector	16

Figure 3-5	Project overview eastern sector	17
Figure 3-6	Maximum and minimum wind turbine dimensions	19
Figure 3-7	A rotor with three blades with the final blade being lifted onto a wind turbine tower	20
Figure 3-8	Site access and road network	21
Figure 3-9	Substation layout	23
Figure 3-10	Example of wind farm substation and operations and maintenance facility	24
Figure 3-11	Example synchronous condenser	24
Figure 3-12	Example 30-megawatt battery system at Ballarat, Victoria	25
Figure 3-13	Battery energy storage system	26
Figure 3-14	Conceptual operations and maintenance site plan	27
Figure 3-15	Meteorological monitoring mast	28
Figure 3-16	Over size and over mass wind turbine component haulage route options	32
Figure 3-17	Typical internal access road	34
Figure 4-1	Project identification and refinement	38
Figure 4-2	Sensitive areas and constraints incorporated into the project design	42
Figure 4-3	Engagement activities	47
Figure 5-1	Interplay between the EES process and other statutory approvals	53
Figure 6-1	Zone and overlay map	75
Figure 7-1	CONCAWE prediction model noise contours	91
Figure 7-2	ISO 9613 prediction model noise contours	92
Figure 7-3	Predicted ancillary infrastructure noise contours using a reduced noise level transformer for day (left) and night (right)	93
Figure 7-4	Landscape and visual investigation area and Zones of Visual Influence of the project	101
Figure 7-5	Location of publicly accessible viewpoints within the investigation area (viewpoints are indicated by yellow dots)	105
Figure 7-6	Dwellings within 6 kilometres of the project site	106
Figure 7-7	Existing operating and approved wind farms and transmission infrastructure within the investigation area	108
Figure 7-8	Dwellings assessed in ground-truthing assessment	111
Figure 7-9	Proposed watercourse crossings	116
Figure 7-10	Groundwater bores and potential GDEs	119
Figure 7-11	Mapped native vegetation within the project site	123
Figure 7-12	Areas of proposed and avoided native vegetation clearance	125
Figure 7-13	Plains Grassy Wetland (EVC 125)	129
Figure 7-14	Basalt Shrubby Woodland (EVC 642) (Nature Advisory)	129
Figure 7-15	Stony Knoll Shrubland (EVC 649) (Nature Advisory)	129
Figure 7-16	Swamp Everlasting recorded in the investigation area	130
Figure 7-17	Flowers of trailing hop bush	130

Figure 7-18 Distribution of Southern Bent-wing Bat and Yellow Sheath-tailed Bat records 132
Figure 7-19 Significant aquatic fauna records 134
Figure 7-20 Brolga assessment method 143
Figure 7-21 Brolga breeding records 145
Figure 7-22 Wetland 4 with nesting Brolgas and Black Swans with the Tarrone Terminal Station in background 146
Figure 7-23 Nesting Brolga 146
Figure 7-24 Final turbine free buffers 148
Figure 7-25 Aviation assessment investigation area 154
Figure 7-26 Local road network 158
Figure 7-27 External daily vehicle movements assuming on-site materials sourcing 159
Figure 7-28 Comparison of heavy vehicle movements between on-site materials sourcing and off-site materials sourcing 160
Figure 7-29 Proposed road mitigation works 163
Figure 7-30 Environmental Management Framework 171

Appendices

Appendix A Map book
Appendix B Land parcels and titles
Appendix C Aboriginal cultural heritage
Appendix D Historical heritage
Appendix E Economic and social
Appendix F Traffic and transport
Appendix G Hydrology and hydrogeology
Appendix H Environmental Management Framework
Appendix I Community engagement summary
Appendix J Noise and vibration
Appendix K Landscape and visual
Appendix L Shadow flicker
Appendix M Electromagnetic interference
Appendix N Air quality
Appendix O Aviation
Appendix P Biodiversity
Appendix Q Brolga
Appendix R Neighbour benefit sharing program

Abbreviations

Abbreviation	Expanded form
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AH Act	*Aboriginal Heritage Act 2006*
AH Regulations	Aboriginal Heritage Regulations 2018
BMO	Bushfire Management Overlay
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CFA	Country Fire Authority
CHMP	Cultural Heritage Management Plan
CMA	Catchment Management Authority
DBH	Diameter at breast height
EE Act	*Environment Effects Act 1978*
EP Act	*Environment Protection Act 2017*
DAWE	Department of Agriculture, Water and the Environment
DELWP	Department of Environment, Land, Water and Planning
Draft National Guidelines	*National wind farm development guidelines – draft* (Environment Protection and Heritage Council, 2010)
EES	Environment Effects Statement
EHP	Ecology and Heritage Partners
EPA Victoria	Environment Protection Authority Victoria
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ERS	Environment Reference Standard
ESO	Environmental Significance Overlay
EVC	Ecological Vegetation Class
FFG Act	Victorian *Flora and Fauna Guarantee Act 1988*
FTE	Full time equivalent
FZ	Farming Zone
GDE	Groundwater Dependent Ecosystem
GWh	Gigawatt hours
Interim Brolga Guidelines	*Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011*
MRSD Act	*Mineral Resources (Sustainable Development) Act 1990*
the Minister	Minister for Planning
MW / MWh	megawatt / megawatt hours
the project	Willatook Wind Farm

Abbreviation	Expanded form
New Zealand Standard	New Zealand Standard 6808:2010 *Acoustics – Wind Farm Noise*
Noise Protocol	EPA Victoria (2021) *Publication 1826.4: Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*
PM	Particulate matter
Policy and Planning Guidelines	*Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* (DELWP, 2021f)
Project proponent	Willatook Wind Farm Pty Ltd
RAP	Registered Aboriginal Party
SUZ	Special Use Zone
TRZ	Transport Zone
VAHR	Victorian Aboriginal Heritage Register

Glossary

Term	Definition
A-weighting	Frequency adjustment representing the response of the human ear, devised to attempt to take into consideration that human response (or sensitivity) to sound is not consistent across all frequencies.
Acid sulfate soil	Naturally occurring soils, sediments and peats that contain iron sulfides, predominantly in the form of pyrite materials. Without oxygen, these materials remain and do not pose a significant risk to human health or the environment. However, if acid sulfate soil is disturbed and exposed to oxygen, the iron sulfides in the material produces sulfuric acid. The acidification of the soil from this process can impact the environment, land use, infrastructure and human health. See also '**potential acid sulfate soil**'.
Annual Exceedance Probability	The probability or risk of a flood of a given size occurring or being exceeded in any given year. A flood with a 1% AEP has a one in a hundred chance of being exceeded in any year, whereas a flood with a 10% AEP has a ten in a hundred chance of being exceeded.
Area of Aboriginal Cultural Heritage Sensitivity	Areas (defined in the Aboriginal Heritage Regulations 2018) that potentially retain Aboriginal cultural heritage. This includes land within 200 metres of named waterways and within 50 metres of registered Aboriginal cultural heritage places.
Bilateral agreement	An agreement between the Australian Commonwealth and Victoria that allows the Commonwealth Minister for the Environment to rely on environmental impact assessments (undertaken in accordance with Victorian legislation) to assess actions under the Commonwealth EPBC Act.
Blade glint	The reflection of sunlight from wind turbine blades.
Broader community	The broader regional community within the entire Moyne Shire. See also '**local community**' and '**near neighbours**'.
Community Engagement Committee	Committee established by Moyne Shire Council in 2010 to provide a forum for direct engagement between the project team, representatives from the local community, and the Moyne Shire Council (including councillors and staff).
Concept design	Initial project design, developed based on a preliminary understanding of the environment, early stakeholder consultation, and experience developing comparable projects in similar environments. This was the design in the EES and EPBC Act referral submissions. See also '**reference design**'.
Crown land	Crown land is land that is owned and managed by the State Government, which is generally not freehold title.
Cultural Heritage Management Plan	Required under the *Aboriginal Heritage Act 2006* when an activity is considered to pose a risk to Aboriginal cultural heritage, being both a 'high impact activity' and occurring in an 'area of cultural heritage sensitivity', or if an EES is required.
Cumulative impact	Combination of effects on the existing environment from multiple projects (or activities) occurring in the same area and over similar timeframes
dB(A)	A-weighted noise level measured in decibels (i.e., unit for expressing sound intensity) See also '**A-weighting**'.
$dB_{A90(10mins)}$	Used in the *New Zealand Standard 6808:2010 Acoustics – Wind Farm Noise* to assess noise generated by wind energy facilities. It refers to a sound level measurement being the average decibel that, over a 10-minute interval period, was equalled or exceeded 90% of the time.

Term	Definition
Ecological Vegetation Class	The basic mapping unit for ecosystem assessment, biodiversity planning and conservation management. An Ecological Vegetation Class is described through a combination of its floristic, life form and ecological characteristics.
Electromagnetic interference	Interference with radiocommunication services to communication signals such as television broadcast signals and fixed point-to-point signals.
Environment Reference Standard	The Environment Reference Standard (ERS) identifies environmental values and provides a way to assess those environmental values in locations across Victoria. The ERS is itself made up of 'reference standards' that cover ambient air, ambient sound, land, and water (surface water and groundwater).
Environmental Management Framework	Environmental Management Framework has been developed to provide the project with a transparent and integrated framework for managing environmental risk and mitigating adverse effects. The Environmental Management Framework outlines clear accountabilities for the delivery of the project in accordance with the environmental management measures and compliance with all relevant environmental laws, approvals, approval conditions and environmental management plans and procedures to ensure that the environmental risks and potential impacts of the project are effectively managed.
General environmental duty	The general environmental duty was introduced in the *Environment Protection Act 2017*. The general environmental duty requires any person in Victoria (businesses, industry and the community) engaging in an activity that may risk harming human health and the environment from pollution and waste to minimise those risks, so far as reasonably practicable
Groundwater dependent ecosystem	Ecosystem that relies on groundwater (either permanently or intermittently) to meet some or all of its water requirements to maintain the flora and fauna, ecological processes and ecosystem services it supports.
Hardstand area	An open, hard-surfaced area to on which infrastructure can be constructed, equipment used, and materials stored.
Instrument flight rules	Rules applicable to the conduct of flight under instrument meteorological conditions and where flight by visual reference is not possible. See also '**visual flight rules**'
Large tree	A tree is considered to be a large tree if it is greater or equal to the large tree benchmark diameter at breast height for the relevant bioregional Ecological Vegetation Class.
Local community	Defined as being within 10 kilometres of proposed wind turbine locations. See also '**broader community**' and '**near neighbours**'.
Matters of national environmental significance	The EPBC Act provides a framework for the protection and management of defined matters of national environmental significance. Under this Act there are nine matters of national environmental significance, which includes nationally threatened species and ecological communities, migratory species and wetlands of international importance.
Meteorological mast ('met mast')	Lattice tower that includes equipment (anemometers and wind vanes at various heights) to record wind speed and direction, temperature and atmospheric pressure.
Migratory species	Animals that move cyclically and at certain times of the year, passing through or migrating to Australia during their annual migration.
Minimum Safe Altitude	The lowest safe altitude is defined for each air route segment to ensure terrain and obstacle clearance.
Nacelle	Located on the top of a wind turbine tower, where the wind turbine hub is mounted with the three blades attached to the hub. The nacelle houses the generator and gearbox (if there is a gearbox) and shafts to convert mechanical energy to electrical energy.

Term	Definition
National Electricity Market	The wholesale generation of electricity, which is transported via transmission lines (incorporating about 40,000 kilometres of state and private assets) to industrial energy users and local energy distributors in all states and territories except Western Australia and Northern Territory. In total, the National Electricity Market supplies around 10 million customers.
Near neighbours	Communities, groups and individuals within 6 kilometres of proposed wind turbine locations. See also '**local community**' and '**broader community**'.
Non-stakeholder dwelling	Landowner not hosting wind farm infrastructure. See also '**stakeholder dwelling**'.
Obstacle Limitation Surface	Series of planes, associated with each runway at an aerodrome, that define the desirable limits to which objects or structures may project into the surrounding airspace (i.e., the aerodrome airspace to be kept free of obstacles such as vegetation, buildings, large structures or transmission lines). See also '**Procedures for Air Navigation Services – Aircraft Operations surface**'.
Offset	In Victoria, an offset is generally required when an approval or permit to remove native vegetation is granted. An offset compensates for biodiversity losses arising from native vegetation removal.
Particulate matter (PM) – including $PM_{2.5}$ and PM_{10}	Refers to particles (solid and liquid droplets) in the air. PM_{10} are particles with diameters less than or equal to 10 microns that, when inhaled, can enter the lungs. Smaller than PM_{10} particles are those with diameters less than or equal to 2.5 microns (referred to as $PM_{2.5}$). These particles can pass from the lungs into the bloodstream.
Photomontage	Photomontage is the process and the result of making a composite photograph whereby the visual representation of project infrastructure is incorporated to site-based photograph.
Point-to-point links	Often used for line-of-sight connections for data, voice and video (such as on mobile and television broadcast towers) See also '**Point-to-multipoint links**'.
Point-to-multipoint links	Provide connections from one location to multiple locations, via multiple paths (e.g., wireless internet connections). See also '**Point-to-point links**'.
Potential acid sulfate soil	See also '**acid sulfate soil**'.
Procedures for Air Navigation Services – Aircraft Operations surface	Surface that extends further and is higher than the Obstacle Limitation Surface, and provides protection for when a pilot is flying using instruments during poor weather. See also '**Obstacle Limitation Surface**'.
Project site	Land parcels (mostly defined by land titles) on which the project is proposed.
Quarry Work Plan	The work plan is the primary document describing the permitted activities to be undertaken on a work authority. It is intended to provide guidance to operations staff at the quarry as well as informing other readers such as Council or Government officers in order to facilitate decisions, approvals, compliance, and enforcement functions. See also '**Work Authority**'.
Reference design	Project design, refined based on findings from initial technical studies, feasibility investigations and input from stakeholders. This is the design assessed by the technical specialists and presented in this EES. See also '**concept design**'.

Term	Definition
Registered Aboriginal Party	Recognised under the *Aboriginal Heritage Act 2006* as having responsibilities to manage and protect Aboriginal Cultural Heritage, being the primary source of advice and knowledge on matters relating to Aboriginal places or Aboriginal objects in their region. The western portion of the project is located in an area that the Eastern Maar Aboriginal Corporation and the Gunditj Mirring Traditional Owners Aboriginal Corporation exercise joint responsibility as Registered Aboriginal Parties. The remainder of the project is located in an area over which the Eastern Maar exercise exclusive Registered Aboriginal Party status.
Renewable Energy Target	A Commonwealth Government policy, administered by the Clean Energy Regulator, designed to ensure at least 33,000 gigawatt hours of Australia's electricity came from renewable sources by 2020. Under the Renewable Energy Target, the Large-scale Renewable Energy Target scheme requires high-energy users to acquire a fixed proportion of their electricity from renewable sources (in the form of large-scale generation certificates).
Renewable Energy Zone	Regions identified in the AEMO 2020 Integrated System Plan with the greatest potential for renewable energy development, based on initial assessments of their resource, infrastructure and transmission capacity.
Respirable crystalline silica	Created during activities such as cutting, grinding, and drilling of materials such as stone, rock, concrete and mortar that contain silica, and can enter lungs when inhaled.
Rotor diameter	The span of the circle (i.e., diameter) swept by wind turbine blades as they rotate.
Scattered tree	A native canopy tree that does not form part of a patch (can be a large or small trees).
Sensitive receptor	Defined by EPA Victoria as land uses that require protection of the air environment, such as for human health and wellbeing and local amenity. This includes places such as residential dwellings, education facilities and outdoor recreation sites.
Shadow flicker	Caused when the sun passes behind the rotating blades of a wind turbine and casts a moving shadow over the neighbouring areas.
Stakeholder dwelling	A dwelling located on the same land as the wind energy facility, or one that has an agreement with the wind energy facility to exceed the noise or shadow flicker limit. See also '**Non-stakeholder dwelling**'.
Swept paths	Analysis of how different parts of a vehicle moves in a steering path. This analysis is used to determine if there is enough room for vehicles to safely make turns.
Synchronous condenser	A synchronous condenser is a device that provides improved voltage regulation and stability by continuously generating/absorbing adjustable reactive power as well as improved short-circuit strength and frequency stability by providing synchronous inertia.
Technical Reference Group	Group formed to provide technical advice to DELWP and the project proponent during the preparation of the EES, made up of relevant state, and local government representatives, as well as representatives from project approval authorities.
Victorian Heritage Inventory	A listing of all known historical (non-Indigenous) archaeological sites in Victoria, protected under the *Heritage Act 2017*. Sites listed on the Victorian Heritage Inventory can also be included on the Victorian Heritage Register. See also '**Victorian Heritage Register**'.
Victorian Heritage Register	A listing of historical (non-Indigenous) heritage sites (places and objects), protected under the *Heritage Act 2017*, that are significant to the history and development of Victoria. Heritage places include buildings, trees and archaeological sites, while heritage objects include items such as furniture and art. See also '**Victorian Heritage Inventory**'.

Term	Definition
Visual flight rules	Rules applicable to flight under visual meteorological conditions (i.e., weather conditions clear enough the pilot can remain clear of cloud and see the terrain and where the aircraft is going). See also '**instrument flight rules**'
Work Authority	A work authority relating to an extractive industry granted under section 77I of the *Mineral Resources (Sustainable Development) Act 1990*.

Acknowledgement to Traditional Owners

Wind Prospect acknowledges the traditional custodians of the land that the project is located on, being the Eastern Maar and Gunditjmara peoples, and wishes to pay respect to Elders, both past and present. We acknowledge the ongoing connection between the Traditional Owners with the land and waters.

Executive summary

This document has been prepared in support of an application for a planning permit to use and develop land for the purposes of a wind energy facility and utility installation and associated works referred to as the Willatook Wind Farm Project (the project).

Approval's context

This report forms part of a planning application for the project. There are several approvals required for the project under a variety of acts and legislative instruments that directly relate to the planning approval.

The project is being assessed via an Environment Effects Statement (EES) under the *Environment Effects Act 1978* (Vic) (EE Act). That assessment process will guide consideration for other approvals processes. Statutory decision makers must consider the Minister's assessment in deciding whether to grant planning approval.

Under the *Planning and Environment Act 1987* the Minister for Planning is the Responsible Authority for all large energy generation facilities and utility installations, which includes wind farms. A Planning Permit is the principal Victorian approval required to progress the project.

Prior to a planning permit being granted, a Cultural Heritage Management Plan (CHMP) approved by First Peoples – State Relations (a group within the Department of Premier and Cabinet) is required under the *Aboriginal Heritage Act 2006* (Vic) (AH Act).

In accordance with Clause 52.08 of the Moyne Planning Scheme and Section 77T of the *Mineral Resources (Sustainable Development) Act 1990* (Vic) (MRSD Act) the proposed on-site quarry to support construction of the project is considered as part of the EES and a work authority and work plan under the Minerals Act would be sought following the assessment of the EES. The quarry is not considered as part of this planning application.

The project must comply with the requirements of the new *Environment Protection Act 2017* (Vic) (EP Act) including the general environmental duty. As such, it must be demonstrated, among other things, that risks of harm to human health and the environment have been minimised so far as is reasonably practicable.

A range of other secondary approvals and consents would be required following the granting of a planning permit.

Project site and context analysis

The project is situated to the south of Woolsthorpe–Heywood Road and lies between Penhurst–Warrnambool Road to the east and Hamilton–Port Fairy Road to the west. The project site, defined as the area within the project boundary, covers an area of about 4,154 hectares in the central western region of Moyne Shire in western Victoria. The project also includes works at three intersections resulting in the removal of native vegetation within the Glenelg Shire, subject to a separate permit application.

The project site is predominantly cleared land used for cattle and sheep farming, with some properties also used for dairy farming. The project site also contains stone fences with heritage value, access tracks, and agricultural infrastructure such as sheds. Dwellings are sparsely populated throughout the landscape and are generally associated with agricultural properties.

The townships of Orford (~100 people) and Hawkesdale (~320 people) are located about 3 kilometres south-west and 10 kilometres north-east, respectively, from the project site. The closest regional centres are Koroit, Port Fairy and Warrnambool located about 19 kilometres south-east, 22 kilometres south and 32 kilometres south-east from the project, respectively.

The project is located within the South-West Renewable Energy Zone recognised by the Victorian State Government. This renewable zone is centred on the existing Moorabool to Heywood 500 kilovolt transmission line, which passes through the project site. There are several wind energy facilities that are either operating or approved in the region. These include the operating Macarthur Wind Farm, and approved Hawkesdale, Ryan Corner, and Woolsthorpe wind farms.

The project site is bordered to the north by Woolsthorpe-Heywood Road (Transport Zone 2), an arterial C class road, which extends east from the Henty Highway, Heywood to Warrnambool-Caramut Road, Woolsthorpe.

Several local roads used primarily for landholder access also intersect the project site.

The Shaw River and Moyne River pass through the western and eastern areas of the project site, respectively. Due to the flat topography and influence of lava flows and stony rises, there are depressions that become inundated during winter and spring, forming ephemeral wetlands during some years.

A site analysis and design response have been undertaken to inform the project. The project has been designed in response to the various site opportunities and constraints. The design of the project has evolved since its inception in 2009. Avoidance and minimisation of impacts has been central to the development of the project. The approach has been to firstly avoid potential impacts, if possible, then to minimise the severity of the impact over space and time.

Project description

The project would generate renewable energy through the construction and operation of up to 59 wind turbines. Electricity produced by the project will be fed through underground cables to the on-site substation. An overhead transmission line (of up to about 300 metres) would connect the on-site substation to the Tarrone Terminal Station, where the electricity would be exported to Victoria's electricity transmission network via the existing Moorabool to Heywood 500 kilovolt transmission line.

The project would generate more than 1,300 gigawatt hours (GWh) of electricity each year, which is, on average, as much electricity as is used by more than 200,000 homes in Victoria each year. An on-site battery storage facility with a capacity of 200 MW / 400 MWh (megawatt hours) is proposed to be located adjacent to the on-site substation. The battery system would store energy and export that energy to the national grid when electricity demand is high.

The project has been designed to enable a maximum wind turbine tip height of 250 metres and associated maximum rotor diameter of 190 metres. The minimum blade clearance from ground level would be 40 metres. A range of current and future wind turbine models would be considered that fit within those parameters.

Access tracks with a final width of 6 metres would provide access to each wind turbine and supporting infrastructure from the public road network. Each wind turbine would be connected to an on-site substation using underground cabling with a total trench length of approximately 62 kilometres. Temporary construction infrastructure would include a construction compound, laydown areas, concrete batching plants and an on-site quarry. The total construction footprint for the project is estimated to be 222.3 hectares. Of this area 99.5 hectares of infrastructure would remain for the life of the project, and the remaining 122.8 hectares rehabilitated once construction is complete.

Design response influences

The design response for this project evolved over more than a decade influenced by a range of factors including the findings of specialist consultants, new legislation, and input from community and other stakeholders.

Avoidance and minimisation of impacts has been central to the development of the project. The approach has been to firstly avoid potential impacts, if possible, then to minimise the severity of the impact over space and time.

A range of sensitive areas and constraints have been mapped within and around the project site, defining areas that can and cannot host wind turbines. The project layout was then determined through various considerations including avoidance of sensitive areas.

Another influence on the project layout was the community consultation and feedback regarding the project. Extensive community engagement has occurred since 2010.

Stakeholder engagement

The project layout has evolved from the analysis of the site opportunities and constraints as well as the feedback from stakeholders regarding the project. Extensive engagement has been undertaken with the

community, relevant authorities and stakeholders to inform the technical assessments which accompany this planning application.

Community and stakeholder engagement started in 2010 during the project feasibility stage and included the distribution of newsletters to dwellings within 10 kilometres of the project. A neighbour doorknock of properties was carried out within 3 kilometres of the project site and local organisations and businesses were contacted to let them know about the project. A community engagement committee with local representatives was established around that time by the Moyne Shire Council.

After the referral of the project to the Victorian Government in September 2018, the Minister for Planning determined that an EES was the appropriate assessment pathway for the project. At the start of the EES process, a Technical Reference Group was established by the Department of Environment, Land, Water and Planning (DELWP) to advise on the scoping and adequacy of the EES impact assessments and chapters. Consultation and engagement with the Technical Reference Group has occurred throughout the EES process, up until lodgement for exhibition. Continued engagement with the local community also occurred throughout the EES process and consisted of open days, a shop front at Koroit and doorknocks at dwellings within six kilometres of proposed wind turbine locations.

The coronavirus (COVID-19) pandemic impacted the ability to carry out in-person engagement activities throughout much of 2020 and 2021. However, during this time, a virtual presence was maintained through the project website, email and phone, updates provided to the community engagement committee, and project update newsletters were distributed in June 2020, April 2021, September 2021, December 2021 and March 2022. Virtual community engagement committee meetings were held in August and December 2020, March 2021, August 2021 and February 2022, with two in person meetings in May 2021 and April 2022.

Planning provisions

The site is located within the Moyne Shire and is subject to the provisions of the Moyne Planning Scheme. Most of the land is within the Farming Zone with small areas located within the Special Use Zone Schedule 6 (SUZ6). The Environmental Significance Overlay Schedule 4 and 5 (ESO4 and ESO5) affect part of the project site however a permit is not triggered for use and development of a wind energy facility in either overlay. A permit is required for vegetation removal under ESO4 and ES05.

The Bushfire Management Overlay (BMO) affects a small portion of the land in the south-west of the project site. The BMO does not trigger a planning permit for the project.

A planning permit is required under the following clauses of the Moyne Planning Scheme:

- Clause 35.07 (Farming Zone): Use and development of a wind energy facility; use and development of a utility installation.
- Clause 36.04 (Transport Zone): Use and development of a utility installation.
- Clause 37.01 (Special Use Zone Schedule 6): Use and development of a wind energy facility, and use and development of a utility installation.
- Clause 42.01 (Environmental Significance Overlay Schedule 4): Removal of native vegetation.
- Clause 52.05 (Signs): Development of business identification signage in Farming Zone (Category 4 – Sensitive areas).
- Clause 52.17 (Native Vegetation): Removal of native vegetation.
- Clause 52.29 (Land Adjacent to the Principal Road Network): Create or alter access to a Transport Zone 2 (Woolsthorpe-Heywood Road).
- Clause 52.32 (Wind Energy Facility): Use and development of a wind energy facility.
- Clause 52.33 (Post Boxes and Dry Stone Walls): Demolish, remove or alter a dry stone wall.

This application also seeks approval for car parking spaces provided to the satisfaction of the responsible authority in accordance with Clause 52.06-6.

There are a range of policy provisions in the Moyne Planning Scheme that apply to the project, and these have been considered, as relevant, in assessment of the application. The *Policy and planning guidelines for*

development of wind energy facilities in Victoria (DELWP, 2021f) (Policy and Planning Guidelines) are a reference document listed under Clauses 19.01 Renewable Energy and 52.32 Wind Energy Facility.

Other guidelines most relevant to the assessment of the application include the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP, 2017b) (Native Vegetation Guidelines), *Design Guidelines and Model Requirements for Renewable Energy Facilities* (Country Fire Authority (CFA), 2022) (CFA Guidelines) and the *Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria – A Guide for Developers* (DELWP, 2021d).

Assessment of the project

Contribution to policy

The project responds positively to the balance of policies by providing a large-scale renewable energy project in an appropriate location with a high quality wind resource. Due consideration has been given to the range of potential impacts as demonstrated throughout the following assessment sections of this report. Impacts on the local community and environment have been appropriately minimised.

In particular, renewable energy will be promoted in accordance with Clauses 19.01-1S and 19.01-2S of the Moyne Planning Scheme. Construction of the proposed wind farm will require installation of high voltage electrical plant and the completion of high voltage line works that will contribute to the ongoing strengthening of Victoria's electricity grid.

Zone and overlay provisions

Farming Zone (FZ)

The proposed use and development conform to the stated purposes of the Farming Zone. The proposed wind farm is in an area dominated by grazing and agricultural activities, is located away from areas used for rural living and sensitive agricultural land uses and will not have a material impact on the current agricultural productivity of the site.

Environmental Significance Overlay (ESO)

The primary considerations of the ESO4 and ES05 permit triggers is vegetation removal and any impacts that may impinge on the use and development of the Shaw River Power Station or the Tarrone Power Station, respectively. The project would not affect the development of either power station is no conflicting infrastructure or sensitive uses are proposed. The project is not inconsistent with the purposes of the ESO4 or ES05. A permit is required for native vegetation removal under ESO4 and ESO5.

Bushfire Management Overlay (BMO)

There is no permit trigger for the project under the BMO, however an assessment of bushfire safety including against the requirements of the CFA Guidelines is provided in Section 7.5.4 of this report.

Mandatory requirements

Clause 52.32-3 stipulates that an application that includes a proposed wind turbine within 1 kilometre of an existing dwelling/s must be accompanied by evidence of written consent of the owner/s of said dwelling/s. This is provided with the application.

Clause 52.32-4 stipulates mandatory requirements for an application in relation to noise:

- That a pre-construction (predictive) noise assessment report is submitted demonstrating the project can comply with NZS6808:2010, including an assessment of whether a high amenity noise limit applies
- An environmental auditor appointed under Part 8.3 of the *Environment Protection Act 2017* must prepare a report that verifies if the acoustic assessment undertaken for the purpose of the pre-construction (predictive) noise assessment report has been conducted in accordance with the Standard.

Amenity

Noise

Noise and vibration impacts were assessed for both the construction and operation of the project by specialist acoustic consultants Sonus Pty Ltd.

The reference level of 40 dB(A) for weekend or evening works (outside normal working hours) from EPA Publication 1834: *Civil construction, building and demolition guide* is achieved for all proposed activities associated with the construction of wind turbines and concrete batching plants, based on the separation distances from the closest dwelling. Works are not proposed to occur at night. In reality, noise levels would likely be less than those predicted as a result of topography and barriers at the construction site.

For wind energy facilities, the New Zealand Standard NZS 6808:2010 *Acoustics – Wind Farm Noise* specifies that any sound levels associated with the facility should not exceed a 40 dB(A) ($L_{A90(10min)}$) noise limit at noise sensitive locations (outdoors) or exceed existing background sound levels by more than 5 dB(A) (whichever is the greater). In 'high amenity areas' (i.e., areas where a higher degree of amenity protection for the sound environment is required) the noise limit becomes the background noise level plus 5 dB(A), or a level of 35 dB(A) (whichever is the greater). Noise sensitive locations outside the 35 dB(A) ($L_{A90(10\ min)}$) contour do not need to be considered.

Noise from the wind turbines was modelled within the SoundPLAN 8.2 noise modelling software using the CONCAWE and ISO 9613 noise models. Both methods were used so that the most conservative (i.e., most onerous) noise prediction model could be used to place wind turbines, with some stakeholders having shown an interest in both modelling methods.

Both CONCAWE and ISO 9613 models predict that the wind turbine operational noise complies with the New Zealand Standard at all non-stakeholder dwellings (i.e., the predicted noise level is no more than 39 dB(A)), thereby achieving the noise criteria of 40 dB(A). The highest predicted noise level at a stakeholder dwelling is 43 dB(A), which achieves the 45 dB(A) criterion of the Policy and Planning Guidelines.

Noise from the project on-site substation and battery facility was predicted based on the CONCAWE noise model.

Without any noise mitigation treatments, the highest noise level at any non-stakeholder dwelling is predicted to be 35 dB(A) during the day and evening periods, and 33 dB(A) during the night period. As such, these predictions achieve the day and evening noise criteria for utilities of 45 dB(A) and 39 dB(A), respectively, and 34 dB(A) for night time.

A report prepared by an environmental auditor verifying the results of the predictive noise assessment by Sonus was undertaken by EnviroRisk Management. EnviroRisk Management is an accredited environmental auditor under Part 8.3 of the *Environment Protection Act 2017*. An independent peer review of the impact assessment report and management plan was also undertaken by Resonate Consultants.

As required by Clause 52.32, a pre-construction noise assessment has been completed and submitted with the planning application. The project meets the objectives of Clause 13.05-1S as the project seeks to control noise effects on sensitive uses through locating infrastructure and operations suitable distances from sensitive receivers.

There are four wind farms within 15 kilometres of the project site that are either in operation or have already received planning approval. Based on the distance between the project and these wind farms, no cumulative noise impacts are predicted.

There would not be any unreasonable noise amenity impacts on the surrounding area as a result of the project. Noise impacts have been minimised and are acceptable in accordance with the relevant policies outlined above and in accordance with the Policy and Planning Guidelines.

Blade glint, shadow flicker and electromagnetic interference

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that wind farm planning permit application must consider the effect of the project on the surrounding area in terms of shadow flicker and blade glint.

Blade glint occurs when sunlight is reflected off the rotating blades of a wind turbine. Modern wind turbine manufacturers avoid potential blade glint nuisance by finishing their blades with a low-reflectivity treatment. As such, blade glint is not considered an issue for the project.

Shadow flicker can occur where the shadow cast by rotating wind turbine blades causes a flickering effect which can cause nuisance, especially inside dwellings. This shadow flicker assessment was prepared by DNV Australia Pty Ltd and is provided in Appendix L – *Shadow Flicker*. It includes an assessment of the potential theoretical and actual shadow flicker related impacts on non-stakeholder (neighbouring) and stakeholder dwellings.

The Policy and Planning Guidelines establish a shadow flicker limit of 30 hours per year experienced in the area immediately surrounding a dwelling, while the *National wind farm development guidelines – draft* (Draft National Guidelines) (Environment Protection and Heritage Council, 2010) provide a more stringent recommendation, with a limit of 30 hours per year of 'theoretical' shadow flicker duration and 10 hours per year of 'actual' shadow flicker.

The project has been designed to avoid unacceptable levels of nuisance from shadow flicker, and the assessment undertaken by DNV confirms that the project satisfies the limits established in the Policy and Planning Guidelines at all non-stakeholder dwellings. Compliance with the shadow flicker limits would be achieved at all non-stakeholder dwellings and any shadow flicker at stakeholder dwellings exceeding the standards would be managed in accordance with individual landowner agreements generally in accordance with model permit conditions. Shadow flicker amenity impacts are therefore acceptable and comply with policy at Clause 52.32 and generally throughout the scheme as it relates to residential amenity.

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that wind farm planning permit applications must consider the effect of the project on the surrounding area in terms of electromagnetic interference. An assessment of the electromagnetic interference has been prepared by DNV Australia Pty Ltd and is included in Appendix M.

The electromagnetic interference assessment considered all identified dwellings within five kilometres of the project site. This area encompasses 136 dwellings, of which 23 are within the project boundary (referred to as 'host landowners').

To minimise electromagnetic interference turbines were relocated away from the communications buffer and a single point to point communication link with buffers, crossing the site, has been incorporated.

Air quality

Air quality impacts can occur when air pollutant emissions from an industry or activity cause a deterioration in ambient (i.e., outdoor) air quality. Air quality information is based on the assessment prepared by Jacobs Group (Australia) Pty Ltd and presented in Appendix N – *Air quality impact assessment*. The Air Quality assessment and impacts relate primarily to the quarry which is the not the subject of this planning application. Assessment of the impacts of the quarry are dealt with the draft Work Plan and EES material for this project.

The existing air quality at the project site is good and typical of air quality for rural Australia, which is typically better than the metropolitan areas of Melbourne and Geelong. A qualitative assessment was also undertaken for the potential impacts on air quality from the construction, operation and decommissioning from all other project activities.

Construction and operation of the proposed on-site quarry was identified as the most significant source of air emissions, having the greatest potential of all project activities to impact air quality for nearby sensitive receptors.

Other construction dust emissions may result from the turbine installation, and the construction of other infrastructure. These will have significantly lower dust emissions compared to the quarry site. The closest concrete batch plant is located approximately 1.2 kilometres from the nearest sensitive receiver.

During project operation, light vehicles and small trucks would travel from the site office and maintenance yard to individual turbines and substation, mostly via internal unsealed roads. Larger vehicles may occasionally deliver large equipment. Dust generated from vehicle movements on unsealed roads during operation and decommissioning (outside of the quarry activities) are expected to be minor and of short

duration. Overall, the emissions from the activities across the broader project site are not expected to be significant contributors to the dust impact of the project.

A site-specific dust management plan (sub-plan of the Construction Environmental Management Plan) will document potential and existing dust sources and outline best practice design controls and management practices to minimise dust.

All project concrete batching plants will be designed and operated to adequately control dust emissions, as per guidelines set out in EPA Victoria Publication 1806: *Reducing risk in the premixed concrete industry.*

It is considered that the project can achieve the relevant policy objectives of Clause 13.06 – 1S Air Quality by utilising siting and mitigation measures *"to assist the protection and improvement of air quality*" through the strategy to *"ensure, wherever possible, that there is suitable separation between land uses that reduce air amenity and sensitive land uses."*

Landscape and visual impact

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that proponents of wind farms must address the potential impact of the wind farm on landscape values. The landscape and visual impact assessment has been prepared by Landform Architects and is included in Appendix K.

The visual elements of the project include the proposed wind turbines of up to 250 metres in height and will be the most visually prominent features of the project. Other features include the on-site substation, on-site quarry, concrete batching plants, access tracks, and construction activities. These are much lower in height and generally less visually noticeable over distance. The aviation risk assessment has determined that aviation obstacle lighting is not required. Aviation obstacle lighting has been assessed within this landscape and visual impact assessment should it become a requirement for the project in the future.

Assessment of the project view from identified representative and key viewpoints within the public domain was undertaken to consider the range of views and likely visual impacts of the project. There are 170 dwellings within 6.0 kilometres of a turbine.

Assessment of visual impacts from residential dwellings was also undertaken. This assessment examines the potential impacts on non-stakeholder dwellings within 6 kilometres of a project turbine. This distance is the zone, or geographical distance at which a 250-metre-high turbine would have the potential to be "highly visible and would usually dominate the landscape" where the whole of the turbine would be visible. This zone is the area within which previous wind farm projects have been required to offer landscape screening to residential dwellings where turbines may be visible from the dwelling.

Many of the dwellings assessed were set among vegetation at a height and scale that would partially screen or filter views of the project turbines. Where screening is not present, existing vegetation in private and public areas demonstrate that landscape screening would be effective, if required. No views from dwellings were identified as key views (e.g., to protected features or landscapes) that would require re-siting or removal or project turbines.

For dwellings near Orford, residential views would be dependent on the proximity and orientation of the dwelling towards the project, the extent of existing plantings near dwellings, and existing timber plantations and vegetation across the broader landscape.

Eight dwellings assessed to have medium-high or high visual impacts prior to mitigation. With the implementation of suggested mitigation (i.e., post mitigation), there was one dwelling predicted to have a high visual impact, and no dwellings with medium-high impacts.

The visual impact from significant landscape and vantage points within the project investigation area was assessed and impacts are negligible to low or nil to negligible. Major roads to the east and west of the project are frequently used by the community, having a medium number of road users. Views from major roads vary and include open clear views towards the project, more discreet and localised views with gently undulating topography screens, and limited views across the landscape. Example photomontages illustrating the likely 'as built' view of the project from viewpoints assessed along Woolsthorpe-Heywood Road and Hamilton-Port Fairy Road and are included with this application.

Overall, the visual impact of the project in views from major roads has been assessed as low. This is due to the majority of views towards the project being limited by vegetation within roadsides, plantation areas and adjoining farming properties, and screening provided by the topography.

The aviation impact assessment, contained within Appendix O accompanying this report, determined that the Project would not require aviation obstacle lighting. However, should this lighting be required as a condition of the project planning permit, the overall visual impact of the aviation obstacle lighting from the road network and residential dwellings is assessed as negligible – low due to the screening of views by vegetation and the presence of light sources contributing to night views.

As the landscape contains several operating and approved wind farms, and the addition of the project to these views would not significantly alter a viewer's perception of the landscape, the cumulative visual impact from sequential views along the connector roads is low, and low – negligible for local roads.

The overlap of multiple views of operating or approved projects would occur along a section of the Princes Highway, inland connector roads and a number of local roads. In these instances, the nearest wind farm is the most obvious contributor to views and the impact from another wind farm in the distance does not alter the level of impact. As such, the simultaneous visual impact of the project is medium – negligible.

Potential cumulative visual impacts to dwellings would depend on the visibility of turbines and the proximity of the dwelling to turbines (affecting their visual scale). These impacts can only be assessed on a case-by-case basis.

Environment

Surface water

The project is situated within the Shaw River and Moyne River catchments. The Shaw River is the main surface water feature in the project site, which is fed by Kangaroo Creek and Carmichael Creek. Back Creek, a tributary of the Moyne River, is another surface water feature that passes through the project site. During summer, these watercourses would typically consist of a series of isolated pools with limited or no base flow. There are also several smaller tributary drainage lines that join the Shaw River and Back Creek.

The surface water assessment is based on the findings of the hydrogeological and hydrological impact assessment prepared by Water Technology Pty Ltd, and (Appendix G) and the biodiversity impact assessment prepared by Nature Advisory Pty Ltd (Appendix P).

Key impacts to surface water features during project construction and operation and include physical disturbance from watercourse crossings, reduced water quality from sediment laden runoff from construction works areas during periods of high rainfall, accidental spills of hazardous materials such as fuels and oils and uncovering of acid sulphate soils during earthworks. Construction of project infrastructure also has the potential to alter existing hydrology of the site.

The project design was informed by hydrological modelling to influence the siting of infrastructure to avoid areas prone to flooding. Other design mitigation measures included adding buffers around DELWP-mapped wetlands, and minimisation of watercourse crossings. A range of management controls would also be implemented to manage creek crossings, minimise the generation of eroded sediments, and minimise the risk of accidental spills.

With detailed designs completed in accordance with best practice guidelines and in consultation with relevant authorities, the residual effects of watercourse crossings and to a lesser extent reduced water quality from construction works was assessed to be localised and temporary.

The project is consistent with the objective of Clause 12.03-1S River Corridors, Waterways, Lakes and Wetlands, which seeks to protect and enhance river corridors, waterways, lakes and wetlands. The project provides for buffers to assist in the protection of water bodies and ground water consistent with Clause 14.02-1S Catchment Planning and Management. Appropriate construction management measures will be put in place to protect water quality and ensure that any discharge or waste won't impact the quality of the surface water consistent with Clause 14.02-2S Water Quality.

Groundwater

Hydrogeologists from Water Technology assessed the potential impacts to groundwater (in Appendix G). These included localised lowering of the water table from groundwater dewatering during quarry operation, and to a lesser extent during wind turbine foundation excavation. Other potential impacts may include 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.

Groundwater within the project site is classified as falling within Segments B to C of the Environmental Reference Standard, which are defined by the concentration of total dissolved solids in the groundwater. Groundwater environmental values, defined by the Environment Reference Standard, relevant to the project include 'water dependent ecosystems and species' and 'agriculture and irrigation (stock watering)'. In general, groundwater in the project site is too brackish and hard for potable domestic use but of sufficient quality to be used for irrigation, stock and some industrial processes.

To minimise the potential for the project to impact local groundwater dependent ecosystems (GDEs), the design has incorporated a minimum 100 metre buffer from mapped potential aquatic GDEs.

Management controls have been proposed for the construction, operational and decommissioning phases of the project to further manage potential groundwater impacts. Overall, impacts to groundwater users and groundwater quality from the project construction, operational and decommissioning are considered to be very low to low.

The project meets the policy objective relating to Clause 14.02-1S Catchment Planning and Management as the measures employed will assist the protection and restoration of catchments, water bodies, groundwater, and the marine environment.

Native vegetation

A permit is triggered for the removal of native vegetation by Clause 52.17 of the planning scheme. Assessment should be undertaken in accordance with Victorian *Guidelines for the removal, destruction and lopping of native vegetation* (DELWP 2017b) (Victoria's Native Vegetation Framework).

Within the project site, nine Ecological Vegetation Classes (EVCs) were mapped within the investigation area, covering an area of 848 hectares. This includes 501 hectares of DELWP-mapped wetlands in the Victorian Wetland Inventory, which are treated as native vegetation. Areas not supporting remnant native vegetation have a high cover of exotic grass species, many of which have been direct seeded for use as pasture. Scattered native grasses are generally present in these areas, however, are less than the required 25% cover to be considered a remnant patch of native vegetation.

The project is predicted to directly impact 0.5 hectares of mapped Seasonal Herbaceous Wetland of the Temperate Lowland Plain, a defined ecological community listed under the EPBC Act. This represents 2.6% of the mapped ecological community within the investigation area. A suitable offset has been identified in accordance with the Commonwealth offset policy.

The proposed development footprint consists of 222 hectares of expected ground disturbance. As the construction footprint has been derived in accordance with the 'avoid' and 'minimise' principles, the majority of the native vegetation has been avoided and will be retained.

The project would result in the removal of 4.6 hectares of native vegetation and six large trees (of which 0.04 hectares would be within Glenelg Shire). The area of native vegetation proposed to be cleared occurs in patches of relatively poor condition (average condition score of 29). This represents about 0.5% of native vegetation mapped within the project site.

The approach to the removal of native vegetation has been to avoid and minimise its removal consistent with the provisions of the Clause 52.17 and the Native Vegetation Framework, as well as Clause 12.01-2S whose objective is "*to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.*"

Native vegetation unable to be retained during the design and construction phases would be offset according to the *Guidelines for the removal, destruction or lopping of native vegetation*. Offsets required to compensate for the proposed removal of native vegetation include 1.206 general habitat units with a minimum strategic biodiversity value of 0.312 from Glenelg Hopkins CMA boundary or the Moyne municipal district. An additional, 0.014 general habitat units with minimum strategic biodiversity value of 0.683 are required for the over-dimensional road route that extends across intersections in both the Glenelg and Moyne Shires.

Flora and fauna

The project has had regard to the objectives of 21.06 Environment as it seeks to protect and enhance the region's indigenous genetic biodiversity and Clause 22.02 Environment, as it seeks to maintain, protect

and enhance the flora and fauna communities and habitat, particularly the critical habitat, of Victorian Rare and Threatened Flora and Fauna species."

A comprehensive flora and fauna assessment has been prepared by Nature Advisory (Appendix P) informed by extensive field surveys and investigations undertaken over more than a decade. The assessment is a requirement of Clause 52.32 and the DELWP Guidelines.

During the field assessments, 208 plant species were recorded. Of these, 123 (59%) were indigenous and 85 (41%) were introduced or non-indigenous native in origin. The desktop review indicated a total of 43 indigenous species have the potential to occur in the investigation area based on database records. This included 18 species listed under the EPBC Act, and 35 species listed under the FFG Act.

A total of 96 bird species were recorded within the investigation area and surrounding areas between 2009 and 2020. This represents about half of bird species reported locally in the Victorian Biodiversity Atlas.

Ten species of bats were recorded during bat surveys between 2009 and 2020. Eight of the species recorded are considered secure in their conservation status (i.e., not listed as threatened) and are widely distributed. Most calls in the site were from the ground-based detector indicating bats in these areas typically fly around ground level. Species recorded at a height of 45 metres were Gould's Wattled Bat, Chocolate Wattled Bat, Large Forest Bat, Little Forest Bat and White-striped Freetail Bat, but at a much lower frequency.

Two species recorded were listed threatened bats; the Southern Bent-wing Bat (EPBC Act Critically Endangered, FFG Act Critically Endangered) and Yellow-bellied Sheathtail Bat (FFG Act Vulnerable). A further four multi-species complexes were recorded, including the Long-eared bats (*Nyctophilus* spp.), Forest Bats (*Vespadelus* spp.), and Freetail Bat (*Ozimops* spp.) complexes. Species belonging to these species' complexes are not threatened.

To manage the risk bird and bat collisions with wind turbines, a Bat and Avifauna Management Plan will be developed to be approved by DELWP Environment and the responsible authority. The Bat and Avifauna Management Plan would include:

- a quarterly mortality monitoring program of at least three years' duration that begins when the first turbine is commissioned
- trigger responses in the event that a listed species is impacted by the wind farm
- responsibilities and reporting requirements.

Several aquatic and semi aquatic threatened fauna were recorded including the Growling Grass Frog (*Litoria raniformis*), Swamp Skink (*Lissolepis coventryi*), the Little (Dwarf) Galaxias (*Galaxiella toourtkoourt*, listed as *Galaxiella pusilla*) and Yarra Pygmy Perch (*Nannoperca obscura*).

To limit potential impacts of proposed watercourse crossings a range of measures are proposed that would form a Growling Grass Frog Management Plan. These include completing 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 (2017c) to ensure habitat connectivity is maintained, and promptly restoring and enhancing affected areas.

To minimise potential environmental impacts to Little Galaxias, Shaw River and Back Creek crossings have been minimised and crossing structures would be designed to maintain appropriate flow capacity, and to minimise the extent of disturbance and vegetation removal within the waterway and the duration over which construction activities take place.

Cumulative impacts to flora and fauna were considered to be greatest during operation of the project due to collisions with of birds and bats with turbine blades. The species most at risk of cumulative impacts was the Southern Bent-wing Bat, which has been recorded in the project site and other wind farm sites. Based on the very low activity levels of the species at Willatook including no records at heights of proposed wind turbines, it was concluded that the project was unlikely to result in cumulative impacts to the species.

The Brolga is an iconic wetland bird listed as endangered in Victoria. The southern portion of the population has experienced significant decline since European settlement attributed to habitat loss from agriculture and wetland drainage, predation from foxes, and collisions with fences and powerlines.

The Victorian Brolga Assessment and Mitigation Standards are currently in draft as of April 2022. These have been exhibited for comment but have not been finalised. Due to uncertainty as to their final form, and the extensive work that was conducted for the project in accordance with the *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population* (Department of Sustainability and Environment, 2012) (Interim Brolga Guidelines). These guidelines outline a standard approach to assessing a wind farm project's impact and achieving a zero net impact on the Victorian Brolga population.

A full assessment of the predicted impacts of the project on Brolga is included in Appendix Q.

Over the last decade significant efforts have been made to assess Brolga activity and suitable habitat at the project site and surrounding area. The assessment included a review of existing Victorian Government database records, consultation with project and surrounding landowners, aerial surveys, many field surveys of wetlands to record Brolga activity and the suitability of wetlands as Brolga habitat, and hydrological modelling to identify potential habitat.

A total of 28 records of Brolga breeding were identified within approximately 10 kilometres of the project site and of these 23 could be attributed to a wetland and defined as a possible Brolga breeding site. Six of these sites are within 3 kilometres of the project, with five associated with the wetlands in the Cockatoo Swamp complex and one isolated wetland to the east of the project. One pair of Brolga were repeatedly observed nesting within the Cockatoo Swamp wetland.

The main mitigation implemented during the project design to avoid or minimise impacts to the Victorian Brolga population has been the development of turbine free buffers around Brolga wetland habitat.

The turbine free buffer areas were designed to limit impacts to Brolga during construction (i.e., habitat destruction and/or disturbance) and operation (i.e., collision with wind turbines). Project-specific Brolga buffers were developed based on:

- extensive field surveys of the project site and surrounding areas
- consultation with landowners, land managers and special interest groups
- understanding of Brolga movements around breeding sites from observational studies by Nature Advisory over the last 15 years
- observations of the movements of Brolga breeding at the Macarthur Wind Farm since 2012
- the recent Brolga research undertaken by Veltheim et al. (2019).

Turbine free buffers developed for the project consider three key habitats:

- Confirmed or valid historical Brolga breeding wetlands used for breeding (nesting, egg incubation and foraging for early-stage chicks) and for night roosting.
- Non-wetland areas around breeding site wetlands used for foraging.
- Functional wetlands used for foraging and/or alternate night time roost within two kilometres of breeding wetlands.
- Movement corridors between breeding site wetlands to functional wetlands.

A Brolga turbine collision risk model was developed in accordance with the Interim Brolga Guidelines. It was assumed that a Brolga pair would nest each year in the Cockatoo Swamp and one additional pair was assumed to use one of the isolated wetlands to the east of the wind farm three out of ten years. The model assumes that a proportion of these Brolga's flights would be at a height and distance where turbine interaction is possible. Wind turbine avoidance rates were calculated using observations of Brolga and international studies of crane species. The model predicts that under the most conservative turbine avoidance scenario where Brolga avoid wind turbines 90% of the time, there would be 0.07 flights at risk of collision per year on average, or 1.7 flights at risk of collision over the 25-year life of the project. Statistically, there is a 95% chance of between zero and five collisions over 25 years.

To assess the impact Victorian Brolga population under various collision risk modelling scenarios, a Population Viability Assessment was completed by Professor Michael McCarthy from the University of Melbourne (included in Appendix Q. This predicted that the population size would be reduced by between 0.3 and 0.8 birds compared with baseline conditions. Using the worst-case scenario collision impact rate, this represents a reduction of about 0.1% in the population.

The Interim Brolga Guidelines require that the impacts on the Victorian Brolga population are 'fully offset' through the implementation of a Brolga compensation plan. The aim of the plan will be to replace the worst-case estimate of the number of Brolga affected by the project (5 individuals over 25 years) through the restoration of lost breeding habitat so that additional breeding pairs can produce increased numbers of young that survive to become breeding adults.

Heritage

Aboriginal cultural heritage

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that proponents of a wind farm project must address the potential impact of the wind farm on cultural heritage values.

A CHMP is triggered for the project. A planning permit cannot be granted until the CHMP has been approved.

A draft CHMP has been prepared by Ecology and Heritage Partners (EHP). The draft CHMP will not be exhibited with the EES or Planning Application as requested by DELWP and First Peoples – State Relations Group. Instead, an Aboriginal Cultural Heritage Impact assessment has been prepared by EHP and is included in Appendix C.

A total of 69 registered Aboriginal places have previously been recorded within five kilometres of the project, consisting of 77 site components, comprising four site component types, being:

- 28 artefact scatters
- 1 scarred tree
- 8 object collections
- 40 earth features.

Of these places, one place (VAHR Registered 1) is located within the project site and consists of an earth feature (mound) measuring approximately 3.2 metres by 2.2 metres. The complex assessment failed to locate this site and it is considered to have since been unintentionally destroyed. Three additional Aboriginal heritage places were identified (i.e., VAHR Registered 2, 3 and 4) comprising a total of 16 subsurface artefacts. One of these places is within the project site. The total of subsurface artefacts recorded gives an artefact density of less than two artefacts per square kilometre across the project site.

Through the implementation of design mitigations, project infrastructure and works avoid areas of known Aboriginal cultural heritage places and areas likely to contain Aboriginal cultural heritage. The likelihood of impacts to these places during project construction, operation and decommissioning is considered low.

The project CHMP will be finalised in consultation with the Registered Aboriginal Party (RAP) and submitted to First Peoples – state Relations Group for evaluation once the Minister for Planning has made an assessment on this EES. The approved CHMP would contain conditions for the management of known Aboriginal heritage places and contingency plans for the unexpected discovery of Aboriginal cultural heritage and human remains. These conditions would ensure that any potential impacts are avoided or minimised.

The Aboriginal cultural heritage assessment has considered the provisions of Clause 15.03, 21.05 and 22.01-1 which have objectives to protect and conserve places of aboriginal cultural heritage significance. Protection of environmental and cultural heritage values will be supported in accordance with these clauses.

Historic heritage

A Historical Heritage Assessment was completed by EHP and is included at Appendix D

The desktop assessment indicated four historical heritage places recorded on the Victorian Heritage Inventory within a five-kilometre radius of the site:

- H7321-0022 (Moyne River Stone Foundation)
- D7321-0040 (Landers Lane Dry Stone Wall)
- D7321-0025 (Officer DSW1)
- D7321-0039 (Harton Hills Dry Stone Wall Complex).

One additional historic place, Turkish Bath House, is listed on the Register of the National Estate and Register of the National Trust. The field assessment identified two new historic heritage places within the project site and included in the Victorian Heritage Inventory for their potential to contain archaeological deposits (H7321-0104 Woolsthorpe-Heywood Road Hut 1 and H7321-0105 (Woolsthorpe-Heywood Road Ruin).

In addition to these design measures, proposed management measures to address residual impacts on historical heritage values in the construction and operation phases of the project include:

- Prior to commencement of works at individual construction locations, construction sites would be surveyed for archaeological places or relics. Should any items of historical heritage value be identified during construction that have not been previously identified, a heritage advisor would be required to assess the site.
- An Unexpected Finds Protocol would be developed prior to the commencement of works and incorporated into the Construction Management Plan.
- Where dry stone walls are impacted by the project, planned or accidental, and that impact is not permanently required (i.e., for access), the dry stone walls would be rebuilt to its existing condition by an experienced stone mason.
- The design of the facility has considered the provisions of Clauses 15.03 Heritage and 21.05 Settlement and Housing, which have the objective to protect and conserve places of heritage significance. The purpose of Clause 52.33 to conserve dry stone walls has been considered and the project is found to be acceptable.
- Places of heritage significance would be conserved in accordance with the objectives of Clauses 15.03 and 21.05. Impacts to the identified heritage places are limited to the Landers Lane Dry Stone Wall.

Community and safety

Aircraft safety

An Aeronautical Impact Assessment has been prepared by Chiron Aviation Consultants and is included in Appendix O. The aviation impact assessment identified existing aviation operations and activities within 30 nautical miles (or about 56 kilometres) of the project site to determine the potential impact to aviation safety. To maintain aircraft safety, design and management measures are proposed.

There are three regulated aerodromes within 30 nautical miles of the project site: Portland, Hamilton and Warrnambool. Nine unregulated private airstrips are on properties within or close to the project site, with these airstrips either decommissioned or unused, or used infrequently for activities like aerial agricultural operations (spraying and spreading).

Avoidance by design has been the primary measure to limit aviation impacts. This has included establishing buffers around local airstrips in the concept design, incorporating the recommendations of the Country Fire Authority (2022) *Design Guidelines and Model Requirements Renewable Energy Facilities* in the project design and management measures, and committing to marking the meteorological monitoring masts in accordance with the *National Airports Safeguarding Framework Guideline D: Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers* to improve visibility of these structures for pilots of low-flying aircraft.

The project would not impact the Obstacle Limitation Surface for the Portland, Hamilton or Warrnambool Aerodromes. Similarly, the project would not impact the Procedures for Air Navigation Services – Aircraft

Operations surfaces prescribed airspace of the Instrument Approach Procedures for the Portland or Hamilton Aerodromes.

To enable the proposed maximum wind turbine tip height to be accommodated, the 10 nautical mile Minimum Safe Altitude would need to be raised by 100 feet (or 30.5 metres) from 2,100 feet to 2,200 feet to satisfy the requirements of ICAO PANS-OPS document 9905 to ensure minimum factors of safety are maintained. The same modification is also required for the Procedures for Air Navigation Services – Aircraft Operations surface for the Warrnambool aerodrome (YWBL RNAV-Z RWY 13) non-precision approach. This change would only affect Instrument Flight Rules aircraft, with the change predicted to have a minimal impact to their pilots. Agreement with the Warrnambool Aerodrome and the Instrument Approach Procedure designer (Airservices Australia) is required to have the recommended amendments made. If agreement to these changes cannot be reached, the blade tip heights of five wind turbines would need to be reduced by between 1.5 and 14 metres to avoid modifying the Procedures for Air Navigation Services – Aircraft Operations.

The assessment concluded that the project does not require obstacle lighting as it is not considered to be a hazard to aircraft safety.

The project turbines would be appropriately painted, and meteorological masts marked, as per the design controls, to ensure they are visible by day.

Overall, the assessment identified the potential to impact aviation operations in the project region is low and does not pose a hazard to aircraft safety.

The project meets the provisions of Clause 52.32 and the Policy and Planning Guidelines as it considers the potential impact of the wind farm on aviation and concludes that there are no impacts. Policy at Clause 18.02-7S would be met with no undue impact on aviation facilities.

Traffic and road impacts

The traffic impacts are detailed in the Traffic assessment prepared by Ratio Consultants at Appendix F.

The road network surrounding the project is consistent with its rural setting, designed to accommodate the transportation needs of the agricultural land uses in the area and the low volume of traffic that typically uses these roads.

A swept path analysis (or evaluation and calculation of the space required to enable a specified vehicle to make turning movements) was undertaken of the over size and over mass haulage route identifying the intersections that would require some median and/or roadside infill works, and potential roadside furniture removal to cater for the vehicles transporting the turbine blades. While other wind farm projects have previously used the Port of Portland for large wind turbine components, the turbine blade length (maximum 93-metre long) used for the assessment are longer than those used on other wind farm projects in the Moyne Shire.

The intersections requiring upgrades are:

- Henty Highway/New Street, Portland
- Princes Highway/Henty Highway, Portland
- Princes Highway/Tyrendarra-Ettrick Road, Tyrendarra
- Tyrendarra-Ettrick Road/Woolsthorpe-Heywood Road, Homerton
- Woolsthorpe-Heywood Road/Hamilton-Port Fairy Road, Broadwater.

Four of the intersections are located within the Glenelg Shire and a separate planning permit is being sought for those works and the associated removal of native vegetation at three intersections.

Two intersections are within the Moyne Shire. A small amount of native vegetation removal is required associated with the works.

The project is seeking to minimise, and as much as is possible, avoid transport impacts caused by the transport of crushed rock through using an on-site quarry.

A large proportion of daily project traffic across all work stages would be associated with staff movements to and from the project site. This traffic would be concentrated to the mornings and afternoon periods when

construction staff are arriving at and departing from the project site, with limited activity at other times. The traffic from heavy vehicles would be more broadly spread with daily volumes translating to an average of four heavy vehicles per hour where road/hardstand materials are sourced on-site and eight heavy vehicles per hour if the material is all sourced externally.

The project is seeking to minimise, and as much as is possible, avoid transport impacts caused by the transport of crushed rock through the use of on-site quarry. It is estimated that an on-site quarry would cater for around 80% of road/hardstand construction material and most non-potable water needs. As such, an on-site quarry would remove up to 60 heavy vehicle movements per day from public roads, limiting potential impacts on traffic, road condition, and the safety of road users. Woolsthorpe-Heywood Road would be used to transfer material between the various areas of the project site, as required.

Traffic management to address the safety risk of changed traffic conditions during the transportation of over size and over mass vehicles would bring with it an impact of closing roads and delaying traffic. The community would be given advance notice of the planned road closures to allow community members to account for closures and possible delays. This process would be outlined in the Traffic Management Plan.

A detailed Traffic Management Plan containing a range of other management measures would be prepared in consultation with the Moyne Shire Council and Department of Transport and 'road maintenance and management agreements' would be entered into with both authorities.

Based on the existing traffic volumes and usage, and the upgrades that have been committed to, traffic specialists concluded the additional traffic generated by the project on public roads can reasonably be accommodated.

Blade drop

Blade drop is the very rare phenomena of a structural failure to a wind turbine generator during operation resulting in the blade or part of it to fall to the ground. In recent times there have been incidence of blade drop there have been no injuries because of the occurrence.

There are no planning provisions that require the consideration of blade drop however this section outlines the consideration of the siting of the turbines and the risk of blade drop to roads and neighbouring properties. In relation to the project, the proposed wind turbine blades have been conservatively assessed as 93 metres. All wind turbines have a minimum setback of 100 metres from any made or all-weather roads and neighbouring property boundaries. The neighbouring properties are absent of structures and generally vacant cropping or grazing land. The neighbouring land holdings are mostly large in size and used for farming purposes. There are no structures located near the project boundary. There are some farm dams on adjoining properties located proximate to the shared boundary with the site. There are no sensitive farming uses, such as horse studs, located on adjoining properties.

Given the size of the properties and the nature of the farming uses, there will be very few occasions where the landowner or another person will be near the boundary where there are turbines. In the event that a neighbour is near the boundary in a location where a turbine is within 200 metres, the actual risk of blade drop is very low.

Fire prevention and safety

There are no specific permit triggers under the planning scheme that apply to the project site relating to bushfire risk, however Clause 52.32 requires proponents of wind farms to address bushfire risks. The CFA Guidelines are relevant to the project, and along with Clause 13.02-1S and Clause 44.06 (BMO) have been considered in this assessment. It is noted the site is within a designated Bushfire Prone Area under the *Building Act 1993* and that a small area of the project site and proposed works are located within the BMO, however no permit triggered.

This section addresses how the project layout has been designed in respect of the CFA Guidelines, the Policy and Planning Guidelines, and address the relevant bushfire objectives of the planning scheme with particular reference to Clause 13.02-1S.

The specifications for the infrastructure for this project are provided with the application material.

The proposed battery is located with suitable fire breaks, and static water supplies will be installed in strategic locations through the project area. Access tracks and project infrastructure are sited so emergency vehicles can easily enter and manoeuvre around the site. Further detailed plans will be prepared in

collaboration with the CFA before construction and commissioning of the project and will be influenced by the outcomes of a detailed risk assessment that aligns with the CFA Guidelines.

As noted within the Aeronautical Impact Assessment, ground based fire fighting is generally used to suppress or extinguish a bushfire while firefighting aircraft are used for support, which are only effective when followed up with intense firefighting activities by ground firefighting crews.

Access for fire trucks and personnel, and consequently their ability to fight the fire within a wind farm, is greatly enhanced by the access roads built for the construction and maintenance of the turbines. These roads also act as fire breaks, which can slow fire spread or contain the fire. The area around the base of each tower is kept clear of vegetation and as such offers a refuge for fire fighters and their vehicles along with also serving as a fire break. There are other water storages associated with the wind farm that are available for firefighting purposes including on site dams.

A suitable fire break width would be provided between any landscape buffer/screening vegetation and the battery energy storage system (and related infrastructure). The battery energy storage system is located reasonably adjacent to a site vehicle entrance where emergency vehicles can be accommodated.

The development of a risk management plan, Fire Management Plan and emergency management plan via a standard permit condition, in consultation with the CFA, would suitably manage any residual fire risks posed by the project. This plan would be prepared prior to the commencement of construction in consultation with the CFA to ensure best practice operational procedures during construction, commissioning and the operations phases.

Project benefits

The project is predicted to provide about 180 direct full time equivalent (FTE) jobs during construction and 12 ongoing direct full time equivalent jobs during wind farm operation. The project would also indirectly support jobs in the Moyne Shire and surrounding local government areas. Up to 290 indirect FTE jobs are anticipated during construction through supply chains and local service industries and up to 35 ongoing indirect FTE jobs once the wind farm is operating.

Of the $800 million total capital expenditure of the project, an estimated $120 million would be retained in the region including wages, contracts and other services. There would also be benefits to local and regional businesses and service providers providing accommodation and other services to the construction workforce.

Ongoing economic stimulus in the region is predicted to be $158.4 million (calculated over 25 years) associated with the operation of the wind farm via financial returns to Moyne Shire, host landowners, neighbour benefit program payments and local wages. This would include rates to the Moyne Shire of about $550,000 each year during the project's operational life.

If constructed, a Community Benefit Fund of up to $59,000 per year (based on $1,000 per turbine), would be established. A fund committee, made up of a number of community representatives and a representative from the wind farm company, would decide what projects or organisations are funded.

A Neighbour Benefit Sharing Program has been developed to share benefits more broadly with the local community. The program would be eligible to dwelling owners within six kilometres of a constructed wind turbine. The program includes a one-off construction payment, an annual Neighbour Benefit Payment of between $1,000 and $30,000, and an Energy Cost Offset plan valued at up to $2,000 per year. The total estimated value of the program is around $900,000 per year for the life of the project, which would also be expected to have regional economic benefits.

The project would contribute significantly to the Victorian Renewable Energy Target of 50 per cent by 2030 and provide enough power to the National Electricity Market to power about 200,000 homes with renewable energy.

Socio-economic

The social impact assessment considered a broad range of potential impacts arising from the construction, operation and decommissioning of the project, with these impacts identified principally through the stakeholder consultation process. Economic and social benefits and impacts associated with the construction, operation and decommissioning of the project were assessed in the Social and Economic Impact Assessment undertaken by Ethos Urban (Appendix E).

An economic impact assessment was completed to identify potential local and regional economic benefits and impacts associated with the project. This assessment was based on an analysis of the local and regional population, labour markets, and occupational and business structure, and the capacity of the townships to participate and service the project.

During construction, temporary negative impacts are anticipated, associated with the generation of dust, noise and vibration, and changes to the visual character of the landscape, increased traffic on local roads, and the presence of a construction workforce that affects the community's sense of place. Construction impacts assessed as having a 'high' social significance include impacts to land, water and air and associated changes in amenity may be experienced by the community. The magnitude of construction impacts to the local community because of changes to the environment and amenity is predicted to be a noticeable change.

Based on construction cost data from several built and operating wind farm projects located in regional areas, approximately 15% in total investment is retained in the region for projects of this type. This indicates that during construction approximately $120 million would be spent on wages, contracts, and other services, flowing into the region's economy.

The Neighbour Benefit Sharing Program would offer the following benefits to eligible neighbouring landowners and/or residents with a dwelling within 6 kilometres of a constructed wind turbine (excluding those hosting infrastructure):

- one off construction payment of $1,000
- neighbour benefit payment of between $1,000 and $30,000 annually (subject to eligibility criteria, including proximity of dwellings to constructed wind turbines)
- energy cost offset plan payment of up to $2,000 annually.

The benefits, where relevant, would be administered over the life of the project.

With the implementation of these and other design and management measures, the social impact significance of a range of impacts was assessed to range from low to medium, except for impacts associated with 'community' (sense of place and character) and 'environment and amenity', which were assessed as high during construction for the community immediately surrounding the site.

Environmental management

The technical studies for the project make recommendations for the preparation of plans to address management measures during the construction, operation and decommissioning of the wind farm. Section 4.3.4 of the Planning and Policy Guidelines requires the preparation of an Environmental Management Plan to accompany the planning application.

The Environmental Management Plan would be prepared to reflect conditions of the planning permit and the Environmental Management Framework, as endorsed by the Minister, before construction starts. The Environmental Management Plan would consolidate all environmental management measures that relate to the project and provides details of how they should be performed.

There will also be several plans and sub plans that will be prepared prior to the commencement of construction of the project. These include a Construction Environmental Management Plan (CEMP), a Decommissioning Plan, Noise and Vibration Management Plan, CHMP, Traffic Management Plan, Water Management Plan, Bushfire Management Plan, and Emergency Management Plan.

The Environmental Management Plan would remain a live document throughout the project pre-construction and construction phases. Some provisions may also apply during the operational phase. The Environmental Management Plan would be updated after the detailed design and pre-construction ecological surveys, and to reflect any changes in legislation, where relevant. All appropriate mitigation and management strategies would be consolidated in the Environmental Management Plan, which would clearly outline what should be done and who has the responsibility for doing it.

Conclusion

The project provides for:

- the generation of electricity through harvesting the power in the wind – that is, sustainable electricity generation, leveraging an excellent wind resource
- social benefits of the project relate to the opportunities for local job generation and training from the construction and operation phases.
- overall long-term benefits include the project's contribution to the local economy and provision of new renewable energy resources to help address climate change.
- low impact on existing land use, allowing continued farming on the land, and providing an additional income stream.
- community and neighbour benefits.

The project has considered the provisions of Clause 52.32 and the Planning and Policy Guidelines and demonstrates a high level of compliance with the relevant planning provisions. Amenity impacts on neighbours are minimised.

Amenity impacts such as noise and visual impacts have been considered and appropriate measures proposed to reduce any impacts. The project has considered the impacts of blade glint, electromagnetic interference and shadow flicker and complies with the relevant regulations.

Other impacts have been avoided or mitigated through the extensive design process. The project demonstrates consistency with the zone and overlay provisions policy framework of the Moyne Planning Scheme.

Chapter 1

Introduction

This planning application report has been prepared in support of an application for a planning permit to use and develop land for the purposes of a 'wind energy facility', 'utility installation' and associated works referred to as the Willatook Wind Farm Project (the project). The project site spans approximately 4,145 hectares within Moyne Shire in south-western Victoria. There are proposed works to some intersections on the haulage route within the Glenelg Shire.

This report outlines the relevant planning provisions and policies and provides an assessment of the project against these. The report outlines the approvals context for the project and how the planning application relates to other approvals. The project site and surrounding context are described. The relevant planning provisions and requirements for a planning application are outlined, and a detailed assessment of the project provided based on impact assessment reports (contained in the appendices to this report). Plans and maps also support the application and are included in Appendix A.

The project has a high level of compliance with the provisions of the Moyne and Glenelg Planning Schemes as it provides for a clean renewable energy source, has been designed to avoid environmental impacts and mitigates for amenity impacts on sensitive receivers.

Chapter 2

Project site and context analysis

This section describes the project site and its surrounds and details how the application has satisfied the application requirements of Clause 52.32-4 in relation to a site and context analysis.

2.1 The surrounds

Covering an area of about 5,478 square kilometres, the Shire of Moyne has a largely agriculturally based economy including dairy, beef and sheep and vegetable production. Quarrying, timber production (blue gum forests) and tourism also provide income sources, as do wind energy facilities.

The project site is predominantly cleared land used for cattle and sheep farming, with some properties also used for dairy farming. The project site also contains stone fences with heritage value, access tracks, and agricultural infrastructure such as sheds. Dwellings are sparsely populated throughout the landscape and are generally associated with agricultural properties. The population density of the Moyne Shire local government area is 3.1 people per square kilometre and considerably lower around the project site. A context plan is included at Figure 2-1.

The project site is within the Glenelg Hopkins Catchment Management Authority area. Bound by the Great Dividing Range to the north and coastline to the south, the region supports agriculture, supplies water to neighbouring regions, and includes national parks and state forest. Three river basins form the Glenelg Hopkins region: Hopkins, Portland Coast and Glenelg basins. The project is located within the Portland Coast basin, within which large areas have been cleared for agriculture, primarily for sheep and cattle grazing.

The nearest population centres, as measured from the nearest site boundary, are summarised in Figure 2-1.

Table 2-1 Population centres near the project site

Township	Approx. distance and direction from project	Population (at 2016 census)
Orford	3.0 kilometres south-west	105
Hawkesdale	9.8 kilometres north-east	322
Macarthur	12.8 kilometres north-west	522
Kirkstall	12.5 kilometres south-east	366
Woolsthorpe	16.8 kilometres east	422

There is good access to an existing network of major roads with the nearest port being Portland approximately 70 kilometres to the south-west. Woolsthorpe-Heywood Road, an arterial C class road, borders the project site to the north and extends east from Henty Highway, Heywood to Warrnambool-Caramut Road, Woolsthorpe.

The 132 kilovolt Macarthur Wind Farm high voltage transmission link traverses the project site from north to south, connecting the Macarthur Wind Farm to the 500 kilovolt Moorabool to Heywood transmission line at the Tarrone Terminal Station, located in the south of the project site. The SEA Gas pipeline is located approximately 2.2 kilometres north-east of the closest proposed infrastructure.

An approved gas-fired power station is proposed by AGL to be located adjacent to the Tarrone Terminal Station and the project; however, there are no immediate plans by AGL to begin construction on that

project. The permit for the approved Shaw River Power Plant proposed by Santos (located in the south-west portion of the project site) has expired.

To the south-west of the project area there are blue gum plantations and approximately 12 kilometres north-west is the Budj Bim National Park.

Operating and approved wind energy facilities within a 15-kilometre radius of the project site are summarised in Table 2-2.

Table 2-2 Operating and approved wind farms within 15 kilometres of the project site (boundary to boundary)

Project status	Project name	Approx. distance from project site (boundary to boundary) and direction
Operating	Macarthur Wind Farm	5.8 kilometres north
	Codrington Wind Farm	17.5 kilometres south-west
	Yambuk Wind Farm	16.5 kilometres south-west
Approved	Hawkesdale Wind Farm	6.3 kilometres east
	Woolsthorpe Wind Farm	11.4 kilometres east
	Ryan Corner Wind Farm	7.4 kilometres south

The project is located within the Victorian Volcanic Plain bioregion. Volcanic activity over a long geological period has deposited thin broad shields or long lava flows of basalt, creating extensive flat to undulating plains interspersed with volcanic cones. Within this landscape are scattered shallow lakes and incised waterways. Native grasslands occur in areas where these flows have experienced long periods of weathering, producing heavy grey, red or black cracking clay soils, which are generally fertile but poorly drained. In contrast, the youngest relatively unweathered lava flows are known as stony rises and have thin soils and support woodland vegetation. Trees and shrubs are either absent or are restricted to watercourses, swamps or rocky hills and slopes bordering the plains.

Volcanic features such as basalt plains, volcanic cones and crater lakes are prominent in the broader landscape. The volcanic cones tend to include the greatest extent of native forest cover, as the surrounding flatter areas have been cleared for agriculture or plantation timber.

The lava flows from the Mount Rouse eruption, which occurred approximately 300,000 years ago, extend approximately 60 kilometres from Mount Rouse to the coast near Port Fairy, passing through the project site. These lava flows have created areas of rises and areas of depressions along the path of the lava flow. Other lava flows within the project viewshed are the Tyrendarra lava flow and the Harmans Valley lava flow. The volcanic activity within the wider region has had a substantial influence on landscape features, historic and existing land use, vegetation, and creek lines.

Budj Bim National Park (formerly known as Mount Eccles National Park) and Mount Napier State Park are located approximately 8.8 kilometres and 23 kilometres north-west of the project site, respectively. Other reserves within 20 kilometres of the project include Eumeralla (Yambuk) Coastal Reserve and Yambuk Wetlands Nature Conservation Reserve, Woolsthorpe Nature Conservation Reserve and Tower Hill Wildlife Reserve, as well as other smaller bushland and flora reserves.

Regionally, large patches of remnant vegetation exist in the reserves, including the Budj Bim National Park, nearby State forests (including Mount Napier State Park) and Woolsthorpe Nature Conservation Reserve. Most of the land within and surrounding the project site is comprised of exotic pastures and grasses for grazing. In these areas, trees have been cleared, leaving scattered trees in paddocks. Planted trees of primarily exotic species are present within shelterbelts along property and paddock boundaries.

Overall, species diversity of this region is low as a result of pastoral and agricultural history, dating from the late 1830s and early 1840s. In most areas native plants have been replaced by pasture grasses and clovers, crop plants, and weeds. Remnants of the native flora are fragmented, and mostly confined to the sides of roads and railways, rocky areas that have not been cultivated or modified, sheltered gorges, cliff crevices or caves, or to small forest reserves.

LEGEND

- Locality
- 500KV transmission line
- 66KV transmission line
- Highway
- Major road
- Major watercouse
- Local government area
- Operating wind farm
- National parks act and nature conservation reserves
- State forest
- Willatook Wind Farm boundary

SOURCE:
Willatook Wind Farm boundary and operating wind farms from Wind Prospect.
Roads, watercourses, transmission lines and national parks from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 5 10 km

SCALE 1:400,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 2.1

Context plan

DATE: 19.05.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F006_GIS DOC REFERENCE: 287657_02_FIG5_A.APRX_V02

2.2 The project site

The project is situated to the south of Woolsthorpe–Heywood Road (see Figure 2-3) and lies between Penhurst–Warrnambool Road to the east and Hamilton–Port Fairy Road to the west. The project site, defined as the area within the project boundary, covers an area of about 4,154 hectares in the central western region of Moyne Shire in western Victoria. The project also includes works at three intersections resulting in the removal of native vegetation within the Glenelg Shire. Table 2-3 provides a summary of the local roads within the project site.

Table 2-3 Local roads within the project site

Road	Section	Classification	Construction Standard	Used by project traffic
Department of Transport				
Woolsthorpe-Heywood Road	Hamilton-Port Fairy Road to Warrnambool Road	Arterial C class	Mix of single and two lane sealed road	Used
Moyne Shire Council				
Tarrone North Road	Woolsthorpe-Heywood Road to Tarrone Substation Access	Sub Arterial	Sealed – Two lane	Used
	Tarrone Substation Access to Tarrone Lane	Sub Arterial	Sealed – Single lane	Potentially*
Kangertong Road	West of Nargorckas Road	Sub Arterial	Sealed – Single lane	Not used
Riordans Road	West of Tarrone North Road	Access	Gravel (Level 2)	Used
	East of Tarrone North Road	Access	Gravel (Level 1)	Not used
McGraths Road	East of Hamilton-Port Fairy Road	Access	Gravel (Level 2)	Used
Landers Lane	North of Riordans Road	Access	Unformed	Not used

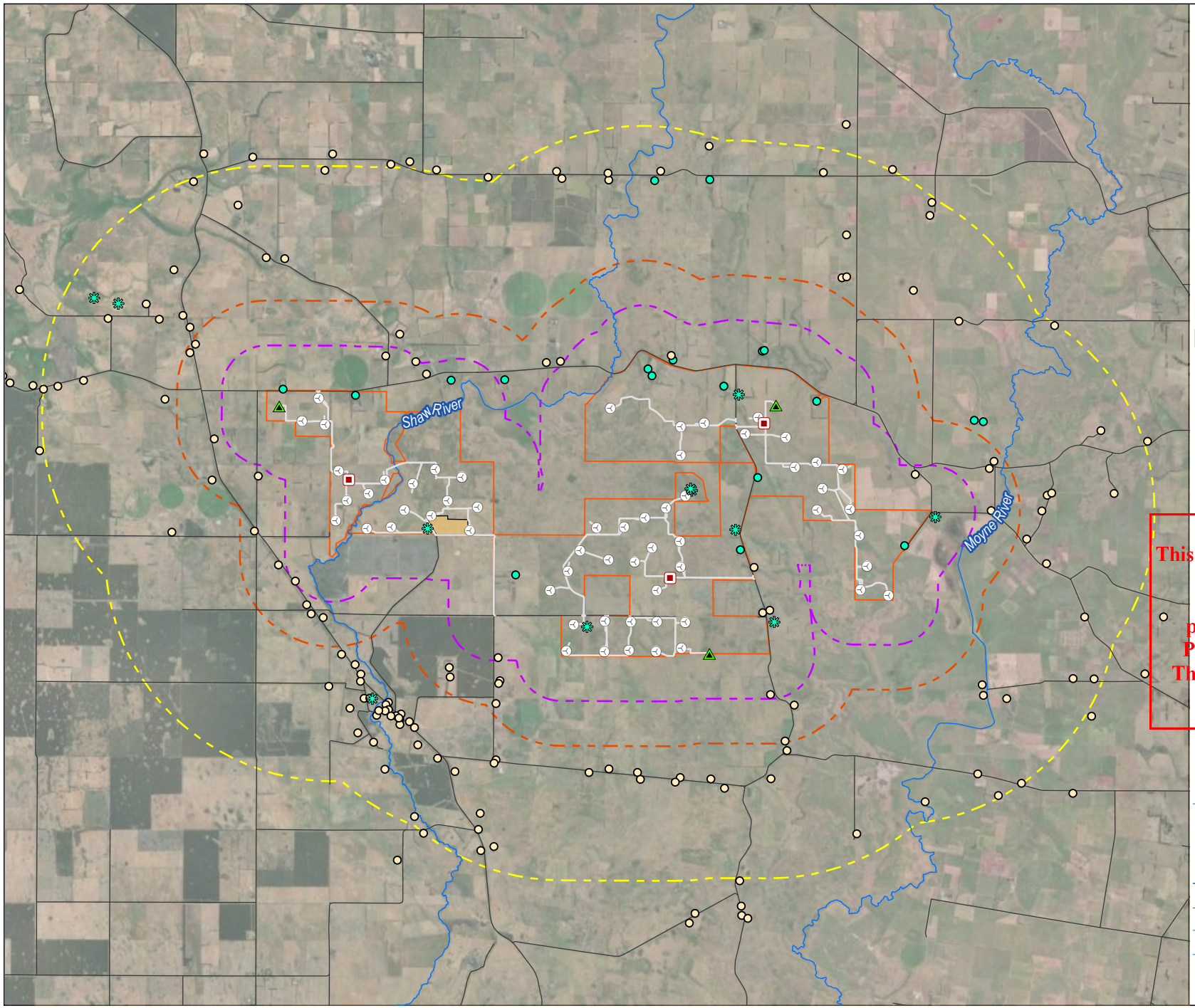
The area is highly suited to wind farm development, with strong prevailing winds, and provides a short link to the existing Moorabool to Heywood 500 kilovolt transmission line via the Tarrone Terminal Station.

The project site is mostly used for sheep and cattle grazing. Single farm dwellings associated with agricultural land use are common and are sparsely populated throughout the landscape. Eight occupied dwellings exist on the project site (plus six dilapidated non-inhabited dwellings). Within the project site there are 16 stakeholders (hosting project infrastructure) with land parcels of varying sizes. The land parcel details are listed in Appendix B along with certificates of title.

The location of stakeholder and non-stakeholder dwellings near the project site is shown in Figure 2-2.

Table B.3 in Appendix B shows the distance from proposed infrastructure to the nearest dwellings.

Table B.4 in Appendix B shows the distance from proposed infrastructure to property boundaries.



LEGEND

- Turbine location
- Permanent met mast
- Non-stakeholder dwelling
- Stakeholder dwelling
- Dilapidated dwelling
- Access track
- Road
- Watercourse
- Concrete batch plant
- Quarry area
- Willatook Wind Farm boundary
- 1 km buffer
- 2 km buffer
- 5 km buffer

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Terminal station from Tetra Tech Coffey.
Roads, transmission line and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

N

0 1 2 3 km

SCALE 1:120,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 2.2

Dwelling locations within and surrounding the project site

DATE: 07.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F022_GIS DOC REFERENCE: 287657_02_FIG3_B_APRX_V03

The topography of the site varies given the large size of the site and can be described as generally flat to slightly undulating, with most of the project site consisting of stony rises, undulating plains, and low swampy ground.

The project is situated within the Shaw River and Moyne River catchments. The Shaw River (e.g., Figure 2-4), Back Creek (a tributary of the Moyne River), and the Moyne River are the main surface water features in the local area. There are also several smaller tributary drainage lines that join the Shaw River and Back Creek. The Shaw River and Back Creek are subject to grazing within the project site, with the riparian and in-stream vegetation consisting of both introduced and endemic grasses and rushes.

Due to the flat topography and influence of lava flows and stony rises (e.g., Figure 2-5), there are depressions that become inundated during winter and spring, forming ephemeral wetlands during some years (e.g., Figure 2-6). The largest wet depression area is the Cockatoo Swamp complex that occurs in the central part of the project site, to the west of Landers Lane. During wet periods the ephemeral wetlands provide habitat to waterbirds including Brolga. These areas then dry and form modified grasslands, which are grazed by sheep and cattle during drier months.

Native vegetation within the project site has largely been cleared (e.g., Figure 2-7). Remnant vegetation is generally restricted to roadside reserves and highly modified isolated occurrences along waterways, gullies, and stony knolls (e.g., Figure 2-8). Exotic shelterbelt plantings are common throughout the landscape and on the project site, particularly around farm dwellings. The landscape and visual study investigation area (i.e., 28.6 kilometres, where project wind turbines would comprise 5% of the vertical field of view) has been extensively modified predominantly by broad-acre farmland comprising cropping, grazing, and timber plantations.

The project is situated on land that is the traditional land of the *Dhauwurd wurrung (Gundidjmara)* Aboriginal people. In the western portion of the project site, the Eastern Maar Aboriginal Corporation and the Gunditj Mirring Traditional Owners Aboriginal Corporation maintain joint responsibility as the appointed RAPs. The remainder of the project site is within a RAP area solely appointed to the Eastern Maar Aboriginal Corporation.

One previously registered Aboriginal heritage place (a mound) is located within the project site; however, this place could not be found during the site surveys and is assumed to have been unintentionally destroyed. One additional place, comprising an isolated artefact, was identified during the complex assessment. This site has been avoided during project design.

No scarred trees were identified within the project site. Additionally, no caves, cave entrances or rock shelters were identified. Further detail is submitted with the application and contained in Appendix C *Aboriginal cultural heritage*.

One historic heritage site is located within the project site: Landers Lane Dry Stone Wall (D7321-0040). Further detail on this site is contained in the historic heritage assessment (Appendix D).

Figure 2-3
Woolsthorpe-Heywood Road, east of Tarrone North Road

Figure 2-4
Shaw River within the project site

Figure 2-5
Aerial view of volcanic lava flows and stony rises

Figure 2-6
Depressions within the landscape that form ephemeral wetlands

Figure 2-7
Typical landscape of the project site

Figure 2-8
Example of patch of Basalt Shrubby Woodlands within the project site

Chapter 3 Project description

3.1 Overview

This section describes the infrastructure and associated construction works proposed for the project. It also describes how the project would operate over its lifetime, and decommissioning requirements.

The project would generate renewable energy through the construction and operation of up to 59 wind turbines. Electricity produced by the project will be fed through underground cables to the on-site substation. An overhead transmission line (of up to about 300 metres) would connect the on-site substation to the Tarrone Terminal Station, where the electricity would be exported to Victoria's electricity transmission network via the existing Moorabool to Heywood 500 kilovolt transmission line.

The 'project site' encompasses an area of approximately 4,154 hectares of private and public land. Within this project site, the following footprints are applicable:

- **Construction footprint:** estimated to be 222.3 hectares (or 5.4% of the project site) of which 4.6 hectares is native vegetation.
- **Operational footprint:** estimated to be 99.5 hectares (or 2.4% of the project site), to be used for the life of the project.

The project would generate more than 1,300 gigawatt hours (GWh) of electricity each year, which is, on average, as much electricity as is used by more than 200,000 homes in Victoria each year.

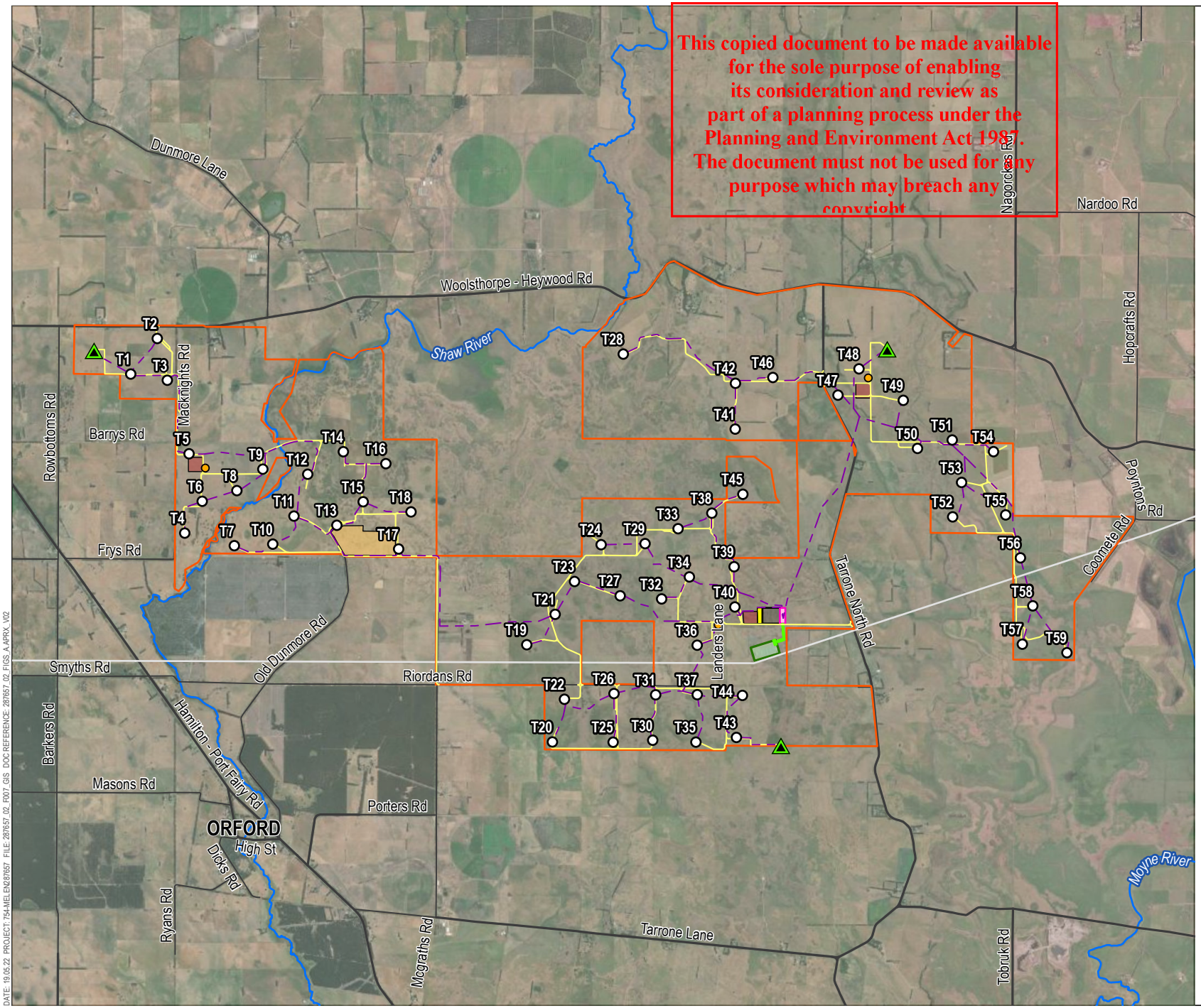
The project's main features are summarised in Table 3-1. The proposed locations of the project's main features are shown in Figure 3-2, Figure 3-3, Figure 3-4 and Figure 3-5.

Table 3-1 Summary of the main project features

Project's main features	Details
Location	The project is located within Moyne Shire approximately 3 kilometres north-east of Orford and 10 kilometres south-west of m. Intersections on the Princes Highway and the intersection of Tyrendarra-Ettrick Road and Woolsthorpe-Heywood Road will require minor works to allow wind turbine blade transport from Portland through the Glenelg Shire. The project site situated immediately to the south of Woolsthorpe-Heywood Road and lies between Hamilton-Port Fairy Road to the west and Penshurst-Warrnambool Road to the east. There are five intersection that also form part of the project site. These are located within the Moyne and Glenelg Shires.
Setting	The main land use with the project site is agricultural (predominantly sheep and cattle grazing). Native vegetation is largely restricted to roadside reserves and highly modified isolated occurrences along waterways, gullies and stony knolls, which would largely be avoided.
Stakeholders	There are 16 stakeholders with project infrastructure proposed to be built on their land.
Wind turbines	Up to 59 with a maximum tip height of 250 metres above ground level, maximum rotor diameter up to 190 metres, minimum tip height of 40 metres and blade length of up to 93 metres.
Wind farm capacity	Around 354 MW.
Annual generation	Over 1,300 GWh per year.

Project's main features	Details
Construction period	Approximately 24 months.
Electrical reticulation	Approximately 112.6 kilometres of underground 33 kilovolt electricity cable would be laid in 62.1 kilometres of trenches, about one metre below the surface to connect wind turbines to the on-site substation. An overhead transmission line of up to about 300 metres would be needed to connect the on-site substation to the Tarrone Terminal Station.
On-site substation	The underground cabling would terminate at the on-site substation to the north of the Tarrone Terminal Station, which would connect to the 500 kilovolt Moorabool to Heywood transmission line via the Tarrone Terminal Station. The on-site substation area may also host a synchronous condenser (see below). The substation would be in a single yard with footprint of up to 70 metres by 220 metres.
Meteorological masts	Up to three meteorological masts are proposed to be in place for the life of the project. A single-lane access track roughly 3 metres wide will be constructed to provide access to these masts.
Operations and maintenance facility	An operations and maintenance facility would be built next to the on-site substation and provide office, storage and maintenance facilities. The facility would be about 70 metres by 220 metres.
Wind turbine hardstand areas	Each wind turbine hardstand covers an area of 6,500 m^2, which equates to 48.8 hectares for all 59 project wind turbines.
Staging areas and passing lanes	Four staging areas of up to 320 metres in length would be constructed adjacent to access tracks (doubling the width of access tracks in these areas). Several passing lanes would be needed throughout the site and would have a length of up to 25 metres.
Battery Energy Storage System	An on-site battery energy storage facility with a nominal capacity of 200 MW/400 MWh and would include the battery units, inverters, transformers, ventilation/cooling systems, and fire protection systems. The battery energy storage system would consist of a series of modular batteries with transformers, high voltage current (heating, ventilation and air conditioning) coolers and other electrical plant. The battery would be sited on a hardstand area of up to 5.5 hectares (around 320 metres x 220 metres).
Synchronous condenser	The synchronous condenser, if built, would have a nameplate capacity of approximately 30 megavolt amperes and a footprint of approximately 15 metres by 20 metres, although the actual capacity and footprint would be determined at a later date when the grid connection requirements are better known.
Transport	Transport of wind turbines and ancillary components (e.g., battery energy storage system and substation infrastructure) would primarily be from Portland and via the regional road network.
Site access and access roads	Twelve project site access points from public roads are proposed to connect to approximately 60 kilometres of internal access. Access tracks would have a final width of 6 metres, and a minimum 30 metres turning radius. The construction footprint of access tracks would be 12 metres wide, within a 40-metre-wide corridor that has been surveyed by ecologists and heritage consultants.
External road upgrades	Widening of a section of Woolsthorpe-Heywood Road and local roads would occur where required to facilitate the project during each project phase to Department of Transport and Moyne Shire Council standards.
Raw materials/quarry	The project is estimated to require approximately 450,000 m^3 of quarried aggregate. This would either be sourced from an on-site quarry (subject to approval of the Quarry Work Plan) or existing commercial quarries. The closest commercial quarry is Tarrone Quarry located approximately 3.6 kilometres south-east of the project site.

Project's main features	Details
Temporary construction components	Three temporary construction compounds would be developed and include office facilities, amenities, car parking, chemical and hazardous material storage, waste collection, and additional laydown areas. Three concrete batching plants (50 metres by 100 metres) would be established to supply concrete for the wind turbine foundations, the on-site substation, and the battery energy storage system. Four laydown hardstand areas would also be established at strategic locations for the storage of wind turbine components and other equipment.
Life	A minimum 25-year operating life is expected after a period of up to 3 years of pre-development and construction activities. Pre-development would include detailed design and early works, where permitted.
Decommissioning	Within 12 months of wind turbines permanently ceasing to generate electricity (assuming they're not repowered), the wind farm would be decommissioned. This would include removing all above ground equipment, restoration of all areas associated with the project, unless otherwise useful to the ongoing management of the land, and post-decommissioning revegetation with pasture or crop (in consultation with and as agreed with the landowner).



LEGEND

- Turbine location
- Permanent met mast
- Concrete batch plant
- Underground cable
- Access track
- Substation 33kV/220kV
- Battery energy storage system
- Construction compound
- Quarry area
- Operations and maintenance facility
- Transmission line and grid connection infrastructure
- Tarrone Terminal Station
- Willatook Wind Farm boundary
- 500kV Moorabool-Heywood transmission line
- Major road
- Local road
- Watercourse

SOURCE:
Willatook Wind Farm boundary, turbine locations and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 2 km

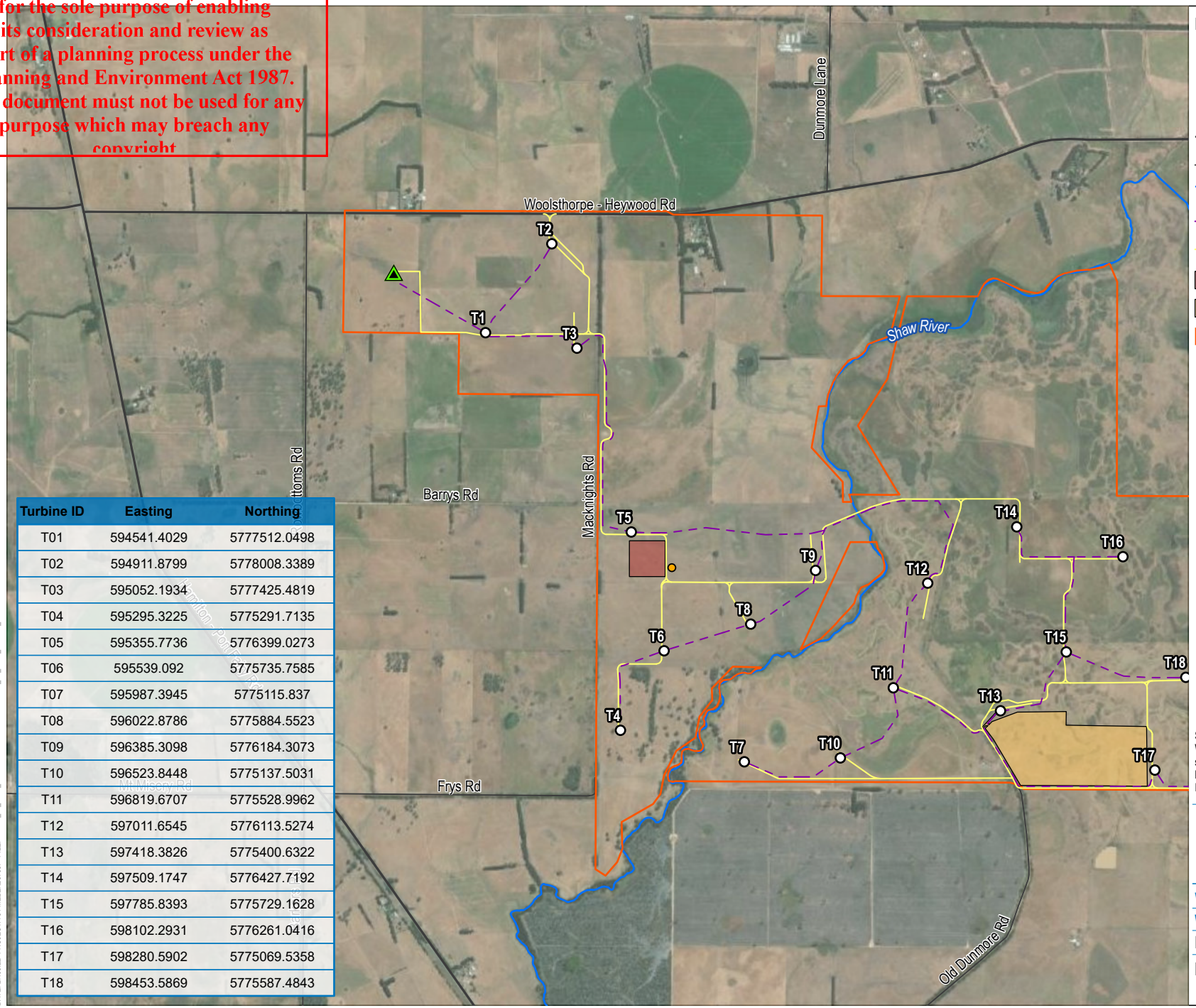
SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT
WILLATOOK WIND FARM

FIGURE 3.1

Project overview

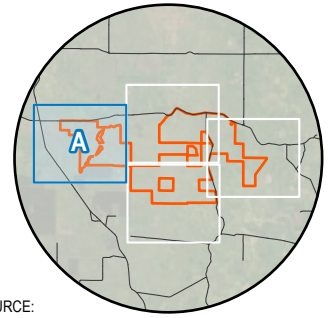
DATE: 19.05.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F007_GIS DOC REFERENCE: 287657_02_FIGS_A APRX_V02



Turbine ID	Easting	Northing
T01	594541.4029	5777512.0498
T02	594911.8799	5778008.3389
T03	595052.1934	5777425.4819
T04	595295.3225	5775291.7135
T05	595355.7736	5776399.0273
T06	595539.092	5775735.7585
T07	595987.3945	5775115.837
T08	596022.8786	5775884.5523
T09	596385.3098	5776184.3073
T10	596523.8448	5775137.5031
T11	596819.6707	5775528.9962
T12	597011.6545	5776113.5274
T13	597418.3826	5775400.6322
T14	597509.1747	5776427.7192
T15	597785.8393	5775729.1628
T16	598102.2931	5776261.0416
T17	598280.5902	5775069.5358
T18	598453.5869	5775587.4843

LEGEND

- Turbine location
- Concrete batch plant
- Permanent met mast
- Major road
- Local road
- Watercourse
- Underground cable
- Access track
- Construction compound
- Quarry area
- Willatook Wind Farm boundary



SOURCE:
Willatook Wind Farm boundary, turbine locations and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 400 800 m

SCALE 1:30,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

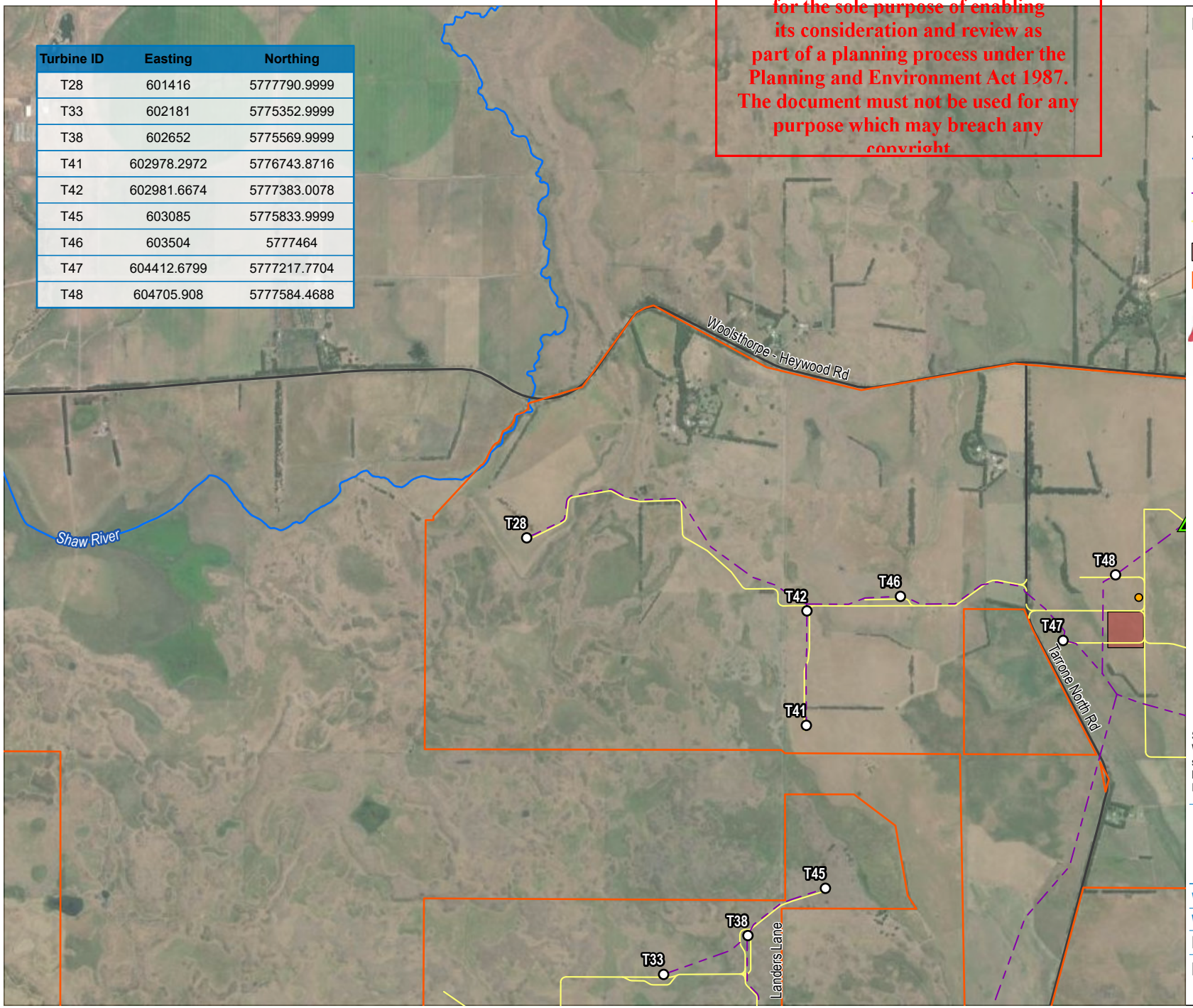
WILLATOOK WIND FARM

FIGURE 3.2

Project overview western sector

DATE: 27.05.22 PROJECT: 754-MELEN287657 FILE: 287657_01_F007_GIS DOC REFERENCE: 287657_02_FIGS_A.APRX_V06

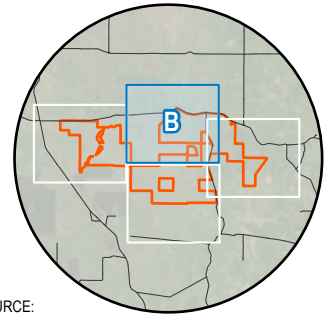
Turbine ID	Easting	Northing
T28	601416	5777790.9999
T33	602181	5775352.9999
T38	602652	5775569.9999
T41	602978.2972	5776743.8716
T42	602981.6674	5777383.0078
T45	603085	5775833.9999
T46	603504	5777464
T47	604412.6799	5777217.7704
T48	604705.908	5777584.4688



LEGEND

- Turbine location
- Concrete batch plant
- Permanent met mast
- Major road
- Watercourse
- Underground cable
- Access track
- Construction compound
- Willatook Wind Farm boundary

ADVERTISED PLAN



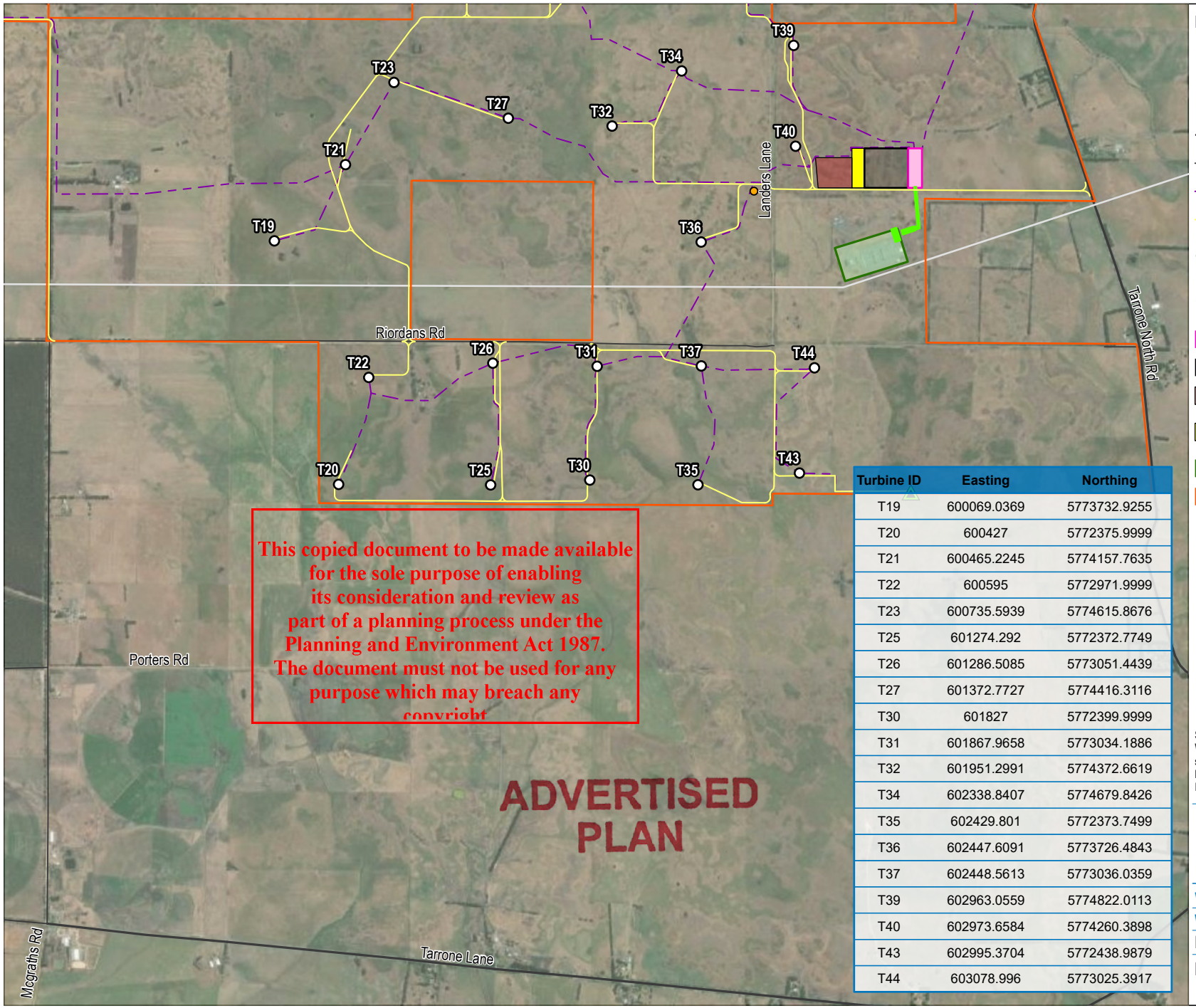
SOURCE:
Willatook Wind Farm boundary, turbine locations and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 400 800 m

SCALE 1:30,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT
WILLATOOK WIND FARM
FIGURE 3.3
Project overview northern sector

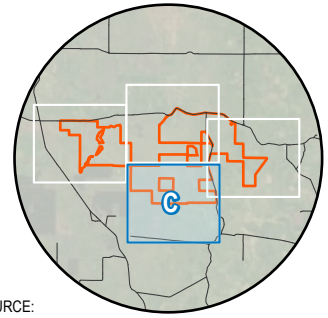
DATE: 27.05.22 PROJECT: 754-MELEN287657 FILE: 287657_01_F007_GIS DOC REFERENCE: 287657_02_FIGS_A.APRX_V06



Turbine ID	Easting	Northing
T19	600069.0369	5773732.9255
T20	600427	5772375.9999
T21	600465.2245	5774157.7635
T22	600595	5772971.9999
T23	600735.5939	5774615.8676
T25	601274.292	5772372.7749
T26	601286.5085	5773051.4439
T27	601372.7727	5774416.3116
T30	601827	5772399.9999
T31	601867.9658	5773034.1886
T32	601951.2991	5774372.6619
T34	602338.8407	5774679.8426
T35	602429.801	5772373.7499
T36	602447.6091	5773726.4843
T37	602448.5613	5773036.0359
T39	602963.0559	5774822.0113
T40	602973.6584	5774260.3898
T43	602995.3704	5772438.9879
T44	603078.996	5773025.3917

LEGEND

- Turbine location
- Concrete batch plant
- Permanent met mast
- Major road
- Local road
- Underground cable
- Access track
- 500kV Moorabool-Heywood transmission line
- Transmission line and grid connection infrastructure
- Substation 33kV/220kV
- Battery energy storage system
- Construction compound
- Operations and maintenance facility
- Tarrone Terminal Station
- Willatook Wind Farm boundary



SOURCE:
Willatook Wind Farm boundary, turbine locations and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 400 800 m

SCALE 1:30,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

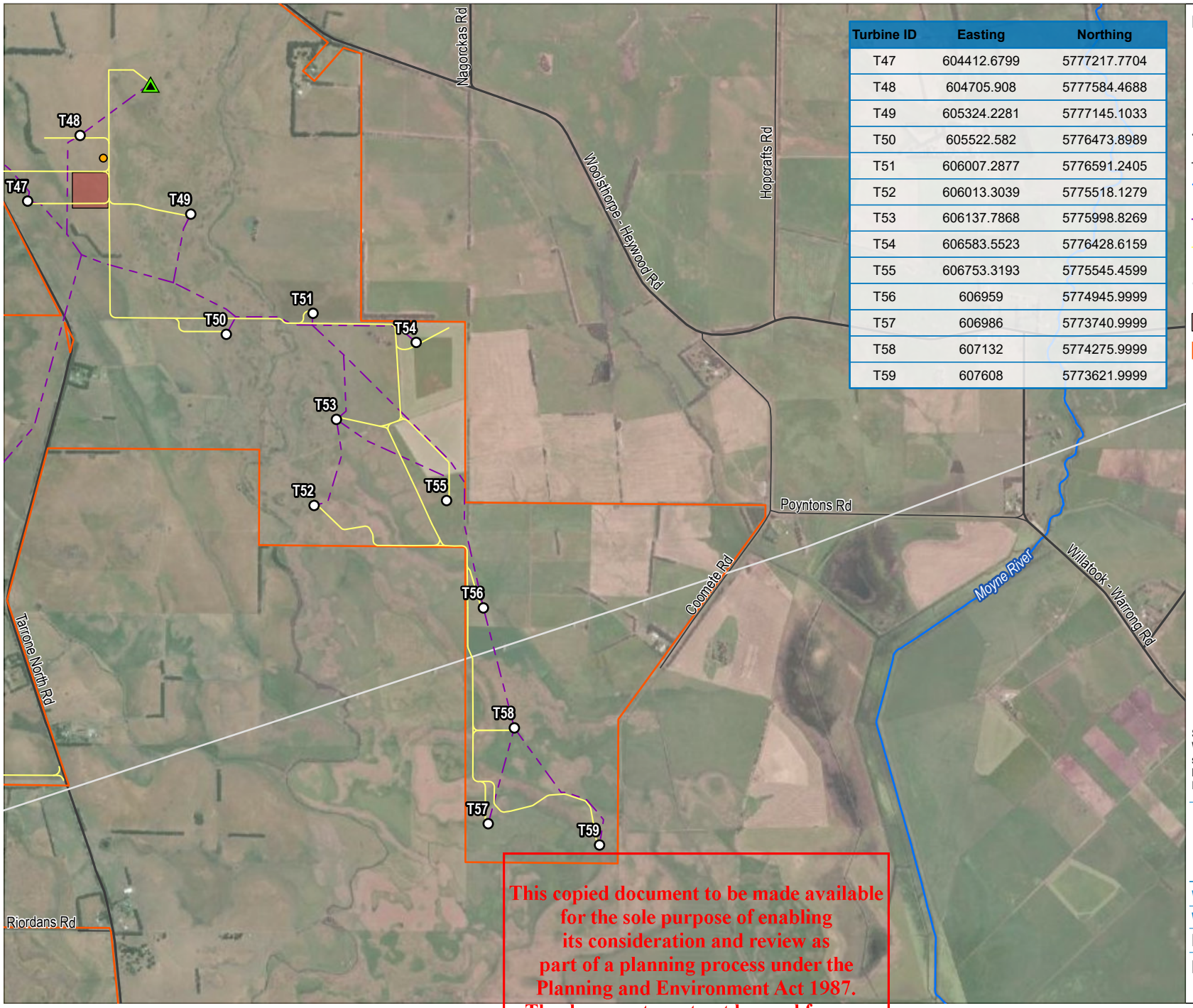
WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 3.4

Project overview southern sector

DATE: 27.05.22 PROJECT: 754-MELEN287657 FILE: 287657_01_F007_GIS DOC REFERENCE: 287657_02_FIGS_A.APRX_V06

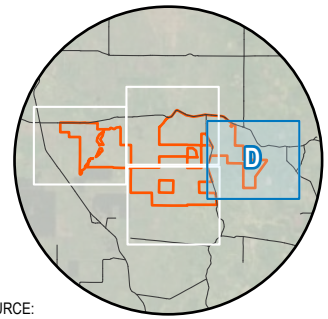


Turbine ID	Easting	Northing
T47	604412.6799	5777217.7704
T48	604705.908	5777584.4688
T49	605324.2281	5777145.1033
T50	605522.582	5776473.8989
T51	606007.2877	5776591.2405
T52	606013.3039	5775518.1279
T53	606137.7868	5775998.8269
T54	606583.5523	5776428.6159
T55	606753.3193	5775545.4599
T56	606959	5774945.9999
T57	606986	5773740.9999
T58	607132	5774275.9999
T59	607608	5773621.9999

LEGEND

- Turbine location
- Concrete batch plant
- Permanent met mast
- Major road
- Local road
- Watercourse
- Underground cable
- Access track
- 500kV Moorabool-Heywood transmission line
- Construction compound
- Willatook Wind Farm boundary

ADVERTISED PLAN



SOURCE:
Willatook Wind Farm boundary, turbine locations and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 400 800 m

SCALE 1:30,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT
WILLATOOK WIND FARM
FIGURE 3.5
Project overview eastern sector

DATE: 27.05.22 PROJECT: 754-MELEN287657 FILE: 287657_01_F007_GIS DOC REFERENCE: 287657_02_FIGS_A.APRX_V06

3.2 Components and layout

The total construction footprint for the project is estimated to be up to 222.3 hectares. This includes an area of up to 99.5 hectares that would be used for the life of the project, and 122.8 hectares that would be rehabilitated once construction is complete.

The project design will be subject to detailed design during the pre-construction phase, incorporating the results of geotechnical investigations and the detailed design work undertaken by the selected wind turbine manufacturer and civil and electrical contractors. As such, a micro-siting allowance of a 100-metre radius from the current wind turbine locations is proposed to facilitate refinements for this detailed design. The micro-siting of any wind turbines would require that the routes of access tracks and underground cables are also adjusted, and this would occur whilst ensuring that there are no greater impacts than those assessed during this assessment process. Where there is an existing dwelling, turbines will not be moved any closer.

3.2.1 Wind turbine generators

The project has been designed to enable a maximum wind turbine tip height of 250 metres and associated maximum rotor diameter of 190 metres. The minimum blade clearance from ground level would be 40 metres. A range of current and future wind turbine models would be considered that fit within those parameters.

Each wind turbine would have foundations, a tower, nacelle, rotor and transformer and is expected to have a generating capacity of approximately 6 megawatts or more.

The maximum and minimum parameters described above have been adopted for this planning application, allowing a 'worst case' assessment of the project (Figure 3-6). Note that if the minimum blade clearance of 40 metres is adopted, the maximum tip height would be 230 metres. If the maximum tip height of 250 metres is adopted, the ground clearance would be 60 metres or higher.

Each wind turbine would have a matte white, non-reflective, finish to achieve visual consistency throughout the landscape. No unnecessary lighting, signage or logos are proposed.

Wind turbine foundations

The wind turbine foundations would be either a gravity foundation or rock anchor foundation and remain in place for the life of the project. The final designs of individual foundations for each wind turbine would be determined by detailed geological and geotechnical investigations.

Hardstands

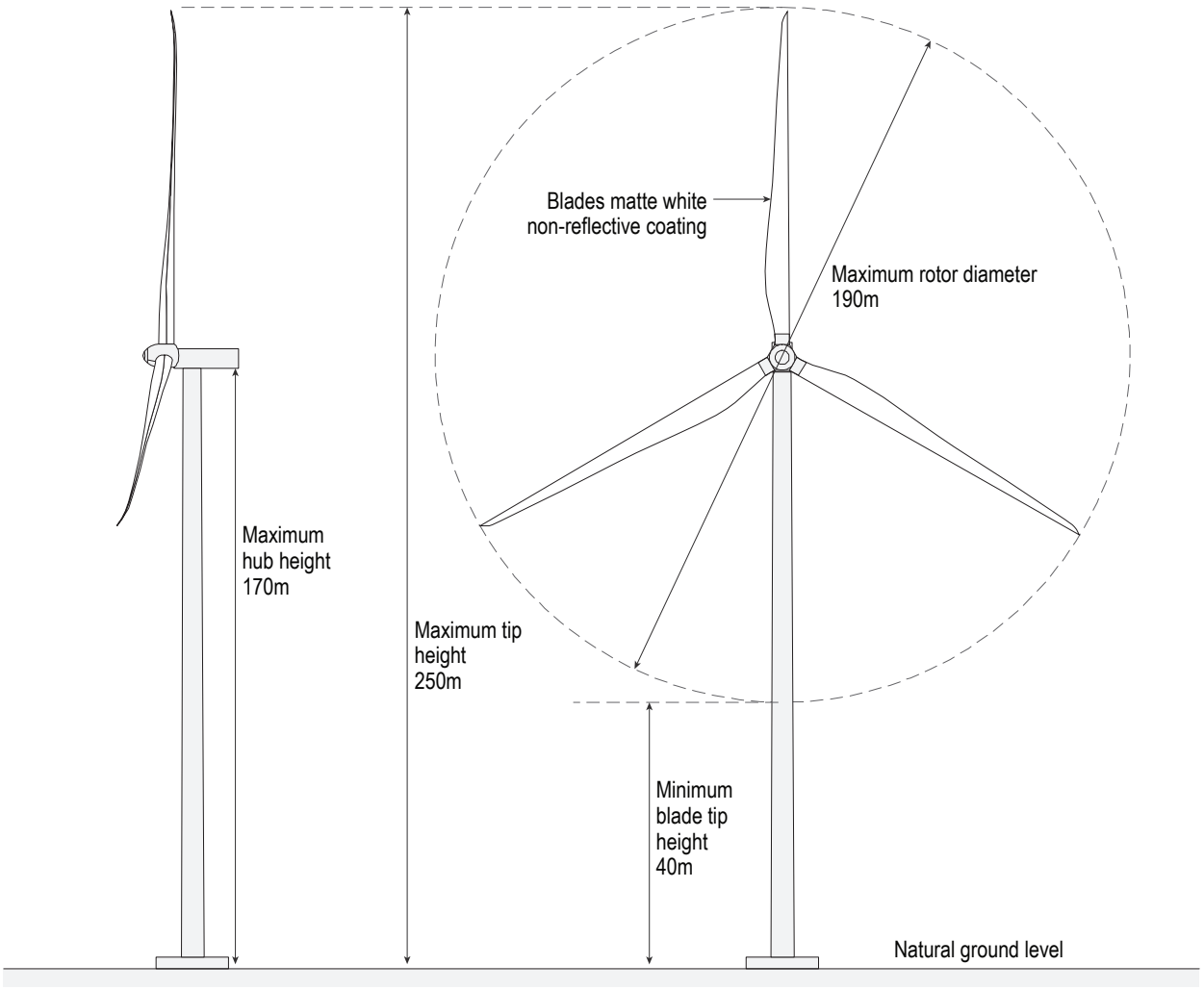
Hardstands are needed next to each wind turbine for the assembly, erection, maintenance, repowering and decommissioning of a wind turbine. Each hardstand area would be about 0.65 hectares, which includes the foundation, laydown areas, and crane pads. Hardstands would be surfaced with material to the required load-bearing specifications for the selected crane. This would likely consist of crushed rock. After construction, the hardstand would be retained and used for periodic maintenance of the wind turbines throughout the life of the project. The exact hardstand arrangement would be designed for the specific requirements of the wind turbines, the crane, and local topography.

Tower

Each wind turbine tower sits on a foundation and comprises several bolted steel sections that would remain in place for the life of the project. Typically, towers that could accommodate the proposed maximum blade tip height of 250 metres would have base diameters of between 5 and 6 metres, tapering to 3 metres at the top. Towers would be transported in sections for on-site assembly.

Nacelle

On the top of each tower sits the nacelle onto which the wind turbine hub is mounted, with the three blades attached to the hub. The wind turbine tower, nacelle, and rotor would all have the same matte white colour.



NOT TO SCALE

SCALE: **NOT TO SCALE**
PAGE SIZE: **A4**

SOURCE:
Turbine design from Wind Prospect.

WIND PROSPECT
WILLATOOK WIND FARM
FIGURE 3.6
Maximum and minimum wind turbine dimensions

DATE: 20.04.22 PROJECT: 754-MELEN287657 AI FILE: 287657_02_GRA009_V01

Rotor

The project is designed to include wind turbine rotors of up to 190 metres in diameter with an individual swept area of approximately 28,353 square metres. However, it is possible that smaller rotors would be used depending on the specifications of wind turbines on the market at the time of construction and their suitability to the project.

The project has conservatively assessed blade lengths of 93 metres in a single piece. This is about 10 metres longer than blades currently in production, however longer blades can be expected in the future as wind turbine technology develops further.

An example of a blade, like what is proposed, being lifted onto a wind turbine tower is shown in Figure 3-7.

Transformer

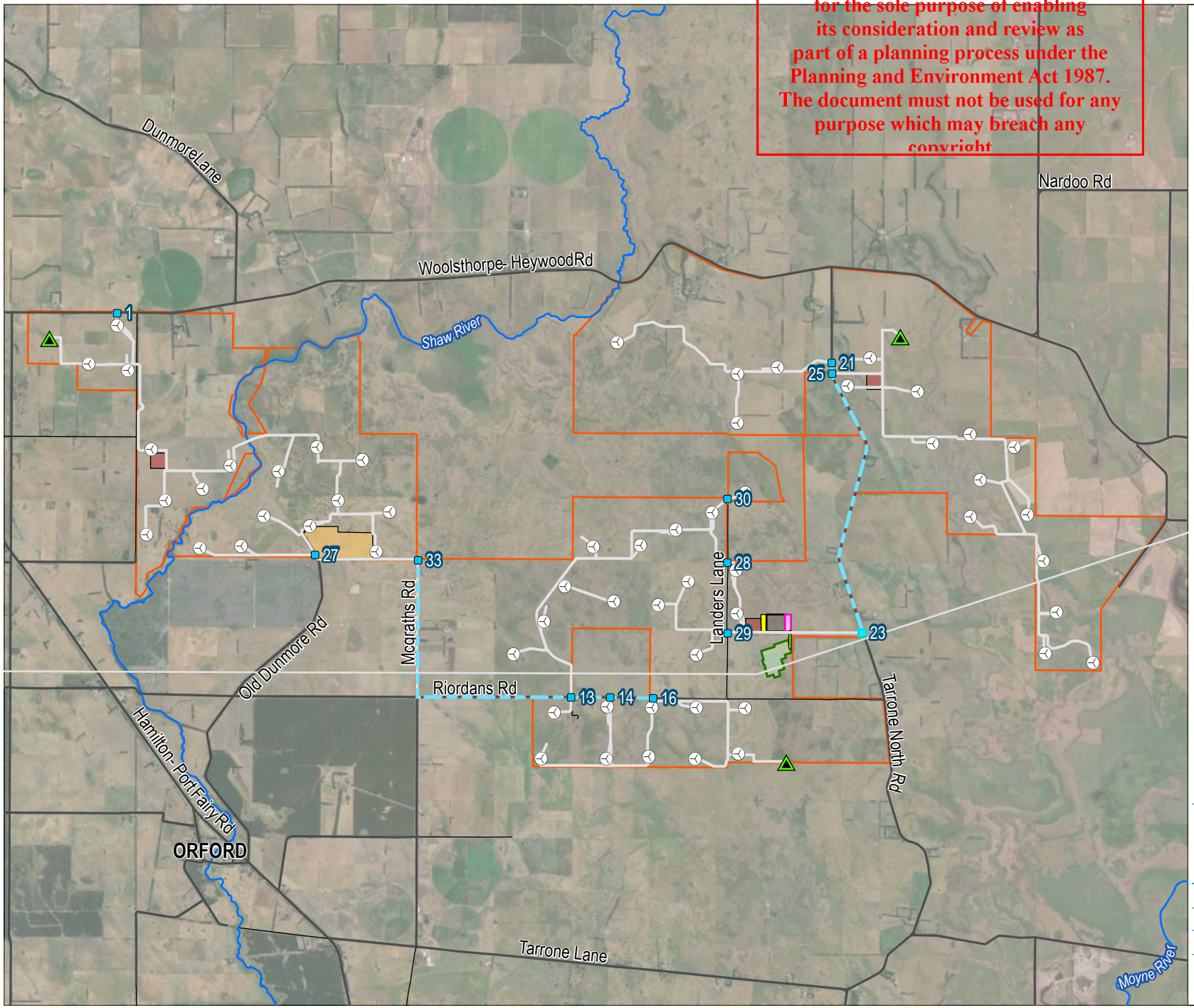
The transformer may be in either the nacelle, within the base of the tower, or next to the base of the tower on a concrete pad.

Provision would be made in the design for containment of any oil that may leak or spill from the transformers. If placed on the hardstand area this would typically be achieved via a concrete bund.

Figure 3-7
A rotor with three blades with the final blade being lifted onto a wind turbine tower

3.2.2 Access tracks and project site access from public roads

A total of twelve site access points from public roads would be established to bring project materials and equipment onto site, all of which would remain in place for the life of the project (see Figure 3-8). One of these access points would be from Woolsthorpe-Heywood Road, three from Tarrone North Road, three from Riordans Road, one from McGraths Road and one from Old Dunmore Road. There are also three crossing points of Landers Lane.



LEGEND

- Wind turbine
- Access gate
- Permanent met mast
- Access track
- Public roads used for movement between WTG areas
- Overhead transmission line
- Substation
- Battery energy storage system
- Construction compound
- Quarry area
- Operations and maintenance facility

Other

- 500kV Moorabool-Heywood transmission line
- Major road
- Local road
- Watercourse
- Tarrone Terminal Station
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, turbine locations and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 2 km

SCALE 1:70,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 3.8

Site access and access road network

DATE: 04.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F012_GIS DOC REFERENCE: 287657_02_FIG3_8APRX_V01

Woolsthorpe-Heywood Road is managed by Regional Roads Victoria (as a Class C arterial road), while the others are local roads managed by Moyne Shire Council. Access points would be established at various times during construction to allow the wind turbine components to be brought onto the project site. All site access points would be gated and have wash down facilities or rumble grids in some instances. Figure 3-8 shows the project site access points and access tracks.

Approximately 60 kilometres of internal access tracks would be needed to provide access to each individual wind turbine and other infrastructure associated with the project. Access tracks would connect all the project infrastructure, provide access for construction and maintenance vehicles, as well as emergency vehicles, and may also be used by stakeholders for their farm operations.

Access tracks would generally have a final width of 6 metres, or up to 10 metres at the corners. The construction footprint for access tracks would be 12 metres wide. Four staging areas of up to 320 metres in length would be constructed next to the access tracks, thereby doubling the width in those locations. Several passing lanes would also be needed throughout the site. These would have a length of up to 25 metres.

3.2.3 Signage

A small business identification sign is proposed to be located at the site main entrance on Tarrone North Road. The sign will be non-illuminated, 2 metres by 1.33 metres (total area of 2.66 square metres).

3.2.4 Electrical reticulation and distribution

Underground 33 kilovolt cable and fibre optic network

Electricity produced by each wind turbine would be transformed from low voltage to medium voltage (nominally 33 kilovolts) by a transformer located within or adjacent to each wind turbine. The electrical network would comprise 33 kilovolt circuits (called strings) between the wind turbines and the on-site substation.

It is proposed that the internal electrical network between the wind turbines and the substation would be an underground distribution network (i.e., buried cables). It is estimated that this would entail 62 kilometres of trenches with insulated copper or aluminium electrical cables installed. The cable trenches would have a width of up to one metre within a work area of seven metres for the excavator to operate and for stockpiling of soil. The trenches would either be next to the access tracks or directly across open paddocks, with a depth of approximately one metre, unless this is not feasible due to the presence of rock, in which case the cables would be installed in cable ducts. There are two locations where cables are proposed to be attached to newly constructed bridges over the Shaw River and Back Creek to avoid additional disturbance at these locations. Fibre optic cable would be laid alongside the power cable, with a bare copper earth cable being laid at the bottom of the trench.

Overhead transmission line

An overhead transmission line of up to approximately 300 metres would be required to connect the on-site substation to the Tarrone Terminal Station. The project will include works on the Tarrone Terminal Station land associated with the connection. The transmission voltage is expected to be nominally 132 kilovolts (although 220 kilovolts is an alternative option) with the overhead dual circuit transmission line consisting of a single pole line (i.e., single poles up to 26 metres high, with conductor circuits on each side).

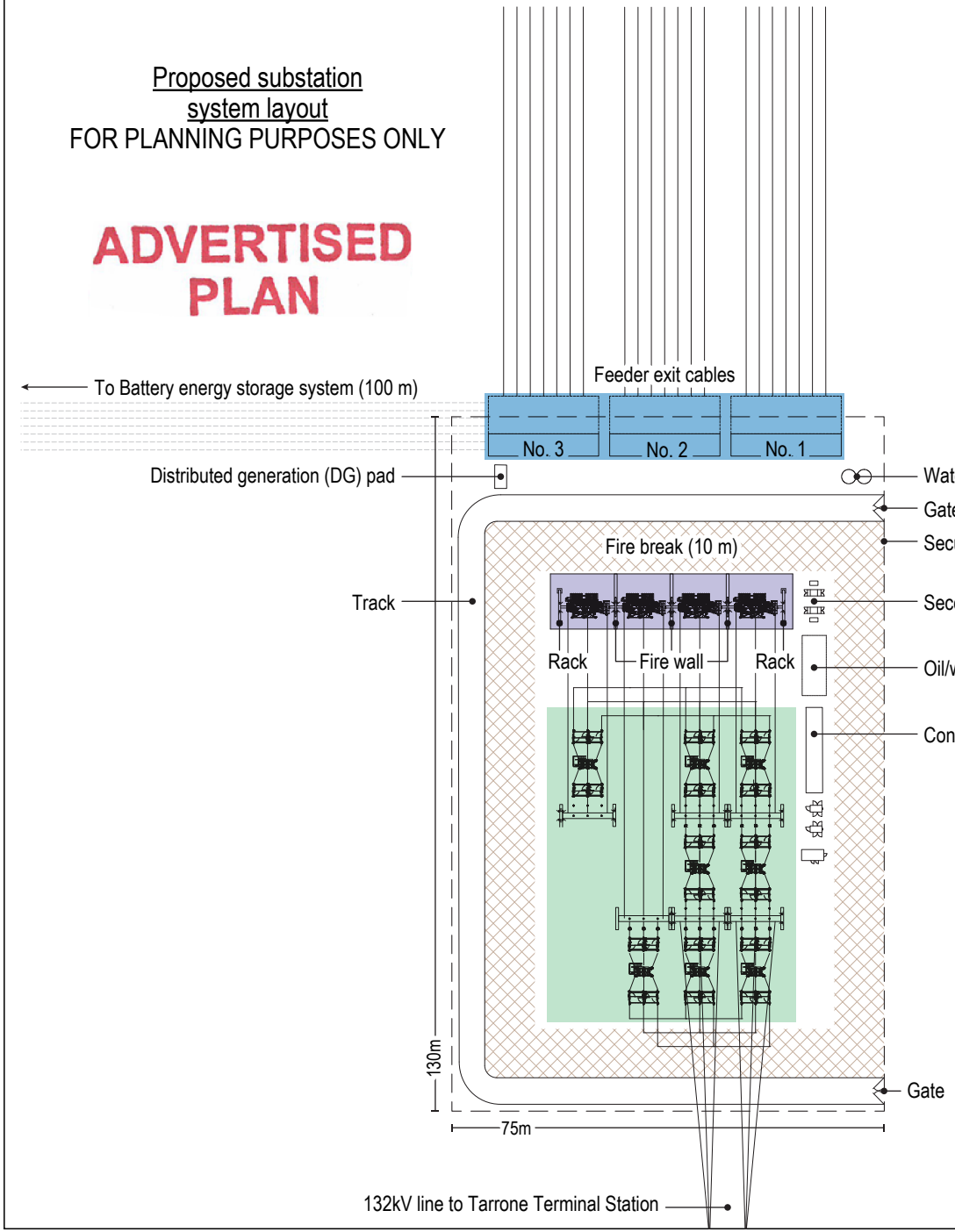
On-site substation

A single on-site substation would be needed for the project to receive electricity generated by the wind turbines and to increase the voltage to 132 kilovolts to enable connection to the grid. The on-site substation would be on a parcel of land next to the existing Tarrone Terminal Station which would enable a simple integration into the Tarrone Terminal Station and then electricity network via the short span of overhead transmission line.

The on-site substation would be a single yard with a footprint of up to 70 metres by 220 metres and include infrastructure with a height of up to 8 metres (excluding the poles for the overhead transmission line) (Figure 3-9).

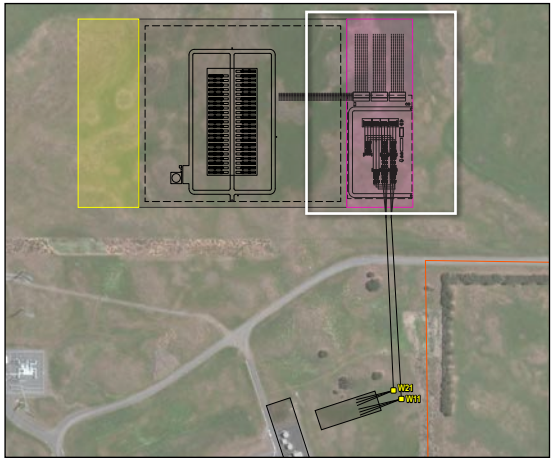
Proposed substation system layout
FOR PLANNING PURPOSES ONLY

ADVERTISED PLAN



General notes:

1. The layouts are indicative only
2. Stormwater discharge point to be determined by agreement with council
3. Layout is subject to receipt of AEMO functional requirements and subject to detailed design
4. The incoming voltage from the wind farm is anticipated to be 33kV and the outgoing voltage from the substation is anticipated to be 132kV
5. Maximum generation connected to common busbar (via No. 1 & No. 2 transformers) 500mW
6. Water tank capacity of at least 48,000 litres
7. Substation dimensions are approximate. Actual dimensions may vary.



LEGEND

- Substation layout design
- 132kV switchyard
- Transformer area
- 33kV switchyard
- Fire break (10 m)

SOURCE:
Willatook Wind Farm boundary and substation infrastructure from Wind Prospect.
Imagery from ArcGIS Online (various capture dates).

0 20 40 m

SCALE 1:1,250
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT
WILLATOOK WIND FARM

FIGURE 3.9

Conceptual substation layout

DATE: 21.04.22 PROJECT: 754-MELEN287657 FILE: 287657_01_FI38_GIS DOC REFERENCE: 287657_01_FIGS_E APRX_V02 A1 FILE: 287657_02_GRA007_V01

The on-site substation would consist of a series of electrical transformers, switchgear, a control room and switch room, amenity facilities, including a toilet, and fire services. A security fence of up to 2.4 metres high would be installed around the perimeter of the on-site substation, battery system, and operations and maintenance facility. The whole area would be accessed via locked gates. The exact fence and gate specifications and their location would be agreed with Energy Safe Victoria during the pre-construction stage and be compliant with relevant legislation.

Areas within the on-site substation would be covered partly with a layer of crushed rock and partly by concrete slabs. The transformers within the on-site substation would be bunded to contain any spills, and fire barrier walls would be installed to protect workers and the community from any incidents. These measures are standard for all transformers within electrical substations in Australia and are governed by strict standards.

An example substation and operations and maintenance facility is shown in Figure 3-10.

Figure 3-10
Example of wind farm substation and operations and maintenance facility

Synchronous condenser

A synchronous condenser may or may not be required and therefore would need further investigation before construction. A synchronous condenser could be expected to have a nameplate capacity of around 30 megavolt amperes and a footprint of about 15 metres by 20 metres, although the actual capacity and footprint would be worked out later in consultation with the Australian Energy Market Operator and AusNet Services, when grid connection requirements are more certain. The synchronous condenser would be next to the battery and on-site substation and, if constructed. A typical synchronous condenser is shown in Figure 3-11.

Figure 3-11
Example synchronous condenser
Source: ABB1

3.2.5 Battery energy storage system

A battery energy storage system would be built immediately to the west of the on-site substation (example of battery shown in Figure 3-13). The battery system would have a nominal capacity of up to 200 megawatts/400 megawatt hours and would include the battery units, inverters, transformers, ventilation/cooling systems, and fire protection systems.

The battery system would consist of a series of modular batteries with transformers, high voltage current (heating, ventilation and air conditioning) coolers and other electrical plant. The battery system would be sited within an area of up to 5.5 hectares (nominally 320 metres by 220 metres), as indicatively shown in Figure 3-13. The battery and hardstand area would only occupy a portion of this area, with the larger area established to provide flexibility for different battery supplier module designs, layouts and orientations, and provide room for emergency access, fire breaks, and firefighting equipment (static and mobile).

The battery energy storage system would include a fire protection system that includes, as a minimum, a fire water supply in static storage tanks, where:

- the fire water supply would be of a quantity no less than 288,000 litres or as per the provisions for Open Yard Protection of *AS 2419.1-2005: Fire hydrant installations* flowing for a period of no less than four hours at 20L/s, whichever is the greater
- the quantity of static fire water storage would be calculated from the number of hydrants required to flow from AS 2419.1-2005, Table 3.3
- fire hydrants would be provided and located so that every part of the battery energy storage system is within reach of a 10 metre hose stream issuing from a nozzle at the end of a 60 metre length of hose connected to a fire hydrant outlet
- the fire water supply would be located at vehicle entrances to the facility, at least 10 metres from any infrastructure (electrical substations, inverters, battery energy storage systems, buildings)
- the fire water supply would be reasonably adjacent to the battery energy storage system and would be accessible without undue danger in an emergency. (e.g., fire water tanks would be located closer to the site entrance than the battery energy storage system)
- the fire water supply would comply with AS 2419.1-2005: *Fire hydrant installations* - Section 5: Water storage.

A fire break of at least 10 metres would be established and maintained around the perimeter of the battery energy storage facility from the boundary of the facility or any vegetation screening inside the property boundary. Separation distances from other project infrastructure, non-project infrastructure, property boundaries and vegetation will be incorporated into the final design that ensures a maximum radiant heat flux of 12.5 kW/m² will be implemented.

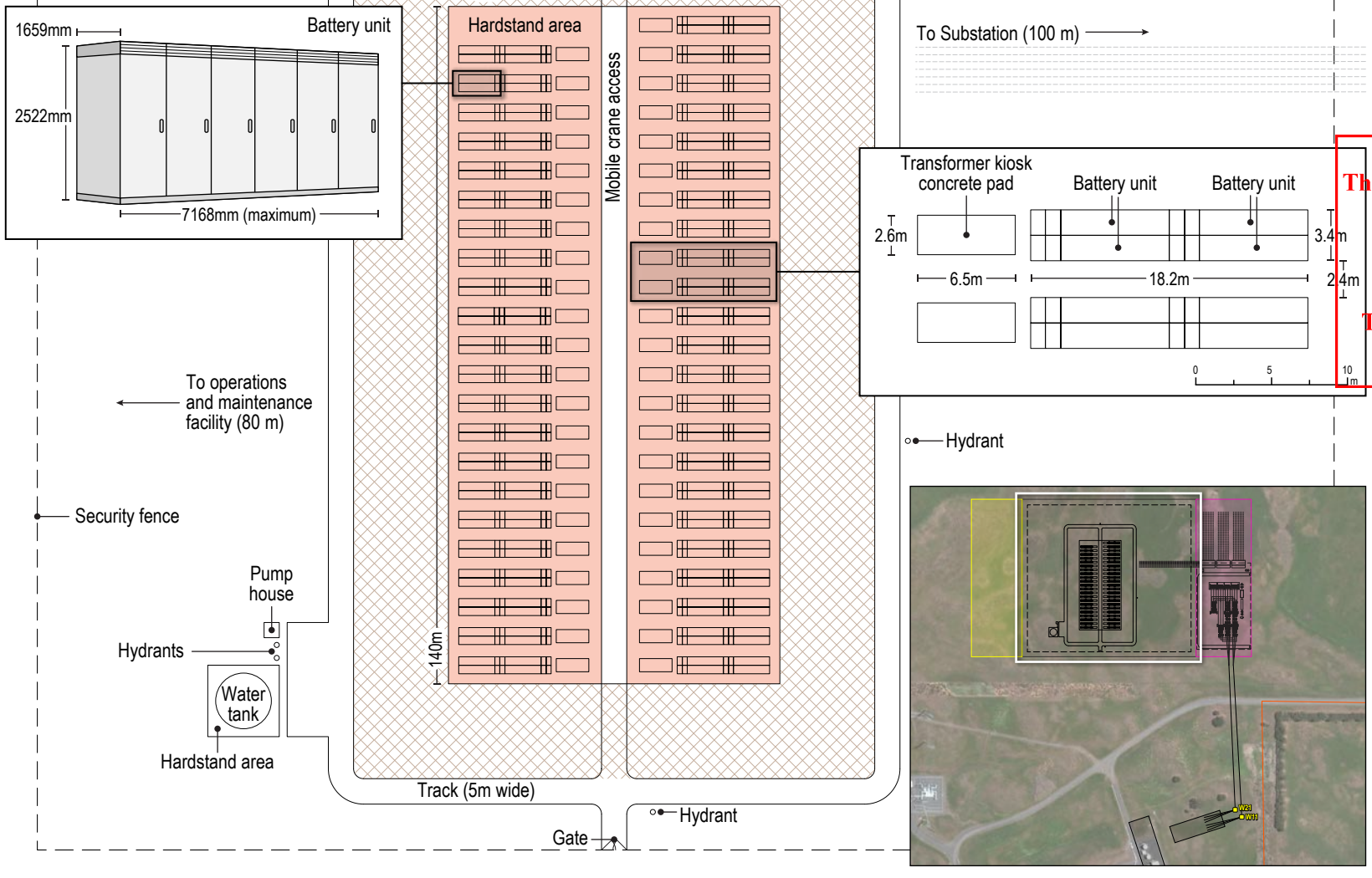
Figure 3-12
Example 30-megawatt battery system at Ballarat, Victoria

Source: https://www.energy.vic.gov.au/batteries-and-energy-storage)

Proposed battery energy storage system layout
FOR PLANNING PURPOSES ONLY

General notes:

1. The layouts are indicative only
2. 2.4m minimum front clearance required for maintenance access between battery units
3. If perimeter fence is proposed:
   a. Additional clearance required for battery unit door swing
   b. Gates required for maintenance to access the front of the battery unit and battery inverters
4. Water tank sized to hold a minimum of 288,000 litres
5. Battery dimensions are approximate. Actual dimensions may vary.



LEGEND

- Battery layout design
- Battery area
- Fire break (19 m)

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary and battery infrastructure from Wind Prospect.
Imagery from ArcGIS Online (various capture dates).

N

0 20 40 m

SCALE 1:1,250
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT
WILLATOOK WIND FARM

FIGURE 3.13

Battery energy storage system

DATE: 21.04.22 PROJECT: 754-MELEN287657 FILE: 287657_01_FXXX_GIS DOC REFERENCE: 287657_01_FIGS_E_APRX_V02 AI FILE: 287657_02_GRA096_V02

3.2.6 Operations and maintenance facility

An operations and maintenance facility would be built next to the on-site substation and battery energy storage system. It would require an area of about 1.3 hectares (nominally 70 metres by 220 metres), and include an office, storage and maintenance facility housed on a concrete base, with adjoining car parking. The facility would be occupied during normal office hours and potentially outside these hours at times, while the wind farm and battery energy storage system would be monitored remotely 24 hours per day, 7 days per week. A conceptual layout of the proposed operations and maintenance facility is shown in Figure 3-14.

The project is proposing a series of carparks adjacent to the site office shown in Figure 3-14. The car parking spaces would be provided to the responsible authority in accordance with Clause 52.06-6.

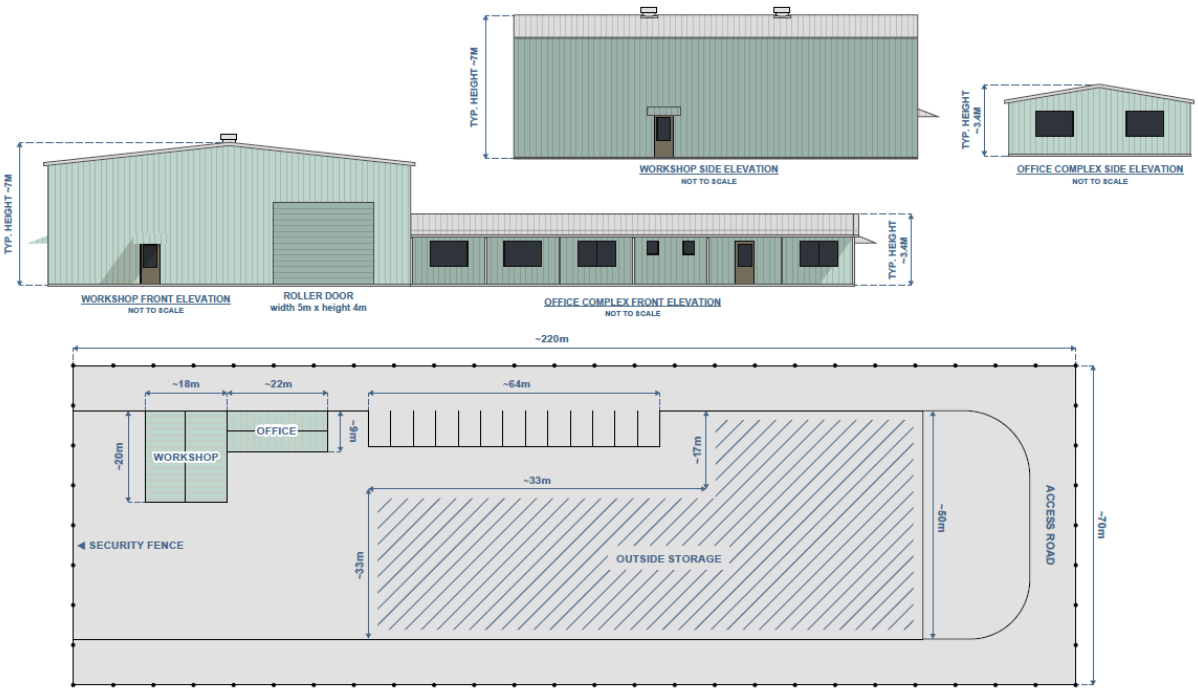


Figure 3-14 Conceptual operations and maintenance site plan

3.2.7 Meteorological monitoring masts

Up to three meteorological monitoring masts ('met masts') would be constructed around the edges of the project site and remain in operation for the life of the project. Each met mast would be a lattice tower, with a height equal to the wind turbine hub height (maximum height of 150 metres) and the indicative design shown in Appendix A. Equipment installed on the met mast would include anemometers and wind vanes at various heights to record the wind speed and direction, temperature and atmospheric pressure, and have prominent aviation markers to ensure visibility for any low flying aircraft, such as those used for crop spraying or firefighting. A single-lane access track roughly 3 metres in width would be constructed to provide access to each met mast. Figure 3-15 shows an example met mast and an associated equipment.

Figure 3-15
Meteorological monitoring mast

3.2.8 Temporary infrastructure components and layout

Quarry

The project includes the preferred option for a temporary on-site quarry. This would require a work authority (i.e., approval) from Earth Resources Regulation, a part of the Victorian Department of Jobs, Precincts and Regions.

The temporary on-site quarry would provide basaltic rock aggregate for construction, including tracks, hardstands, and the temporary construction compound. Aggregate may also be used for wind turbine foundations if the rock is of suitable quality. The quarry would be in the western part of the project site, east of Old Dunmore Road and about 4 kilometres to the north-east of Orford. The proposed quarry location and design avoids community, environmental, hydrological, cultural, biodiversity and geo-morphological constraints, and has gone through several iterations after feedback from stakeholders.

The alternate option to supply aggregate material for the project is to source material from nearby commercial quarries including the Tarrone Quarry, if the temporary on-site quarry is not approved or the cost of developing it proves to be prohibitive. The Tarrone Quarry is around 3.6 kilometres south-east of the project site boundary.

Construction site office and compounds

A main temporary construction compound and site office would be established during the enabling works and would be in the central part of the project site. The compound would be a fenced area of about 4 hectares. The temporary construction compound would consist of:

- cleared construction lay down areas
- temporary site buildings (site offices)
- ablution facilities
- site parking for vehicles and mobile plant
- storage of machinery and construction materials.

The construction site office would be staffed during normal office hours and would include a sign-in/sign-out area for visitors to the project.

Two additional temporary construction compounds, nominally 200 metres by 200 metres, are planned on the east and western sides of the project site. These hardstand areas would be established for the storage of wind turbine components and other equipment.

Staging areas

Temporary staging areas are those where components are placed on the ground in preparation for moving around the project site during construction. Their locations are dependent on detailed design and construction programming but would be selected to minimise the project footprint and to avoid environmental constraints and impacts.

Staging areas would be needed next to each wind turbine, construction compounds and access tracks for the storage and assembly of wind turbine components and equipment. The area allocated for hardstands and crane assembly areas would be used wherever possible to minimise the footprint and impacts, however in some instances dedicated staging areas will be needed.

Concrete batching plants

Three temporary concrete batching plants are proposed for the construction of the project and would be positioned to provide convenient access to all wind turbine locations. These plants are needed for the construction of wind turbine foundations and would also supply concrete for the construction of building foundations, the pad for the on-site substations and other project infrastructure. Each concrete batching plant would have a footprint of about 50 metres by 100 metres and would contain the concrete batching equipment, stockpiled materials, a cement silo, water tanks, a slump stand, washout facility and bunding for the containment of water runoff.

Washdown facilities

Washdown facilities or in some instances rumble grids would be installed at all access points from public roads and at crossing points between neighbouring properties. Each washdown facility would consist of a bunded area capable of retaining all excess water runoff as a result of any wash down activity.

3.3 Project phases

Subject to receiving all planning and environmental approvals, permits and consents, the construction of the project is estimated to take around two years. The earliest construction could commence is about early-mid 2024, with commissioning of the project in early-mid 2026.

The project consists of four discrete phases: pre-construction, construction, operation and decommissioning. These phases and associated activities are described in Table 3-2.

Table 3-2 Project phases

Project phase	Project activity
Pre-construction (12–18 months)	• Grid connection application made, and approval received • Geotechnical assessment • Tendering for wind turbine supply and construction, and balance of plant civil works • Discharge of planning conditions, including preparation of the Environmental Management Plan, Construction Method Statement and Traffic Management Plan, with production of other mitigation plans, as required • Financing and other commercial activities.
Construction (2 years)	• Enabling works, including project-specific local road upgrades, construction of site access points, temporary construction compounds and on-site quarry • Construction of access tracks and wind turbine hardstands • Construction of wind turbine foundations and installation of wind turbines • Installation of underground cabling, on-site substation and battery • Testing and commissioning of the wind farm • Maintenance of local road network in consultation with Regional Roads Victoria and Moyne Shire Council in accordance with the Traffic Management Plan • Removal of all temporary infrastructure from the project site, including the on-site quarry infrastructure and construction compound • Rehabilitation of the on-site quarry area and the wider project site.
Operations (25-30 years)	• Commencement of electricity export • Operation and maintenance of the project.
Decommissioning and rehabilitation (1 year)	• Removal of wind turbines and all other above ground equipment and infrastructure • Restoration of the project site in accordance with the Decommissioning Plan and in consultation with the relevant landowners, Earth Resources Regulation and Moyne Shire.

3.3.1 Construction

Construction of the project is anticipated to take around two years. Public road upgrades would start after completion of the detailed engineering design. Key site establishment activities will then include:

- establishing the on-site quarry to supply crushed rock
- delivery of key plant and construction vehicles
- construction of the initial access tracks required for the delivery of materials and goods for construction
- establishment of temporary concrete batching plant and temporary construction offices.

Next would be the civil works, which would include the construction of:

- the balance of internal access tracks
- wind turbine hardstand areas and footings
- underground cables
- on-site substation and battery facilities.

The final construction activities would involve wind turbine delivery, installation, demobilisation of key plant and rehabilitation of temporary construction areas and commissioning. Significant overlap between activities would occur, with site preparation and civil works, and wind turbine delivery and installation being completed on a rolling basis.

Construction hours of operation

EPA Victoria Publication 1834: *Civil construction, building and demolition guide* supports the civil construction, building, and demolition industries to eliminate or reduce the risk of harm to human health and the environment through good environmental practice. This guideline includes the working hours that should be applied to various activities. The project would be constructed in accordance with this guideline, with construction generally being carried out during the specified normal working hours:

- Monday to Friday, 7 am to 6 pm
- Saturday, 7 am to 1 pm.

Work outside these normal hours may be required for some activities, including:

- wind turbine installation, which is weather dependent
- concrete pouring, which may need to be completed during a fixed period and/or within specific temperature conditions
- transport of over-sized equipment, such as the wind turbine tower sections and blades, which is sometimes performed during lighter traffic periods (e.g., at night).

Work would be planned and conducted in consultation with the Responsible Authority and other relevant stakeholders and would be guided by EPA Publication 1834. The project's Noise and Vibration Management Plan would outline how activities are controlled and managed outside normal hours (see Section 7.2.1 *Noise and vibration*).

Construction workforce

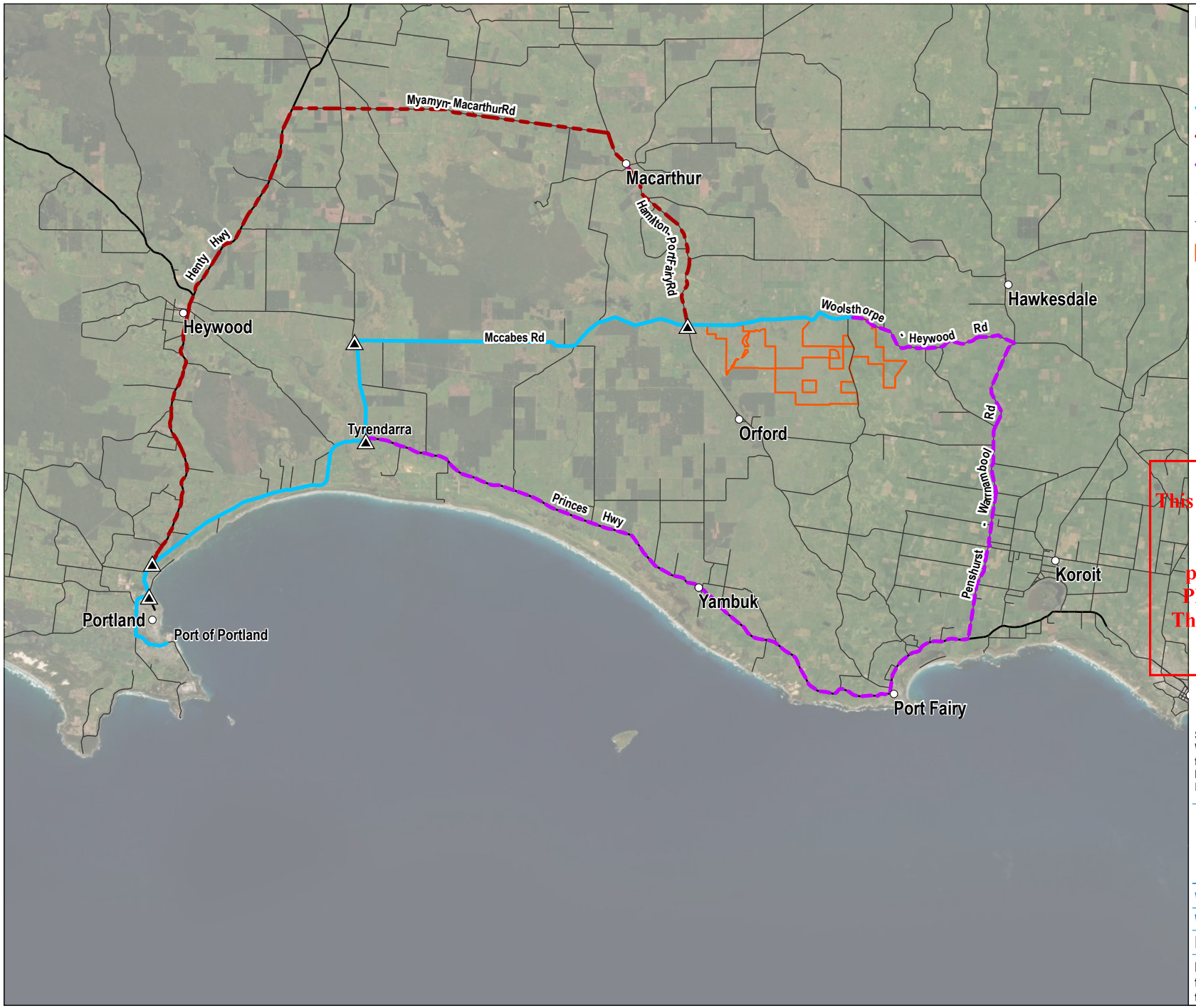
It is anticipated up to 180 direct and 290 indirect full time equivalent jobs would be created during construction, based on estimates in Appendix E – *Economic and social*. It is predicted that most of the construction workforce would be accommodated in the surrounding towns of Warrnambool, Port Fairy and Koroit.

Transport route

The wind turbine towers would be manufactured in sections and transported to the project site for installation. The tower sections, along with the wind turbine blades and other large project infrastructure, require specially planned transport routes.

The proposed over-dimensional route starts at Portland and ends at the various project site access gates after travelling along Woolsthorpe-Heywood Road from the west, as described in Section 7.5.2 of this report and detailed in Appendix F – *Traffic and transport*.

In consultation with Department of Transport and Moyne Shire Council, Option 1 (shown in Figure 3-16 below) has been identified as the preferred haulage route for the large turbine components as it is the shortest and most direct route between the Port of Portland and project site, avoids more highly trafficked roads and townships, and it is possible to undertake temporary works to facilitate the transport of the over size and over mass vehicles.



LEGEND

- Locality
- Intersections requiring upgrades
- Option 1
- Option 2
- Option 3
- Highway
- Arterial/Sub-arterial road
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary and haulage routes from Wind Prospect.
Roads from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 10 km

SCALE 1:400,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 3.16

Potential over size and over mass routes from the Port of Portland to the project site

DATE: 11.02.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F046_GIS DOC REFERENCE: 287657_02_FIGS_E_APRX_V01

Five intersections within the Moyne and Glenelg Shires along this route would need some roadside infill works, potential roadside furniture removal, native vegetation removal and traffic management works. The intersections are:

- Henty Highway/New Street, Portland
- Princes Highway/Henty Highway, Portland
- Princes Highway/Tyrendarra-Ettrick Road, Tyrendarra
- Tyrendarra-Ettrick Road/Woolsthorpe-Heywood Road, Homerton
- Woolsthorpe-Heywood Road/Hamilton-Port Fairy Road, Broadwater.

The proposed works would be finalised in consultation with the haulage contractor, Regional Roads Victoria and Moyne and Glenelg Shire Councils. A Traffic Management Plan would be developed before the start of construction to document the detailed requirements for safe transport of equipment and materials for the project with minimal disruption.

Other material that would be brought to the project site and the associated traffic impacts are described in Section 7.5.2.

Public road upgrades and site access

To facilitate the mobilisation of construction teams, equipment and project infrastructure to site, site access works would be needed at intersections along the over-dimensional access route (as described above) and at project site access gates. Local road upgrades would also be needed in some locations. Improvements to local roads would be completed as required in consultation with Regional Roads Victoria and Moyne Shire Council to ensure safe and efficient traffic movements (including that of the public).

Site access works required for the project would include:

- trimming some trees and shrubs at intersection upgrade locations and along some road sections to allow transport of over-dimensional project components
- intersection upgrades along the over-dimensional route and the local road network to enable safe access to the project site
- upgrades of local roads to accommodate over-dimensional vehicles and heavy vehicles and to allow safe turning into the project site by all vehicles, as needed
- construction of access gates from local roads onto private property.

Upgrades have been identified based on a theoretical maximum wind turbine blade length of 93 metres and a maximum tower base of between 5 and 6 metres.

Internal access tracks

Around 60 kilometres of internal access tracks would be needed for construction but would be left in place and maintained for use during project operation. Access tracks would be developed on private property, maximising the use of existing farm tracks, or being positioned next to existing fence lines where this is preferred by the relevant landowner. A number of access tracks would cross unnamed government roads known as ‘paper roads’, which are Crown land.

Internal access tracks would be established using heavy earthwork machinery to excavate these areas to a depth determined under the relevant standards, before laying a compacted gravel. Sediment and erosion control measures would be established during civil construction works.

Access tracks would have a final width of six metres and a minimum 30 metre turning radius. The construction footprint of access tracks would be 12 metres wide, within a 40-metre-wide corridor that has been surveyed by ecologists and heritage consultants (see Figure 3-17). The road base would be crushed rock aggregate sourced from the project’s on-site quarry or an existing commercial quarry. Rock excavated from wind turbine foundations and other infrastructure areas would also be used for the subgrade road base subject to meeting the relevant functional specification. Access tracks would be constructed to enable water to shed directly to table drains to avoid scouring, with drainage culverts built at determined flow paths informed by hydrological modelling.

The access tracks would be built to a standard which enables all weather access to the wind turbines and would satisfy the requirements of the CFA Guidelines (*Design Guidelines and Model Requirements for*

Renewable Energy Installations, 2022). The CFA Guidelines contain several provisions to enable access for fire vehicles, including minimum width, maximum grade and number of access points.

Twelve crossings of waterways (mostly tributary creeks and drains) would be needed for access across the project site. Although these have been minimised by appropriate siting of the access tracks, the proposed crossings are necessary to provide access to infrastructure and would prevent vehicles, including trucks from the quarry, being diverted onto public roads.

The construction footprint of the water crossings has been designed to avoid impacts to waterway flows and to protect the integrity of the waterway banks as much as possible. All waterway crossings and culvert and bridge designs would conform to relevant local guidelines and be approved by Glenelg Hopkins Catchment Management Authority before the start of construction.

Access track crossings of minor drains would be sized to accommodate the required design capacity, based on peak water velocity and depth estimates predicted by hydrological modelling (see Appendix G – *Hydrology and hydrogeology*). The exact design specifications to maintain water flow at each drainage line would be determined as part of the detailed design during the pre-construction phase.

The construction of water crossings would adhere to a project erosion and sediment control management plan, as well as the measures outlined in Appendix H – *Environmental management framework*, to enable the project to develop the necessary infrastructure in line with legislation, approval requirements and industry best practice.

Any works to cross waterways would be discussed with the landowners and relevant authorities. Permissions for waterway crossings, including permits for works on waterways from Glenelg Hopkins Catchment Management Authority, would be obtained before crossing works begun.

Final designs of waterway crossings would be refined during the detailed design when the balance of plant contractor is engaged, and the requirements of the crossing are better defined.

Figure 3-17
Typical internal access road

Wind turbine generator installation

The wind turbine foundation type would be determined after detailed geotechnical surveys are completed. The foundation type would be either be gravity or rock anchor foundations. The excavated area needed for both types of foundation would be about 27 metres by 27 metres, potentially requiring low-level blasting where firm rock is encountered. Blasting would be carried out by qualified specialists subject to relevant statutory requirements being met.

Gravity foundations would involve the excavation of ground material to a depth of 3.5 metres or more. Steel reinforcement is installed before concrete is poured into the excavated area in-situ and allowed to cure.

The wind turbine components would be delivered to the project site progressively using oversize/over-mass truck and trailer combinations. Erection of wind turbines is generally a two-stage process, with the base and first two tower sections lifted into place. This generally takes one day to complete. Once this has been completed various minor works are carried out before the remaining tower sections, nacelle, generator, hub and blades are lifted into place. This can take three days to complete depending on the weather conditions.

Construction typically involves the use of a small auxiliary 200 tonne crane for vehicle offloading and preliminary assembly. A larger main-lift crane, with about 1,000 tonnes of lifting capacity, and a 100-tonne trailing crane would be used to erect the wind turbines once preliminary assembly has been completed.

Hardstands would be surfaced with pavement material to the required load-bearing specifications.

Electrical cable reticulation

The project design provides for the undergrounding of electrical cabling wherever possible in response to feedback from stakeholders to minimise the visual impact, provide an important bushfire safety mitigation, and protect birds from accidental collisions.

Around 62 kilometres of trenches would be needed to bury the cables up to one metre below the surface. The only exception for underground cables is at two watercourse crossings (Shaw River and Back Creek) where it is proposed that cables would be run along-side the bridge structures.

Several parallel cables would be needed in each trench, the number of which would be confirmed during detailed design. It is possible that some of the strings (i.e., groups of wind turbines connected via a single cable route) can be merged to result in fewer, larger cables, resulting in a smaller total cabling trench length.

Once a trench has been excavated, bundled cables would then be laid within a bed of protective sand and warning tape added to alert the presence of electrical cables at the required depth. Trenches would then be backfilled and compacted with previously excavated material using a vibration plate compactor. On completion, the underground transmission lines may be marked with small marker posts.

It is estimated that this trenching would cause a seven-metre-wide surface disturbance area during construction, which would be rehabilitated to be consistent with the surround landscape. In certain locations, to avoid disturbance to infrastructure and environmental values on the surface, horizontal directional drilling or directional boring may be used.

Underground cables would cross several designated waterways, drainage lines, and public roads. There are a range of methods that would be used for these crossings. Proposed crossing methods for watercourses have been based on an assessment of the environmental, cultural heritage and technical constraints. Geotechnical conditions would influence the design of an appropriate crossing method, and these future investigations at specific sites would inform the final crossing method of each watercourse. All crossings of designated waterways would require a waterways licence from the Glenelg Hopkins Catchment Management Authority.

The three options for crossing watercourses, drainage lines and roads are:

- Open cut excavation: For this method, the trench is excavated through the feature, which involves excavating soil to form a trench, enabling new infrastructure to be laid/ repaired/ removed, and is then backfilled. This method is typically employed on minor watercourses and local roads. Where this method is used to cross a local road, one lane or a deviation is always kept open for emergency vehicle access. Where this method is used to cross watercourses, the water (when flowing) is diverted around the excavation to ensure stream flows are maintained.
- Directional boring: This method involves a small tunnel being drilled through soil enabling new infrastructure to be laid. Provided there are suitable geotechnical conditions, this method can limit disruption to the watercourse bed and banks. To enable a directional boring to occur, sumps or bell holes are excavated either side of the feature. The boring machine is placed in one sump and then drills under the feature to the other sump.
- Aboveground conduits: It is proposed that cables would be run along-side the proposed bridges/culverts on Shaw River and Back Creek. These would be designed in accordance with electrical standards to ensure protection from debris and flooding.

Final designs of waterway crossings would be refined during detailed design when the balance of plant contractor is engaged, and the requirements of the crossing are better defined.

On-site substation and battery energy storage system

The on-site substation and battery areas would be cleared and then excavated to the depth required. Reinforced concrete foundations would then be constructed to support electrical infrastructure and buildings. Infrastructure required within these yards would include transformers, switchgear, power conditioning equipment, energy storage technology, switch room, cabling and backup generators.

The on-site substation would be designed and constructed in accordance with relevant technical, electrical, and planning standards and in consultation with relevant stakeholders. On-site trafficked areas would be limited to the site entrance and surrounding the switch room and control building. The electrical compound areas would be finished with coarse gravel.

Temporary facilities

Temporary buildings and facilities would be needed for construction personnel and equipment. Within each temporary construction compound (three in total), a portable site office, amenities and parking bays would be established. Rock crushing and batching plant facilities and staging and storage areas for plant, equipment and wind turbine components would also be established. Arrangements would be made for power, potable water, and communications at the site office during the construction period.

Concrete batching plants would be developed and operated in accordance with EPA Victoria Publication 1806: *Reducing risk in the premixed concrete industry*. The concrete batching plants would be decommissioned and removed at the end of the construction phase, and the land would be rehabilitated and returned to the landowners.

3.3.2 Operation

Wind turbines start to generate energy at wind speeds of around 3 metres per second (or 11 kilometres per hour). This is known as the cut-in wind speed. The output increases in a linear trend with increasing wind speed until the wind reaches 13 to 14 metres per second (or 47 to 50 kilometres per hour). At that point, the power is regulated at rated power (i.e., 6 megawatts if using the nominal rated capacity of a 6 megawatt wind turbine). If the average wind speed exceeds the maximum operational limit (about 25 metres per second, or 90 kilometres per hour), the wind turbine is shut down and the blades are feathered (i.e., locked in a set position).

During periods of operation, wind turbines generate noise and shadow flicker. The project is required to operate within regulated limits and to demonstrate compliance via predictive modelling and on-ground monitoring. See Section 7.2.1 for further details on these aspects.

Once the wind turbines are in operation, the project would be monitored by both on-site staff and remote monitoring. Around nine staff, mostly involved in technical maintenance, would be located on-site. These on-site staff and specialised contractors would carry out routine and responsive operation, maintenance and repair activities.

The site office would be occupied during normal office hours, except when required to respond to unplanned equipment failures that may occur outside these hours. Remote monitoring would occur via control systems to monitor the performance and control the operation of the wind turbines. Major planned servicing of the wind turbines would be carried out about twice per year. This would involve additional on-site staff to undertake these works.

Light vehicles and small trucks would travel from the site office and maintenance yard to individual wind turbines and substation, mostly via internal access tracks. Large vehicles may occasionally deliver replacement wind turbine components to the project site and a crane may be needed to install them.

3.3.3 Decommissioning and rehabilitation

The wind turbines would have an operating life of around 25 years, at which stage there are three main options for consideration:

1. Continue to use the project site as a wind farm using the existing wind turbines potentially with some refurbishment and subject to their condition at that time.
2. Replace the existing wind turbines with more modern wind turbines and continue to operate the wind farm.
3. Decommission the project by removing all above ground infrastructure and rehabilitating hardstand areas and access tracks (except where landowners want them retained for their farm operations) so the land can be returned to agricultural use.

The decision on whether to refurbish or replace the wind turbines would be subject to an assessment of the economic viability closer to the time, and in consultation with the landowners and approval authorities. Long-term leases have been entered into with landowners with stringent decommissioning obligations. Ongoing fees are payable to landowners until decommissioning is properly completed, providing a strong incentive for this to occur once the wind farm ceases operation.

Decommissioning activities would result in similar potential impacts to construction activities and is expected occur over a period of 6 to 12 months. Decommissioning activities would involve large equipment (e.g., cranes, excavators and graders) and the transport of large project components from the site (e.g., wind turbine towers and blades). The environmental management framework (Appendix H) includes requirements to manage the decommissioning of the project in a way that mitigates and manages any associated impacts.

Most above ground components of the project can be recycled at the end of their life, including the steel towers and copper contained within each wind turbine. The ability to recycle some wind turbine components, including blades, is expected to be significantly improved (technologically and economically) by the time decommissioning of wind turbines is required.

Upon decommissioning, below ground infrastructure, including wind turbine foundations and underground cables, may be left in situ and covered with at least 500 millimetres of clean fill material. The ground surface would be rehabilitated to reflect the natural surface that existed pre-development and to avoid soil erosion. A map of below ground infrastructure would be provided to each landowner hosting wind farm infrastructure.

Non-stakeholder landowners and the local community would be engaged with to address any issues, minimise impacts and maximise benefits. This community engagement would occur whether the decision is to refurbish, replace or decommission at the end of the project's operating life.

Chapter 4

Design response influences

The design response for this project developed through a long evolution influenced by a range of factors including the preliminary findings of specialist consultants, changing legislation, and input from community and other stakeholder engagement. This chapter describes the evolution of the project from these influences.

4.1 Design response

The project has been designed in response to the various site opportunities and constraints. The design of the project has evolved since its inception in 2009.

The design has evolved from assessing various wind turbine models, designing numerous wind turbine layouts, and assessing different site access and transport routes.

Avoidance and minimisation of impacts has been central to the development of the project. The approach has been to firstly avoid potential impacts, if possible, then to minimise the severity of the impact over space and time. Figure 4-1 outlines the process used to refine the project design.

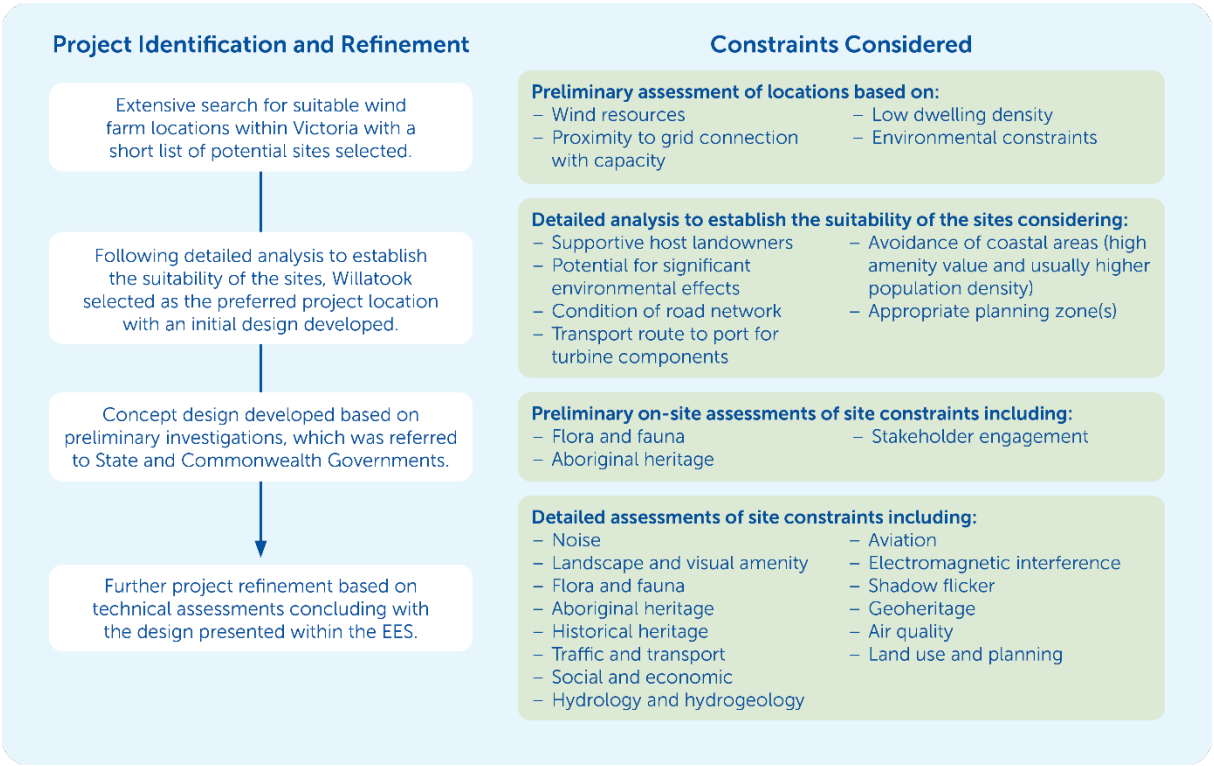


Figure 4-1 Project identification and refinement

Key criteria driving the design development include:

- Wind speed – sufficient electricity generating potential is a fundamental requirement for any wind farm and therefore wind speed is a core element of the project design. Optimising the conversion of wind energy to electricity is influenced by the positioning and spacing of wind turbines.
- Access to land – contracts were completed with landowners that agreed to participate in the project, enabling a wind farm to be developed on their land.

- Constraints – there are a range of constraints that must be considered including:
  - the location of existing dwellings
  - potential noise and shadow flicker
  - historical and Aboriginal cultural heritage within and near the project site
  - patches of native vegetation on the project site, including the DELWP mapped wetlands
  - fauna habitats such as the nationally listed Growling Grass Frog (*Litoria raniformis*)
  - geology and geomorphology of the land
  - visual sensitivity of the landscape.

Known sensitive areas with constraints and buffers incorporated into the design are listed in Table 4-1.

Table 4-1 Sensitive areas and constraints

Sensitive areas	Potential impact or risk	Design response
Dwellings	The Victoria Planning Provisions prevents wind turbines being sited within 1 kilometre of a dwelling without the written consent of the owner of that dwelling.	A buffer of at least 1.5 kilometres has been applied to all non-stakeholder dwellings, and a buffer of 2 kilometres to some non-stakeholder dwellings in response to feedback.
Neighbouring property boundaries	There is the potential for the wind turbine blades to overhang into the airspace above neighbouring properties or adjoining public land.	A 100-metre buffer has been applied around the perimeter of the site to prevent wind turbine blade overhang into the airspace above neighbouring properties or adjoining public land.
Townships	There is usually an increased density of dwellings in townships and therefore an increased potential for adverse impacts.	A 3-kilometre buffer was applied to all Township Zones as defined in the Victoria Planning Provisions to minimise potential impacts to township residents.
Aboriginal cultural heritage sites and places	Aboriginal cultural heritage sites and places could potentially be impacted. One existing registered Aboriginal site was identified and assessed by experts and areas of Aboriginal cultural heritage sensitivity were extensively surveyed uncovering one additional Aboriginal site for registration.	All existing and newly identified registered Aboriginal sites have been buffered to avoid any impact. Areas of potential Aboriginal cultural heritage sensitivity defined by heritage specialists were buffered to avoid potential impact. See Section 7.4 *Heritage* and Appendix C – *Aboriginal Cultural Heritage Impact Assessment*.
Brolga breeding habitat	Nesting and foraging Brolga could potentially be disturbed by the construction and operation of wind turbines. There is also a risk of collision if wind turbines are operating too close to where Brolgas are active.	Buffers have been developed by technical experts for potential Brolga breeding and roosting habitats. For a rationale for the buffering method see Section 7.3.4 and Appendix Q - *Brolga*.
Native vegetation, threatened flora species and habitat for listed fauna species	The removal of native vegetation in the form of Ecological Vegetation Classes (EVCs), EPBC Act listed ecological communities and FFG and EPBC Acts threatened flora species should be avoided and minimised.	Vegetation has been mapped and ground-truthed and several specific habitats for threatened species also defined and mapped (e.g., Growling Grass Frog). This mapping provides the basis for avoidance and minimisation of impacts throughout the design process. See Section 7.3.3 and Appendix P - *Biodiversity* .
Wetlands	Wetlands are important for a variety of threatened flora and fauna and are often locations with higher probability of Aboriginal heritage sites and hold intangible values to Aboriginal people.	A 100-metre buffer was applied around mapped wetlands on the Victorian wetland inventory to limit potential impacts to these areas.

Sensitive areas	Potential impact or risk	Design response
Watercourses	Watercourses and riparian zones are important for a variety of threatened flora and fauna, are often locations with higher probability of Aboriginal heritage sites and hold intangible values to Aboriginal people.	Crossings of watercourses by access tracks and cable routes have been minimised as part of the design process and watercourses have been buffered as follows to avoid impacts: • 100 metre buffer applied to watercourses (excluding drainage channels) • 30 metre buffer applied to drainage channels. Where watercourse crossings are needed, further mitigation has been developed. See Section 7.3.1 and Appendix G – *Hydrology and hydrogeology*.
Potential groundwater dependent ecosystems (GDE)	GDE's could be affected by impacts to groundwater caused by the construction of infrastructure that interferes with groundwater flows. These could include the construction of trenches and the construction of wind turbine foundations.	Potential GDE's have been identified from the Bureau of Meteorology GDE Atlas and buffers applied as follows: • 100 metre buffer applied to potential aquatic groundwater dependent ecosystems. • 25 metre buffer applied to potential terrestrial groundwater dependent ecosystems
Existing powerlines	Project infrastructure could interfere with existing powerlines if placed too close.	Existing powerlines were buffered as follows to minimise potential interference: • 500 kilovolt transmission line buffer easement width plus 200 metres = 230 metres • 66 kilovolt distribution line buffer is easement width plus 100 metres = 115 metres • 22 kilovolt distribution line buffer is easement width plus 100 metres = 110 metres • 12.7 kilovolt distribution lines are not buffered.
SEA Gas pipeline	The SEA Gas pipeline that traverses a portion of the site is a significant part of the regional energy network. Project infrastructure could interfere with the SEA Gas pipeline if not appropriately buffered.	The SEA Gas pipeline has been buffered by 453 metres, approximately 3 times the maximum hub height in accordance with a request by the owners and operators of the SEA Gas pipeline.
Roads	Project infrastructure could interfere with existing roads.	To avoid potential interference to existing roads: • a 100-metre buffer has been applied to public roads • a 25-metre buffer has been applied to access roads on Crown Land (also known as paper roads).
Local airstrips	Wind turbines have the potential to impact the operation of local airstrips.	Buffers are applied to local airstrips based on Civil Aviation Advisory Publication CAAP 92-1(1), guidelines for aeroplane landing areas and advice from an expert aviation consultant. See Section 7.5.1 *Aircraft safety* and Appendix O – *Aviation Impact Assessment*.
Communications links	Wind turbines could interfere with communications links if they are not appropriately buffered.	A single point to point communication link crosses the site therefore a buffer was applied, as recommended by an expect consultant in consultation with the operator of the link, as follows: • 20 metres plus rotor radius (95 metres) + 20 metres uncertainty (total 135-metre buffer). See Section 7.2.2 of this report and Appendix M - *Electromagnetic Interference*.

The sensitive areas and constraints have been mapped within and around the project site, defining areas that can and cannot host wind turbines (Figure 4-2). The project layout was then determined through various considerations including avoidance of sensitive areas.

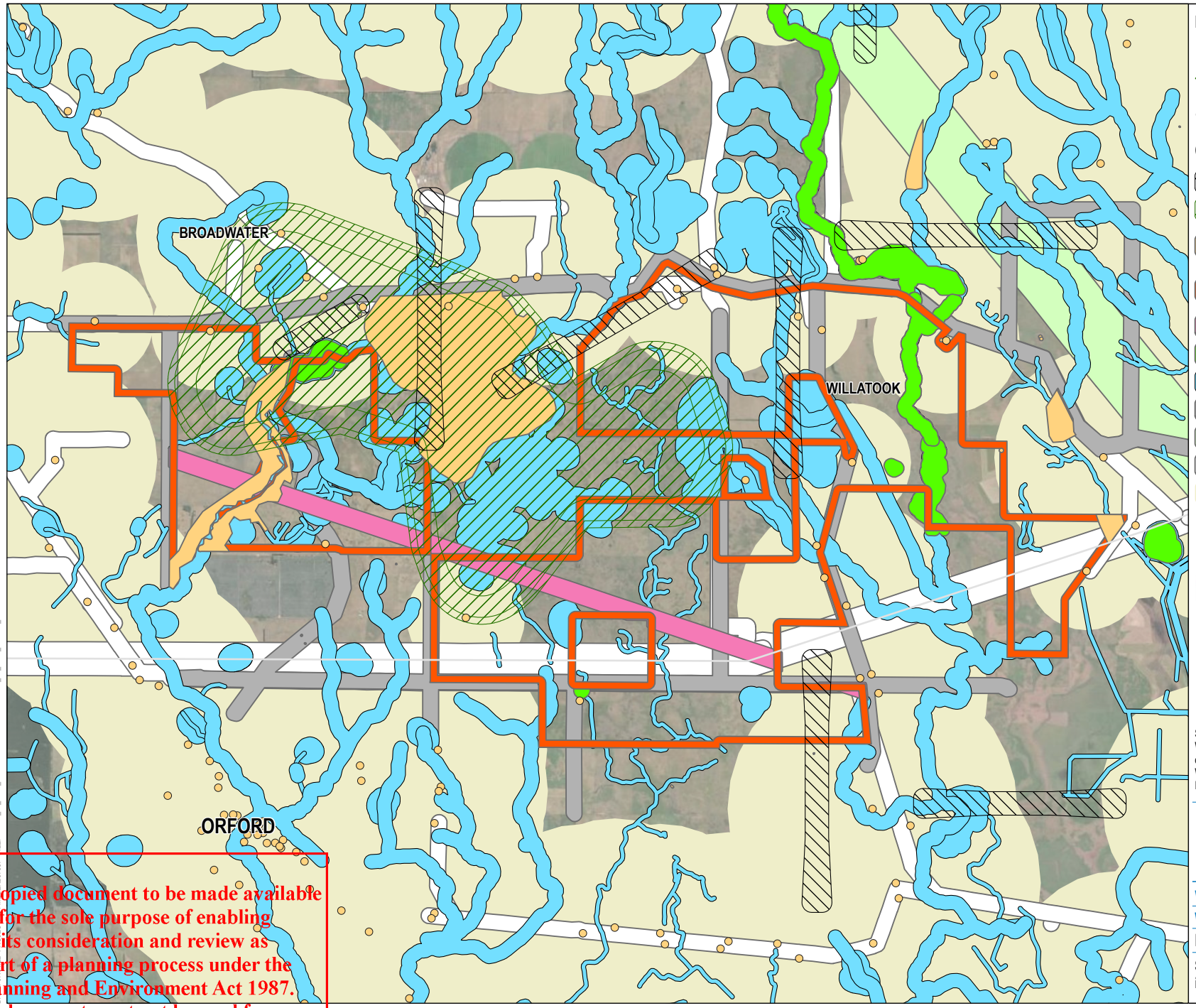
Another influence on the project layout was the community consultation and feedback regarding the project. Extensive community engagement has occurred since 2010. A summary of the engagement activities for the project is included in Appendix I – *Community Engagement Summary*.

Engagement has also been shaped by *Community Engagement and Benefit Sharing in Renewable Energy Development: A Guide for Renewable Energy Developers* (Lane and Hicks, 2017) and the updated guideline published by DELWP in late July 2021 (*Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria: A Guide for Renewable Energy Developers*). Both documents provide guidance to renewable energy developers about to how to carry out best practice community engagement and develop a benefit sharing program.

Other guidance documents considered included:

- *Policy and Planning Guidelines for the Development of Wind Energy Facilities in Victoria* (Policy and Planning Guidelines) (DELWP, 2021f)
- *Best practice charter for Renewable Energy Developments* (Clean Energy Council, 2021)
- *Environment Effects Act 1978: EES Consultation Plan Advisory Note* (DELWP, 2018)
- *Community Engagement Guidelines for the Australian Wind Industry* (Clean Energy Council, 2018).

Communities, groups and individuals within three kilometres of proposed wind turbine locations were initially identified as 'near neighbours' for more focused engagement. When the size of the proposed wind turbines increased and best-practice standards for engagement changed, the distance for identifying near neighbours was extended to six kilometres. All near neighbours within six kilometres of proposed wind turbines have been kept informed and provided with the opportunity to get involved via newsletters, doorknocks and other forms of engagement.



LEGEND

- Dwellings
- SEAGas pipline
- 500kV Moorabool-Heywood transmission line

Constraints

- Local airstripes
- Proposed brolga buffer
- Aboringinal cultural hertiage sites and places
- Willatook Wind Farm Boundary buffer
- Communication links
- EPBC listed habitat
- Wetlands and watercourses
- Public roads
- SEAGas pipline
- Powerline easement buffer
- Dwelling and township

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, turbine locations and constraints from Wind Prospect.
Wetlands from DELWP.
Imagery from ArcGIS Online (various capture dates).

N

0 2 km

SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 4.2

Sensitive areas and constraints incorporated into the project design

4.2 Stakeholder engagement

The project layout has evolved from the analysis of the site opportunities and constraints as well as the feedback from stakeholders regarding the project. Extensive engagement has been undertaken with relevant authorities and stakeholders to inform the technical assessments which accompany this planning application.

Each of the technical studies carried out for the project has included engagement with key stakeholders. Table 4-2 summarises the engagement carried out to help inform the technical studies.

Table 4-2 Engagement in relation to technical studies

Technical study	Stakeholders	Form of engagement
Flora and fauna	• Birdlife Australia • Brolga Recovery Group • Friends of Pallisters Reserve Inc • Landowners and near neighbours • Local community • DELWP • Technical Reference Group • Australian Bluegum Plantation • Basalt to Bay Landcare Network	• All landowners and near neighbours (including absentee landowners) and the local community, which includes the owners of land within 10 kilometres of a proposed wind turbine, were invited to share local knowledge (particularly in relation to Brolga) through an interview and survey carried out by ecologists. • Flora and fauna consultation interviews and surveys took place at the Willatook Hall between 3 and 7 December 2018 and were attended by 26 local community members. Follow-up calls were made on 4 and 6 Feb 2019 to capture 11 other local community members. Friends of Pallisters Reserve Inc and the Australian Bluegum Plantation also took part in this interview process. • DELWP (Barwon South West) was engaged intensively throughout the development of the project, particularly between 2019 to 2021. • Basalt to Bay Landcare Network engaged in a survey during the Orford information session on 24 July 2019. • Birdlife Australia were consulted as part of the specialist assessment for the project. • The Brolga Recovery Group are a key interest group and have been provided with project updates.
Landscape and visual	• DELWP • Moyne Shire Council • Near neighbours • Technical Reference Group	• Feedback from Moyne Shire was provided about the landscape and visual assessment, particularly about cumulative effects. • Neighbouring landowners that have been identified as potentially having visual impacts from their dwellings have been contacted and offered an in-person visual impact and mitigation options assessment, which were completed in March 2022.
Noise	• Environment Protection Authority Victoria • Near neighbours • Moyne Shire Council • Technical Reference Group	• Background noise monitoring locations arranged in consultation with neighbouring residents with preference being given to locations with the highest predicted noise levels. • Consultation with near neighbour and local community attendees at the information sessions, where a demonstration was set up to provide an opportunity to hear wind farm sound levels at different distances from a wind farm.

Technical study	Stakeholders	Form of engagement
Aboriginal cultural heritage	• First Peoples – State Relations Group (formerly Aboriginal Victoria) • Gunditj Mirring Traditional Owners Aboriginal Corporation / Eastern Maar Aboriginal Corporation Registered Aboriginal Parties • Unsuccessful Registered Aboriginal Party applicants: Framlingham Aboriginal Trust, Ella Maar Aboriginal Corporation • Technical Reference Group	• Background review (desktop assessment), field surveys (standard assessment) and subsurface excavations (complex assessment). • The most intensive subsurface work was conducted in 2010 with additional testing conducted in August and November 2017. • Further investigations were conducted with the Eastern Maar Aboriginal Corporation at the proposed on-site quarry location during April and June 2021.
Historic heritage (non-Aboriginal)	• Heritage Victoria • Moyne Shire Council • Landowners • Technical Reference Group	• A Notice of Intention to survey was submitted to Heritage Victoria in 2009, with the site being surveyed in 2010. • An additional historical heritage survey was completed in February 2020. • Heritage Victoria and Moyne Shire Council have also been consulted through the Technical Reference Group. • Historic heritage identified within the project site has been discussed during the survey process with the relevant landowners on whose land the heritage is located.
Traffic	• Landowners and near neighbours • Moyne Shire Council • Regional Roads Victoria • Department of Transport • Technical Reference Group	• Consultation and feedback from the Department of Transport about the proposed wind turbine component haulage route in August 2021. • Consultation from Regional Roads Victoria about traffic generation profiles and suggested measures for the Traffic Management Plan in August 2021. • Feedback from Moyne Shire was provided about the traffic and transport assessment focussing on the use of local roads, road upgrades and recommended management measures. • Information on school bus and regional bus routes provided by the Department of Transport in August 2021.
Aviation	• Aerial Agricultural Association of Australia • Air Services Australia • Department of Defence • Country Fire Authority (CFA) • Civil Aviation Safety Authority • DELWP • Landowners and near neighbours • Royal Australian Air Force • Warrnambool Airport and Warrnambool Regional Airport Reference Group	• Wind Prospect has met with the owner of Warrnambool Airport (Warrnambool City Council) and the Airport's Reference Group to provide feedback on, and discuss the potential aviation impacts of, the project and suggested mitigation measures. • Landowners and near neighbours with local airstrips have been consulted in relation to the project and the potential impact on aerial applications. • As part of the aviation assessment (Appendix O), the technical consultant consulted with government, private and community stakeholders with an interest in aviation and aviation-related safety.

Technical study	Stakeholders	Form of engagement
	• Technical Reference Group	
Surface water and groundwater	• Landowners • Moyne Shire Council • DELWP • Glenelg Hopkins Catchment Management Authority • Southern Rural Water • Technical Reference Group	• Wind Prospect and the technical consultant met with Moyne Shire Council and Glenelg Hopkins Catchment Management Authority to discuss the potential impacts of the project on surface water and groundwater. • Southern Rural Water were contacted by telephone on several occasions to discuss the potential impacts of the project on groundwater, with specific reference to the proposed on-site quarry, which is likely to encounter groundwater.
Social and economic	• Landowners • Near neighbours • Businesses • Moyne Shire Council • DELWP • Technical Reference Group	• Engagement with landowners and near neighbours, planned and run by a local independent consultant, has provided feedback relating to the social and economic issues, concerns and benefits associated with the project. • Feedback has led to the development of the Neighbour Benefit Sharing Program, which has been put in place to provide neighbouring residents with an ongoing, annual financial benefit from the project.
Electromagnetic interference	• AusNet Services • Aussie Broadband • Australian Communications and Media Authority • BAI Communications • Emergency Services • Optus Networks • NBN • Powercor • Telstra • Technical Reference Group	• Emails and letters were sent to communications providers and emergency services seeking feedback about potential electromagnetic interference impacts from the project. • BAI Communications provided a report on the potential impacts on their services. • The technical consultant reviewed the Australian Communications and Media Authority database of communication infrastructure and services in the area as part of their electromagnetic interference (Appendix M).

Other community engagement has occurred for the project. There is also Neighbour Benefit Sharing Program proposed for the project (Appendix R). A summary of all the engagement of this project is included in Appendix I - *Community engagement summary*. This section outlines this community engagement that has been undertaken and details of the Neighbour Benefit Sharing Program.

Community and stakeholder engagement started in 2010 during the project feasibility stage and included the distribution of newsletters to dwellings within 1ten kilometres of the project. A neighbour doorknock of properties was carried out within three kilometres of the project site and local organisations and businesses were contacted to let them know about the project. A community engagement committee with local representatives was established around that time by the Moyne Shire Council.

During 2014, the development of the project was slowed considerably due to policy uncertainty. Due to the absence of substantial activity to share, stakeholder engagement activities were less frequent during this time, however the community engagement committee has continued to meet since 2010. Community engagement and stakeholder consultation activities increased in 2017 when development activity ramped up.

After the referral of the project to the Victorian Government in September 2018, the Minister for Planning determined that an EES was the appropriate assessment pathway for the project. At the start of the EES process a Technical Reference Group was established by DELWP to advise on the scoping and adequacy of the EES impact assessments and chapters. Consultation and engagement with the Technical Reference

Group has occurred throughout the EES process, up until lodgement for exhibition. Continued engagement with the local community also occurred throughout the EES process and consisted of open days, a shop front at Koroit and doorknocks at dwellings within six kilometres of proposed wind turbine locations.

The coronavirus (COVID-19) pandemic impacted the ability to carry out in-person engagement activities throughout much of 2020 and 2021. However, during this time, a virtual presence was maintained through the project website, email and phone, updates provided to the community engagement committee, and project update newsletters were distributed in June 2020, April 2021, September 2021 and March 2022. Virtual community engagement committee meetings were held in August and December 2020, March 2021, August 2021 and February 2022, with one in person meeting in May 2021.

Engagement activities are summarised in Figure 4-3.

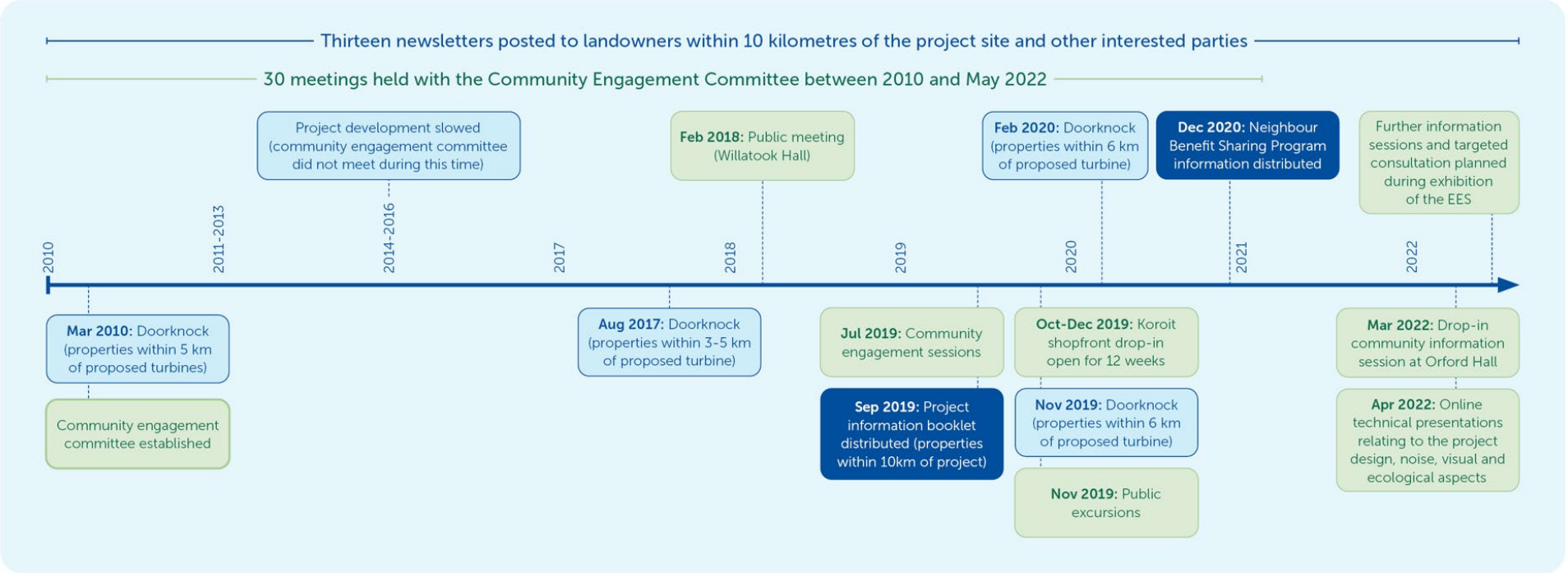


Figure 4-3 **Engagement activities**

Responses to the key issues and concerns raised by stakeholders during the engagement activities (outlined in

Figure 4-3) are summarised in

Table 4-3.

Table 4-3 Summary of responses to key issues and concerns raised by stakeholders

Key issues raised	Response
Noise	
Concerns about noise associated with the operation of the project, including cumulative impacts from the Macarthur Wind Farm.	• The project has been designed to a maximum sound level of 40dBA90, measured at neighbouring dwellings and allowing for the existing nearby Macarthur Wind Farm, in compliance with the New Zealand Standard NZ6808:2010. Acoustics – Wind Farm Noise as required by Victoria Planning Provisions. • Modelling has been completed and compliance is achieved using both the CONCAWE and ISO 9613 modelling methods. Both methods were used to determine the most conservative noise predictions. • A noise and vibration impact assessment was prepared by acoustic specialists Sonus as part of the EES process to assess potential construction and operational noise and vibration impacts, including cumulative effects, and to identify measures to manage potential impacts at sensitive receptors (Appendix J). • Information sessions were held on 23 and 24 July 2019 at the Willatook and Orford halls, respectively. During these sessions, the technical acoustic specialist was present to answer questions from the local community relating to noise and vibration. Maps were available to enable attendees to identify the location of their dwelling and the distance from proposed wind turbine locations. Outside the halls, a wind farm noise simulation was set up to enable attendees to experience wind farm noise from different distances from a wind farm and level of sound that could be expected to be heard. • An information sheet and presentation on noise is available on the project website. This provides answers to frequently asked questions about potential noise impacts. Posters displayed at the 2019 information sessions were also bound into a booklet and mailed out to the local community (i.e., the owners of land within 10 kilometres of a proposed wind turbine location). This comprehensive information booklet is also available online. • An independent peer review of the noise and vibration impact assessment was conducted by an independent acoustic specialist (Resonate) (Appendix J to assess whether the methodology and assessment conducted in the acoustic impact assessment is a complete assessment of the potential impacts of the project. • A detailed Noise and Vibration Management Plan would be prepared for the project in addition to the pre- and post-construction noise assessments. This Plan, which would be approved and endorsed by the responsible authority, would detail procedures to be followed if any noise complaints are received (as required by the Environment Protection Regulations 2021).
Visual and landscape impacts	
Some local residents, particularly around the north-east area of the project site, raised concerns that with existing and proposed neighbouring wind farms, there will be too many wind turbines and overhead powerlines visible in the local area that could change the character of the	• The project is undergrounding the internal cabling routes in response to concerns raised by local residents and Moyne Shire that overhead powerlines would cause significant visual impacts and potential safety risks. • The approximately five kilometres of previously proposed overhead transmission line, connecting the on-site substation to the Tarrone Terminal Station, has been reduced to about 300 metres. This is partly in response to Moyne Shire Council's motion that transmission lines be undergrounded for all future wind farm projects in the Shire (March 2019), and concerns from local residents and other stakeholders about the visual impact and potential safety risks associated with overhead powerlines. • Four wind turbines were removed from the south-west section of the project site to provide a larger buffer of the Orford township as a proactive design measure, creating a three kilometre buffer. The project has also reduced the maximum number of wind turbines from 99 in 2017 to 59 in this EES. • The Hawkesdale township is more than 10 kilometres from the closest project wind turbine.

Key issues raised	Response
area, making it more of an industrial landscape.	• A 1.5-kilometre turbine-free buffer of neighbouring landowner dwellings has been proactively put in place, in excess of the one kilometre buffer required under the Victoria Planning Provisions. A two kilometre turbine-free buffer has been put in place at some non-involved landowner dwellings in direct response to feedback from those neighbouring residents. • The opportunity to have potential visual impacts assessed was available to the owners of all near neighbour properties and was specifically offered to any near neighbour that raised concerns about potential visual impacts. • Photomontages depicting what the project would look like once constructed were prepared for eight near neighbours in 2010 and 2011, and for two near neighbours in 2017, from locations of their choosing. The intent was that the photomontages would aid consideration of potential visual impacts and inform further discussion. Photomontages depicting what the project would look like from publicly accessible locations in the local area were displayed at information sessions in July 2019 and March 2022. • A landscape and visual impact assessment (provided in Appendix K) was conducted by specialists as a part of the EES process to assess potential landscape and visual impacts (including via new photomontages), and to identify measures to manage potential impacts at sensitive receptors. The findings of this assessment are presented in Appendix K – *Landscape and visual*.
Damage to roads	
Some local residents and Moyne Shire Council raised concerns that construction of the project could damage roads and create safety risks.	• A temporary on-site quarry has been incorporated into the project design to internalise traffic and reduce the number of vehicles travelling between external quarries and the project site. • A traffic and transport impact assessment (provided in Appendix F) was conducted by specialists as a part of the EES process to assess potential impacts on the local road network, including an assessment of the existing road conditions. The results of this assessment are summarised in Appendix F – *Traffic and transport*. The assessment identified roads requiring upgrading to allow for the construction of the project, and developed management measures to ensure the project leaves the local road network in an equivalent or improved state than before construction starts. • A condition assessment of the road network would be done before construction starts and again after construction is completed to ensure the road network is remediated as agreed with Regional Roads Victoria and Moyne Shire Council. • A detailed Traffic Management Plan would be developed in consultation with, and endorsed by, the responsible authority before the start of construction.
Property values	
Some local residents are concerned the project will devalue their properties and consider their properties to be 'their super'. That is, the sale of their properties would fund their retirement.	• Wind Prospect offered to provide available research about the potential impact of wind farms on property values to local residents and offered to discuss options for benefit sharing. A summary of research available was displayed at the information sessions in July 2019 and included in the booklet posted to landowners within 10 kilometres of proposed wind turbine locations. • Anecdotally, numerous sales have occurred of landowner and near neighbour properties in recent years, including properties adjoining or very close to the project site as well as many properties within the project site. There has been no indication the project has impacted the contract price or level of interest in any of those properties. While the project has not yet received planning approval, it has been publicly known for more than a decade. Sales have occurred when there has been active communication about the project. • An economic and social impact assessment (provided in Appendix E) was conducted by specialists as part of the EES process to assess potential social and economic impacts and identify management measures to reduce potential negative impacts and capture positive effects. • A substantial Neighbour Benefit Sharing Program has been developed that aligns with DELWP's *Community Engagement and Benefit Sharing in Renewable Energy Development: A Guide for Renewable Energy Developers* (2021d). An initial draft of the Neighbour Benefit Sharing Program was refined in response to feedback from the local community and other stakeholders (Appendix R).

Key issues raised	Response
Cumulative impacts	
Some members of the local community are concerned about potential cumulative impacts from the development of the project and existing and approved wind farm projects in Moyne Shire.	• The potential cumulative impacts of the project and nearby existing and approved wind farm projects have been addressed by specialists in their impact assessments, where appropriate. Potential cumulative impacts have been assessed in relation to noise, biodiversity, landscape and visual, and traffic (from other wind farms under construction and the neighbouring blue gum plantation operations). • The project has been designed to comply with regulated noise limits taking into account other existing and proposed wind farms, including the nearby Macarthur Wind Farm. • Potential cumulative landscape and visual impacts have been assessed at key locations, between the project and the existing Macarthur Wind Farm and from the townships of Orford and Hawkesdale. • A larger buffer of two kilometres was incorporated into the design in response to specific concerns raised by the owners of some near neighbour dwellings about potential cumulative impacts of the project with the nearby Macarthur Wind Farm.
Aviation	
Some local residents are concerned about the potential impact of the project on their ability to apply fertiliser and weed and pest control via aerial application, and also the potential impact on aerial firefighting.	• Engagement with local residents who raised these concerns has sought to assess potential impacts on their aerial operations and the options available to address these impacts in their specific circumstances. • An aviation impact assessment (provided in Appendix O) was conducted by specialists as a part of the EES to assess potential impacts on aviation activities, and to identify measures to manage potential impacts. • Meteorological monitoring masts are more difficult to see than wind turbines. To address this risk, it is proposed that all meteorological monitoring masts would be marked in accordance with the National Airports Safeguarding Framework (2012) *Guideline D: Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers*, except for the strobe light, and the base around the outer guy wires would be marked in a contrasting colour to the ground. • The CFA's *Design Guidelines and Model Requirements for Renewable Energy Installations* (2022) (CFA Guidelines) state that as long as wind turbines are no less than 300 metres apart there is adequate distance for aircraft to operate around a wind energy facility given the appropriate weather and terrain conditions. Fire suppression aircraft operate under visual flight rules and as such, fire suppression aircraft would only operate in areas where there is no smoke and can operate during the day or night. Wind turbines would be at least 300 metres apart.
Other matters raised by stakeholders	
Noise and disruption during construction	• Temporary construction noise is to be expected for a wind farm project with large plant and equipment needed to construct the project and to operate the temporary quarry. To minimise the impact of construction noise on the local community, construction activities would generally occur during normal working hours of Monday to Friday, 7 am to 6 pm and Saturday, 7 am to 1 pm. • Works outside of these normal hours could be required throughout construction and these occurrences would be communicated in advance with local residents.
Impact on TV reception and telecommunications links	• An electromagnetic interference impact assessment (provided in Appendix M) was conducted by specialists as a part of the EES process to assess the potential for impacts to TV reception and other telecommunication services, and to identify management measures to address any potential impacts.
Impacts on Brolga	• A buffer has been designed to largely avoid impacts on nesting and foraging Brolga. No wind turbines or other infrastructure would be within the buffer (refer to Appendix Q – *Brolga*).
Impacts on flora and fauna	• A biodiversity impact assessment (provided in Appendix P) was conducted by specialists as part of the EES process to assess potential biodiversity impacts, and to identify management measures to avoid and minimise any potential impacts.
Impacts on health	• The project has been designed in accordance with New Zealand Standard NZS 6808:2010 Acoustics – Wind Farm Noise and in accordance with the Environment Protection Act 2017. The Victorian EPA will be enforcing adherence to these and

Key issues raised	Response
	the Environment Protection Amendment (Interim) Regulations 2021, and other aspects of the project relating to people's health and wellbeing.
Increased fire risk	• The project has contacted the CFA, notifying them of the project and providing an opportunity for the local Country Fire Authority branch to provide comment on any risks associated with their operations. Due to the recent changes to the CFA Guidelines consultation will be ongoing. • A member of the CFA raised a concern at a public meeting about the potential impact of the project on night aerial firefighting activities. The specialist consultant assessing potential aviation impacts of the project has advised the use of aerial firefighting helicopters in the past has been very limited due to limited approval being granted, while no fixed-wing firefighting aircraft are approved for night operations as these aircraft need specific avionics equipment, night vision equipment, modified instrument panel lighting and two suitably endorsed pilots to fly the aircraft at night (refer to Appendix O – *Aviation*). • The CFA Guidelines provide details about standard measures and processes in relation to fire safety, risk and emergency management that should be considered when designing, constructing, operating and upgrading renewable energy facilities in Victoria. The project has been designed and would continue to be developed in accordance with the requirements in these guidelines. • The CFA Guidelines state that as long as wind turbines are located no less than 300 metres apart there is adequate distance for aircraft to operate around a wind energy facility, given the appropriate weather and terrain conditions. Fire suppression aircraft operate under visual flight rules. As such fire suppression aircraft only operate in areas where there is no smoke and can operate during the day. • The project includes the development of around 60 kilometres of access tracks (new and existing) in accordance with the CFA guidelines that would provide increased firefighting access through the stony rises country across the project site, should this be needed. The project design also includes water tanks in strategic positions around the project site that would be designed to meet the requirements of the CFA. • Wind turbines are fitted with comprehensive lightning protection systems that safely transfer any high voltages or currents directly to the earth in the event of a lightning strike. They are also fitted with automatic shutdown systems enabling shut down if temperatures reach a set level. • In the event of a fire the wind farm would be shut down and this can be done remotely.
The project could be divisive in the local community	• The sixteen landowners involved are supportive of the project proceeding, want to avoid any conflict with neighbouring landowners and within the local community generally, and are keen for any concerns about the project to be addressed. Best endeavours have and would continue to be used to manage potential conflict by putting in place best practice stakeholder engagement practices, developing the project in an open and transparent manner, and proactively seeking resolution of any issues or concerns raised. • In response to concerns about the equity of financial benefits in the community (i.e., not just landowners receiving financial benefit), the project team consulted widely with the local community through doorknocks, information sessions, a drop-in shopfront in Koroit and mail outs to understand the community's preferences for the design of the Neighbour Benefit Sharing Program (Appendix R). • The community feedback was used to shape the proposed Neighbour Benefit Sharing Program, which was then provided to community in December 2020.

Chapter 5

Legislative context

There are several approvals required for the project under a variety of acts and legislative instruments. This section outlines the key approvals required for the project.

5.1 Project approvals process

The project was referred to the Minister for Planning (the Minister) in October 2018 under the *Environment Effects Act 1978* (EE Act). On 27 December 2018, the Minister determined an Environment Effects Statement (EES) was required due to the potential for the project to have significant impacts on the environment and community. The procedures and requirements for the EES assessment process are set out in the Minister's Statement of Decision, the Ministerial Guidelines, and are further detailed in the scoping requirements.

The project is being assessed via an Environment Effects Statement (EES) under the EE Act. While the EE Act and EES do not provide a direct avenue for approval for the project, the completed EES informs the decision of the Victorian Minister for Planning (the Minister) regarding the acceptability of the environmental effects of the project. This is provided to Commonwealth, state and local decision makers to inform all applicable planning and environmental approvals for the project. These statutory decision makers must consider the Minister's assessment in deciding whether to grant planning approval.

Figure 5-1 depicts the EES process under the EE Act and its interplay with other legislation and the approvals required for the project.

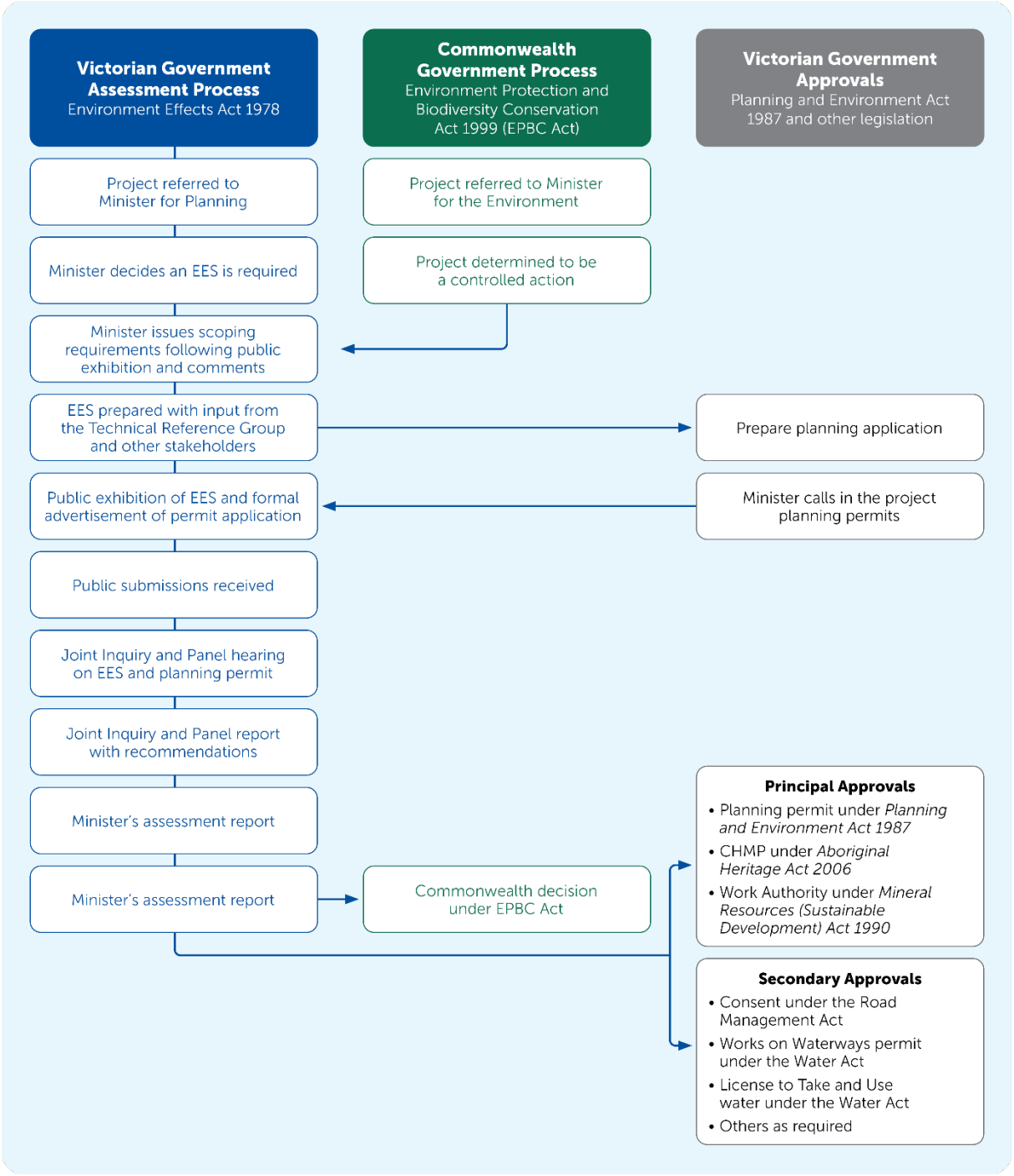


Figure 5-1 **Interplay between the EES process and other statutory approvals**

5.2 Principal approvals

5.2.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects matters of National Environmental Significance. The objectives of the EPBC Act are as follows:

- to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance
- to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources
- to promote the conservation of biodiversity
- to provide for the protection and conservation of heritage
- to promote a cooperative approach to the protection and management of the environment involving governments, the community, landholders and Indigenous peoples
- to assist in the cooperative implementation of Australia's international environmental responsibilities
- to recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and
- to promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.

Under the EPBC Act assessment and approval is required for actions that are likely to have a significant impact on:

- a matter of national environmental significance
- the environment of Federal land (even if the action is taken outside Federal land); and
- the environment anywhere in the world (if the action is undertaken by the Federal Government).

An action includes a project, development, undertaking, activity, or series of activities. When a person proposes to take an action they believe may need approval under the EPBC Act, they must refer the project to the Australian Minister for the Environment by submitting a completed Referral Form to the Department.

Federal agencies are also required to consider advice before authorising certain actions. The Minister may exempt a person from the requirement to undergo an environmental assessment and/or obtain approval, if it is considered in the national interest to do so.

The project was referred to the Commonwealth Department of the Environment and Energy under the EPBC Act (Ref EBPC 2019/8439) on 30 April 2019. With a restructuring of Commonwealth Government departments, the EPBC Act is now administered by the Department of Agriculture, Water and the Environment (DAWE). On 12 June 2019 a delegate for the Minister for the Environment determined the project was a 'controlled action'. The relevant controlling provisions are listed threatened species and communities (Section 18 and 18A). In particular, the species of concern were:

- Southern Bent-winged Bat
- Seasonal Herbaceous (Freshwater) of the temperate Lowland Plains
- Growling Grass Frog
- a range of nationally-listed plant species.

The Commonwealth Minister for the Environment's delegate determined that "the project will be assessed under the assessment bilateral agreement with Victoria". Under the bilateral agreement, the Victorian Minister for Planning's assessment of the environmental effects of the project will be provided to the Commonwealth Minister for the Environment to inform the approval decision in relation to the EPBC Act.

5.2.2 Planning and Environment Act 1987

The purpose of the *Planning and Environment Act 1987* (P&E Act) is to establish a framework for regulating the use and development of land in Victoria. The P&E Act sets out the structure and administration of planning in Victoria and authorises the preparation, adoption and approval of planning schemes and planning scheme amendments.

The Minister for Planning is the Responsible Authority for all large energy generation facilities and utility installations, which includes wind farms. Further, the Minister also has the power to call in any additional planning permits required by the project under Section 97B of the P&E Act. If the permit application is called in, a combined assessment under Section 97B(1)(c) of the P&E Act may occur.

5.2.3 Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2018

In Victoria, Aboriginal cultural heritage is protected by the *Aboriginal Heritage Act 2006* (AH Act) and the Aboriginal Heritage Regulations 2018 (AH Regulations). In accordance with s.49 of the AH Act, a Cultural Heritage Management Plan (CHMP) is required for any project requiring an EES under the EE Act.

In addition to the EES process requiring the preparation of a CHMP, other CHMP triggers relevant to the project are:

- the project site is located within areas of cultural heritage sensitivity, defined under Division 3 of the AH Regulations
- the project is a 'high impact activity' as it involves "the construction of a building or the construction or carrying out of works for a specified use, land used to generate electricity, including a wind energy facility"
- part or all of the project site has not been subject to previous significant ground disturbance as defined by the AH Regulations.

The western portion of the project is located in an area over which the Eastern Maar Aboriginal Corporation and the Gunditj Mirring Traditional Owners Aboriginal Corporation exercise joint responsibility as Registered Aboriginal Parties (RAPs) under the AH Act. The remainder of the project is located in an area over which the Eastern Maar Aboriginal Corporation exercise exclusive RAP status in line with a decision of the Victorian Aboriginal Heritage Council on 6 February 2020. A RAP was not in place for the project site when notice of intent to prepare a CHMP was submitted. As such, First Peoples – State Relations Group (formerly Aboriginal Victoria) will evaluate the project CHMP.

If a CHMP is required under the AH Act, the responsible authority cannot issue a planning permit until it receives a copy of the approved CHMP (Sub-sections 52(1) and (2)). A planning permit cannot be granted for an activity that is inconsistent with an approved CHMP (Sub-section 52(3)).

A CHMP (No. 11090) has been prepared for the project by Ecology and Heritage Partners (EHP) in accordance with Part 4 of the AH Act.

Responsible authorities may choose to include a note on the permit directing the proponent to the recommendations of the CHMP approved under the AH Act. This may assist proponents to identify all compliance requirements for a project.

It has been requested by the Department of Environment, Land, Water and Planning (DELWP) and First Peoples – State Relations Group that the CHMP is not publicly exhibited as part of the EES or planning permit application processes for the project. Instead, an Aboriginal cultural heritage impact assessment has been prepared by EHP and is included with this application (see Appendix C).

The CHMP will be finalised and lodged to First Peoples – State Relations Group once the Minister has made an assessment of the EES.

5.2.4 Mineral Resources (Sustainable Development) Act 1990

The option to develop an on-site quarry to supply materials to construct internal access tracks, hardstand areas, and turbine foundations is being considered. The *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) regulates mineral exploration, mining and extractive activities in Victoria, including quarrying.

The extraction of stone requires a work authority under Section 77I of the MRSD Act, regulated by Earth Resources Regulation (ERR) (part of the Department of Jobs, Precincts and Regions), Victoria's regulator of quarrying activities.

To obtain a work authority, the project must prepare a work plan for the proposed quarry under Section 77G of the MRSD Act, which includes a rehabilitation plan and a community consultation plan. This work plan requires approval by ERR. The work plan must meet all prescribed criteria in the MRSD Act, consider relevant requirements specified in the Minister's assessment, and include a review by relevant agencies (e.g., Environment Protection Authority Victoria (EPA Victoria), Moyne Shire Council, First Peoples – State Relations, catchment and water authorities) before it is approved, and quarrying can commence. A copy of the preliminary quarry work plan is provided in EES Attachment II – *Preliminary draft quarry work plan* to meet the scoping requirements and would be formally reviewed by ERR following the Minister's assessment (of the EES).

The use of groundwater extracted from the quarry requires a separate permit from Southern Rural Water to take and use that water.

5.3 Other relevant legislation

5.3.1 Environmental Protection Act 2017

The project is being developed under the provisions of the new *Environment Protection Act 2017* (EP Act), which sets out the legislative framework for the protection of human health and the environment from pollution and waste in Victoria. Pursuant to the EP Act, the project will be required to minimise risks of harm to human health and the environment from any pollution or waste so far as reasonably practicable. 'Pollution and waste' are very broadly defined.

EPA Victoria are the primary regulator for water discharges from mining and quarrying activities and advises ERR in its assessment of the quarry work plan on air discharges, noise and waste management, and environmental management conditions related to waste and pollution.

On 26 October 2021, the Environment Protection Amendment (Interim) Regulations 2021 were introduced (under the EP Act) to specify requirements relating to wind turbine noise from wind energy facilities, and outline measures to demonstrate compliance. These interim regulations address the general environmental duty to minimise harm to human health and the environment and will be effective for 12 months, or until replaced by new regulations.

Under the Environment Protection (Interim) Regulations 2021, operators of wind energy facilities must make sure they:

- comply with *New Zealand Standard NZS6808:2010, Acoustics - Wind Farm Noise*
- implement a noise management plan
- implement a complaints management plan
- provide an annual statement with details of complaints, maintenance activities, and noise remediation actions during the previous 12 months
- undertake noise monitoring procedures every five years to ensure ongoing compliance with the relevant noise limits.

EPA Victoria is now the primary regulator for operational wind turbine noise (for both new and existing wind farms), meaning that councils are no longer responsible for enforcing permit conditions relating to wind turbine noise.

Particular provision Clause 52.32 Wind Energy Facility states that noise impacts of wind farm proposals are to be assessed accordance with the *New Zealand Standard NZS6808:2010, Acoustics – Wind Farm Noise*. An application must be accompanied by a pre-construction (predictive) noise assessment report and a report from an environmental auditor to verify the findings of this report. These reports are provided in Appendix J.

5.3.2 Heritage Act 2017

The *Heritage Act 2017* regulates the protection and conservation of places and objects of heritage significance listed in the Victorian Heritage Register and archaeological sites and relics listed in the Victorian Heritage Inventory.

Under the *Heritage Act 2017*, a permit is required from Heritage Victoria to carry out works and activities in relation to a registered place or registered object.

No approvals are expected to be required for the project under the *Heritage Act 2017* unless unexpected historic archaeological material is detected during construction. In this instance, consent from Heritage Victoria would be required.

5.3.3 Water Act 1989

Victoria's *Water Act 1989* promotes the orderly, equitable and efficient use of water resources to ensure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians. The *Water Act 1989* regulates the impacts on and use of surface water and groundwater.

The project may require a licence to take and use water (e.g., for the quarry) or to construct a bore. If either of these were a preferred option for the supply of water during construction, the project would require approval from Southern Rural Water under Section 51 of the *Water Act 1989*.

The project will include a crossing over Shaw River, as well as other waterway crossings associated with the transmission cables and access tracks. A licence to construct works across any designated waterway would require a works on a waterway licence from Glenelg Hopkins Catchment Management Authority (CMA), pursuant to Section 67 of the *Water Act 1989*.

5.3.4 Flora and Fauna Guarantee Act 1988 and Flora and Fauna Guarantee Amendment Act 2019

The *Flora and Fauna Guarantee Act 1988* (FFG Act) provides a framework for biodiversity conservation in Victoria. The FFG Act provides for the listing of threatened species, communities of flora and fauna and potentially threatening processes. A number of non-threatened flora species are also protected under the FFG Act. The *Flora and Fauna Guarantee Amendment Act 2019* came into effect on 1 June 2020 and strengthens the framework for the protection of Victoria's biodiversity.

A permit from DELWP is required to remove species protected under the FFG Act from public land and for impacts to 'critical habitat' on private land.

The EES process requires that impacts on FFG Act listed species be assessed, even on private land.

5.4 Relevant policies and guidelines

5.4.1 Policy and planning guidelines for development of wind energy facilities in Victoria

The Policy and Planning Guidelines (DELWP, 2021f) are a reference document listed under Clauses 19.01 Renewable Energy and 52.32 Wind Energy Facility.

The Policy and Planning Guidelines recognise Victoria's abundant wind resources that will support a large-scale grid of connected wind energy facilities which can contribute to the sustainable delivery of Victoria's future energy needs.

The Policy and Planning Guidelines provide:

- a framework for a consistent and balanced approach to assist the assessment of wind energy projects
- a set of consistent operational performance standards to inform the assessment and operation of a wind energy facility project
- guidance as to how planning permit application requirements might be met
- a framework for the regulation of wind turbine noise.

The Policy and Planning Guidelines provide advice for responsible authorities, proponents, applicants, and the community to provide guidance about suitable sites to locate wind energy facilities, and to inform planning decisions about a wind energy facility project.

The Policy and Planning Guidelines outline what information and assessment should be provided with an application for a wind energy facility. These considerations include:

- Consistency with the Planning Policy Framework.
- Noise impacts – The project must submit a pre-construction noise assessment, demonstrating compliance with the *New Zealand Standard NZS6808:2010, Acoustics - Wind Farm Noise*. There are mandatory conditions which must appear on any permit that may be issued.
- Blade glint, shadow flicker and electromagnetic interference – Blades should be finished with a surface treatment of low reflectivity to ensure that glint is minimised. The shadow flicker experienced immediately surrounding the area of a dwelling must not exceed 30 hours per year as a result of the operation of the facility. The potential for electromagnetic interference should be minimised through turbine siting and design.
- Landscape and visual amenity - To reduce visual impact, the Policy and Planning Guidelines suggest measures such as minimising views from areas used for recreation and for dwellings, spacing wind turbines to respond to the landscape characteristics, protecting waterways and drainage lines, minimising removal of vegetation, constructing wind turbines at a consistent in height, ensuring wind turbines rotate in the same direction and limiting night lighting.
- Flora and fauna and removal of native vegetation – The Responsible Authority needs to consider the survey effort made to support the application and what efforts may be made to protect native vegetation in the future. The extent and type of native vegetation to be removed is to be considered.
- Aircraft safety - The Responsible Authority will assess whether appropriate consultation has been undertaken with the Civil Aviation Safety Authority (CASA) and with any other private airstrip operators that may not be identified by CASA.

5.4.2 Guidelines for the removal, destruction or lopping of native vegetation

The *Guidelines for the removal, destruction or lopping of native vegetation* (Native Vegetation Guidelines) (DELWP, 2017b) provide a three-step approach to native vegetation:

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

The Native Vegetation Guidelines are incorporated at Clause 72.04 of the Planning Scheme and forms part of Clause 52.17.

The construction of the project would require the removal of some native vegetation and is required to achieve net zero loss of vegetation. In accordance with these guidelines, as well as the EPBC Act and FFG Act, the project would use appropriate offsets where native vegetation removal cannot be avoided.

5.4.3 Design Guidelines and Model Requirements for renewable energy installations

The purpose of the *Design Guidelines and Model Requirements for Renewable Energy Installations* (2022) (CFA Guidelines) is to provide details about standard measures and processes in relation to fire safety, risk and emergency management that should be considered when designing, constructing and operating new renewable energy facilities, and upgrading existing facilities. In the planning context, CFA's involvement may be in response to a notice from the responsible authority for CFA's consideration and comment. If this occurs, this document outlines the design requirements CFA is likely to include in response to council's notice.

In relation to wind energy facilities, the CFA Guidelines recommend the following measures in relation to the siting of wind energy facilities:

- Where practicable, wind energy installations can be sited on open grassed areas (such as grazed paddocks). Vegetation is to be managed as per the requirements of the guideline, or as informed through a risk management process.
- Wind turbines are to be located no less than 300 metres apart. This provides adequate distance for aircraft to operate around a wind energy facility given the appropriate weather and terrain conditions. Fire suppression aircraft operate under visual flight rules. As such, fire suppression aircraft only operate in areas where there is no smoke and can operate during the day or night.
- Installed weather monitoring stations can be high and difficult to see and are hazardous to CFA flight operations during fires. CFA requires the following in relation to the installation of these monitoring stations:
  - Monitoring towers higher than 100 feet must be clearly marked and guy wires fitted with markers.
  - The installation must be notified to CFA and Geoscience Australia (for inclusion in the Vertical Obstruction Database).

Among other things, the CFA Guidelines also stipulate the following requirements in relation to the operation and maintenance of wind energy facilities:

- Wind turbine manufacturers must provide specifications for safe operating conditions for temperature and wind speed.
- A wind energy facility emergency management plan must include maximum operational wind speed and temperature conditions and operating procedures to limit fire risk.

It is noted that the subject site is within a Bushfire Prone Area under the *Building Act 1993* (Vic), being likely to be subject to bushfires, similar to most areas in the state of Victoria. The Bushfire Management Overlay (BMO) also applies to parts of the site, noting that there are no works in the BMO area and that there is no relevant permit trigger associated with the BMO.

5.4.4 Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria

Community Engagement and Benefit Sharing in Renewable Energy Development – A Guide for Developers to the Victorian Renewable Energy Target Auction (Lane and Hicks, 2017) published by the Victorian Government helps developers meet the high standards of community engagement expected for projects bidding in the Victorian Renewable Energy Target Auction Scheme. An updated guideline was published in July 2021 – *Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria: A guide for renewable energy developers* (DELWP, 2021d).

5.4.5 Interim Brolga Guidelines

The *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population* (Interim Brolga Guidelines) (Department of Sustainability and Environment, 2012) respond to the perceived risk posed to Brolga by the wind industry by outlining an approach to achieving a zero net impact to the Victorian Brolga population.

The Interim Brolga Guidelines detail three levels of progressively more detailed investigations required to assess impacts and design mitigation strategies.

The Interim Brolga Guideline assessment framework is broken into the following levels:

1. Design the wind farm including all infrastructure to avoid and mitigate potential effects, to the extent that is practicable.
2. Estimate any remaining and unavoidable risk using tools such as collision risk modelling and population viability analysis, to ascertain likely effects on the population.
3. Determine appropriate compensatory measures to, at a minimum, completely offset unavoidable effects.

If all potential risks cannot be removed by the first step, then steps two and three apply. Triggers for the level of Brolga assessment required, along with their applicability to the project, are described in Chapter 7.

It is noted that the DELWP *Brolga Assessment and Mitigation Standards for wind energy facility permit application*s are currently in draft as of April 2022. These have been exhibited for comment but have not been finalised. Due to uncertainty as to their final form, and the extensive work that was conducted for the project in accordance with the Interim Brolga Guidelines, the draft Brolga Assessment and Mitigation Standard has not been adopted by the project.

5.5 Relevant plans and strategies

5.5.1 Victoria's Climate Change Strategy

Victoria's Climate Change Strategy (DELWP 2021b) is a roadmap to net-zero emissions and a climate resilient Victoria by 2050. The strategy is intended to support communities and businesses in making changes to reduce impacts of climate change, including to meet Victoria's renewable energy target or 50% by 2030.

To achieve these emissions reduction targets, Victoria's Climate Change Strategy includes actions to:

- transition the state to a clean energy future that will create jobs, cut costs for households and businesses and strengthen the energy system
- invest in innovative technologies, such as zero emissions vehicles and hydrogen, and partner with businesses and communities to set Victoria up for their adoption
- recognise and safeguard the role of our natural environment in reducing emissions, and ensure our farmers are well placed to embrace new technologies and practices that reduce emissions
- support Victorian businesses and communities to cut emissions and thrive in a net-zero emissions future.

5.5.2 Great South Coast Regional Growth Plan 2014

Regional Growth Plans cover eight regions in Victoria and, together with Plan Melbourne 2017-2050, provide a land use planning framework for Victoria. Of the regional plans, the *Great South Coast Regional Growth Plan* (2014) covers the project site and Moyne Shire, as well as the municipalities of Corangamite, Glenelg, Southern Grampians and Warrnambool.

The *Great South Coast Regional Growth Plan* outlines opportunities for growth during the next 30 years, with the vision to "create a thriving, multifaceted and resilient economy, while valuing and managing our natural resources and environment". A key strategic direction of the plan is to position the Great South Coast for economic growth, with renewable energy (including wind energy) identified as a major opportunity for the region. Land use policies, strategies and actions outlined in the plan in relation to alternative energy production (i.e., energy generated from renewable sources and natural gas) include:

- "support the development of energy facilities in appropriate locations where they take advantage of existing infrastructure and provide benefits to the regional community
- require the protection and proper maintenance of infrastructure and assets, including local roads, during the development and construction of energy projects
- plan for and sustainably manage the cumulative impacts of alternative energy development
- secure access to key construction material resources in the region, including on-site quarrying".

5.5.3 Moyne Shire's Council Plan 2021–2025

The Moyne Shire's *Council Plan 2021–2025* includes strategic objectives relating to renewable energy, including that:

- *"Local communities receive significant benefits from investment and development in renewable energy projects across the Shire*", and
- *"The scale and size of renewable energy projects considers cumulative social, environmental and economic impacts*".

The project team has worked with Council via Council's Major Projects team, the EES Technical Reference Group and periodic presentations to councillors.

On 27 November 2018, Council resolved to oppose any further wind farm development or new transmission infrastructure within the shire, pending the implementation of the National Wind Farm Commissioner's 2017 annual report recommendations within Victoria. The key concern raised by Council was around cumulative impacts of wind farms on the community, including social impacts relating to housing availability, noise and visual amenity, and traffic, as well as environmental impacts such as impacts to Brolga and other threatened fauna, native vegetation and threatened flora (Moyne Shire Council, 2021). These concerns have been addressed through the avoidance of impacts where possible, and mitigation and management measures where needed (as contained within the EES and summarised in Appendix H – *Environmental management framework*).

5.5.4 Renewable Energy Action Plan (DELWP 2017a)

Victoria's Renewable Energy Action Plan was released in 2017 by DELWP, setting out long-term actions to drive renewable energy investment in Victoria. Action 1 of the Plan was a commitment to the Victorian Renewable Energy Target for 2020 and 2025. The Victorian Government has since legislated renewable energy targets within the *Renewable Energy (Jobs and Investment) Act 2017*. This legislation sets targets of 25% renewable energy by 2020, 40% by 2025 and 50% by 2030. The Government has met its 2020 target with more than 26% of Victoria's electricity generated from renewable energy sources.

Action 6 of the Plan is to streamline renewable energy project processes and approvals. The Government established a 'one stop shop' for wind farm planning permit matters "to ensure relevant government agencies can respond promptly to issues for individual applications". The action also flagged the future introduction of EPA Victoria audit of noise assessments and noise management plans.

Action 17 of the Plan is to support energy storage that integrates with renewable energy generation. The Plan commits to a minimum of two 20 megawatt batteries in western Victoria, *"to support battery storage becoming mainstream".*

5.5.5 Victoria's Regional Statement

Victoria's *Regional Statement* was released in 2015 and set out the next steps and flagged future directions for regional development policy. The statement's focus is on regional jobs growth and boosting regional economies, with renewable energy identified as a key element of future plans.

In late December 2019, the Barwon South West Renewable Energy Roadmap was released, which incorporates the Moyne Shire (DELWP, 2019). The roadmap articulates the region's "vision for a renewable energy future, identifying opportunities to attract investment and better understand their community's engagement and capacity to transition to renewable energy" (from the Minister's foreword). Collaboration, consultation and engagement with local communities was key to the roadmap's development. Key themes from the consultation were:

1. Support for renewable energy is strong – very few people (less than 1%) did not support a shift to renewable energy.
2. Take a strategic approach and listen to the community – the community was concerned that renewable energy generation projects were not being planned in a systematic way across Victoria, leading to rushed and ad hoc projects, and that community consultation about proposed renewable energy projects was poor.
3. Share the benefits – it was important that projects created local jobs and an economic boost to local businesses.
4. Wind and solar are the preferred technologies – these technologies were seen by communities as the most appropriate, given the climatic conditions and advantages.
5. Cut down the complexities and costs and make it easier – the community felt that the current rules and regulations are highly complex and preventing community involvement and innovation in the renewable energy space.

Respectful engagement and honest sharing of information has formed a key part of the project's development for more than ten years. While some of the key themes of the project's consultation are reflected in those from the Roadmap, community engagement was (and continues to be) carried out in accordance with the Clean Energy Council's *Best Practice Charter for Renewable Energy Developments* (Clean Energy Council, 2021).

5.5.6 Renewable Energy Zones

AEMO's *2020 Integrated System Plan* (2020) identified six Victorian Renewable Energy Zones. These Renewable Energy Zones are regions with the greatest potential for renewable energy development across the state, and their selection focuses on areas where grid improvements should be carried out to facilitate the transition to a renewables-based National Electricity Market. The project is located within the South-West Victoria Renewable Energy Zone.

The Victorian Government has committed to developing the Renewable Energy Zones to meet the following objectives:

- ensure that communities, including traditional owners, are engaged in the process
- provide for the orderly, planned development of renewable energy resources
- efficiently and effectively expand the grid and connect new generation
- reduce network congestion and costs.

A Renewable Energy Zone Development Plan is currently under development to ensure investments are coordinated, timely, and deliver positive outcomes for Victoria and local communities. This follows the release of the *Victorian Renewable Energy Zones Development Plan Directions Paper* in February 2021 (DELWP, 2021c) which tabled several priority transmission network upgrades "to support existing and future renewable energy generation development in Victoria's Renewable Energy Zones".

In early 2021, the Victorian Government announced the establishment of VicGrid to administer a $540 million Renewable Energy Zone fund. This government agency will engage with regional communities to provide for appropriate and beneficial development in each Renewable Energy Zone. Their work will see immediate network investments to upgrade the grid to support the decentralisation of energy generation (i.e., over-reliance on coal fired generation in the Latrobe Valley) and integration of renewables within the Renewable Energy Zones in Victoria.

The strength of the wind resource, access to a transmission network with capacity and the availability of suitable land on which to develop renewable energy projects has led to south-west Victoria being designated a Renewable Energy Zone. This identification of the candidate Renewable Energy Zone was formalised by the Victorian Government in early 2021, and the management of the Renewable Energy Zone will be overseen by VicGrid.

5.6 Other planning schemes

The landscape visual impact assessment undertaken for the project is required to take into consideration the broader landscape. Relevant Clauses of other Planning Schemes applicable to the project include:

- Southern Grampians Planning Scheme – Clause 02.03-2 Environmental and Landscape Values
- Glenelg Planning Scheme – Clause 12.05-2L Landscapes
- Warrnambool Planning Scheme – Clause 21.03-4 Significant environments and landscapes.

The assessment of the project against these other provisions is discussed in the landscape visual impact assessment, provided in Appendix K.

Chapter 6
Planning provisions

The project site is located within the Moyne Shire and is subject to the provisions of the Moyne Planning Scheme. The scheme sets out the permit triggers and policy considerations for any planning application for a wind farm and associated infrastructure. Responsible authorities must consider the matters outlined in the scheme when administering the use and development of land and their impacts as relevant to the EES. Planning Schemes are prepared, approved and implemented under the P&E Act.

The Moyne Planning Scheme and the Planning Policy Framework seek to ensure the objectives of planning in Victoria (as set out in section 4 of the P&E Act) are fostered through appropriate land use and development planning policies and practices which integrate relevant environmental, social and economic factors in the interests of net community benefit and sustainable development.

The objectives of planning in Victoria as set out in the P&E Act are:

a. to provide for the fair, orderly, economic and sustainable use and development of land
b. to provide for the protection of natural and man-made resources and the maintenance of ecological processes and genetic diversity
c. to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria
d. to conserve and enhance those buildings, areas or other places which are of scientific, aesthetic, architectural or historical interest, or otherwise of special cultural value
e. to protect public utilities and other assets and enable the orderly provision and coordination of public utilities and other facilities for the benefit of the community
f. to facilitate development in accordance with the objectives set out in paragraphs a), b), c), d) and e)
fa. to facilitate the provision of affordable housing in Victoria
g. to balance the present and future interests of all Victorians.

The following is an outline of the key provisions of the Moyne Planning Scheme that relate to the project.

6.1 Land use definition

The land use for the project works are defined under Clause 73.03 (Land use terms) of the Moyne Planning Scheme as:

Wind energy facility: Land used to generate electricity by wind force. It includes land used for:

a. any turbine, building or other structure or thing used in or in connection with the generation of electricity by wind force
b. an anemometer.

This land use is applicable to the wind turbines, access tracks and ancillary facilities, and meteorological monitoring masts.

Utility installation: Land used:

a. to transmit, distribute or store power, including battery storage.

This land use is applicable to the battery energy storage system and on-site substation.

Earth and energy resources industry: Land used for the exploration, removal or processing of natural earth or energy resources. It includes any activity incidental to this purpose including the construction and use of temporary accommodation.

This land use is applicable to the on-site quarry.

6.2 Moyne Planning Scheme

6.2.1 Planning Policy Framework

The Planning Policy Framework outlines state-wide and regional strategic planning issues and is common in content across all Victorian planning schemes.

In line with the transitional provisions of Planning Scheme Amendment VC148 and Clause 23, policies of local significance are included in the Municipal Strategic Statement and Local Planning Policies (of the Local Planning Policy Framework), until the future introduction of the Municipal Planning Strategy and integration of local content into the Planning Policy Framework. Any reference to the Local Planning Policy Framework is to be taken to be a reference to the Planning Policy Framework and vice versa.

A brief summary of the most relevant sections of the Planning Policy Framework is provided below, with all sections of the scheme being considered, as relevant, in assessment of the application (see Chapter 7).

Clause 11.01-1S Settlement

The objective of this clause is to promote sustainable growth and development of Victoria and deliver choice and opportunity for all Victorians through a network of settlements and supporting infrastructure. The relevant strategies include to develop sustainable communities through supporting access to jobs, services, infrastructure and community facilities.

Clause 11.01-1R Settlement - Great South Coast

The objective of this clause is to attract more people to the region. Relevant strategies include to support development and investment in small towns that are facing economic and population challenges.

Clause 11.02-1S Supply of urban land

The objective of this clause is to ensure a sufficient supply of land is available for residential, commercial, retail, industrial, recreational, institutional and other community uses. Relevant strategies include to maintain access to productive natural resources and an adequate supply of well-located land for energy generation, infrastructure and industry.

Clause 11.03-5S Distinctive areas and landscapes

The objective of this clause is to protect and enhance the valued attributes of identified distinctive areas and landscapes. Relevant strategies include to recognise the unique features and special characteristics of these areas and landscapes and to enhance conservation of the environment, including the unique habitats, ecosystems and biodiversity of these areas. Use and development that could undermine the long-term natural or non-urban use of land is to be avoided.

Clause 12.01-1S Protection of biodiversity

The objective of this clause is to assist the protection and conservation of Victoria's biodiversity. Relevant strategies include ensuring that decision making take into account the impacts of land use and development on Victoria's biodiversity, including consideration of cumulative impacts, the fragmentation of habitat and the spread of pests and weeds.

The impacts of change in land use and development on biodiversity values of national parks and conservation reserves or nationally and internationally significant sites including wetlands should be considered.

Clause 12.01-2S Native vegetation

The objective of this clause is to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. Strategies include to apply the three-step approach in the Native Vegetation Guidelines.

Clause 12.03-1S River corridors, waterways, lakes and wetlands

The objective of this clause is to protect and enhance river corridors, waterways, lakes and wetlands. Relevant strategies include:

- protect the environmental, cultural and landscape values of all water bodies and wetlands
- ensure development responds to and respects the significant environmental, conservation, cultural, aesthetic, open space, recreation and tourism assets of water bodies and wetlands
- ensure development is sensitively designed and sited to maintain and enhance environmental assets, significant views and landscapes along river corridors and waterways and adjacent to lakes and wetlands
- ensure development does not compromise bank stability, increase erosion or impact on a water body or wetland's natural capacity to manage flood flow.

Clause 12.05-1S Environmentally sensitive areas

The objective of this clause is to protect environmentally sensitive areas with significant recreational value from development that would diminish their environmental conservation or recreational values. This includes coastal areas and their foreshores.

Clause 12.05-2S Landscapes

The objective of this clause is to protect and enhance significant landscapes and open spaces that contribute to character, identity and sustainable environments. Strategies to achieve the objective include:

- ensure that development does not detract from the natural qualities of significant landscape areas
- recognise the natural landscape for its aesthetic value as a fully functioning system, and
- ensure important natural features are protected and enhanced.

Clause 13.01-1S Natural hazards and climate change

The objective of this clause is to minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning. The risks associated with climate change should be considered in planning and management decisions and processes.

Clause 13.02-1S Bushfire planning

The objective of this clause is to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life. This policy applies to all planning and decision making under the P&E Act relating to land within a designated bushfire prone area. The objective is to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life. It identifies a range of matters to consider in bushfire hazard identification and assessment, including consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire measures.

Clause 13.05-1S Noise abatement

The objective of this clause is to assist the control of noise effects on sensitive land uses. This clause seeks to ensure that development is not prejudiced, and community and human health is not adversely impacted by noise emissions, using a range of building design, urban design and land use separation techniques as appropriate to the land use functions and character of the area. The provisions of the *Environment Protection Act 2017* (Vic) (EP Act) and Regulations should be considered as relevant.

Clause 13.07-1S Land use compatibility

The objective of this clause is to protect community amenity, human health and safety while facilitating appropriate commercial, industrial, infrastructure or other uses with potential adverse off-site impacts. Strategies are to ensure that use or development of land is compatible with adjoining and nearby land uses.

Clause 14.01-1S Protection of agricultural land

The objective of this clause is to protect the state's agricultural base by preserving productive farmland. The clause seeks to avoid the permanent removal of productive agricultural land from the state's agricultural base without consideration of the economic importance of the land for the agricultural production and processing sectors. In considering an application for use or development of agricultural land the impacts on the continuation of the primary production on adjacent land, with particular regard to land values and the viability of infrastructure for such production should be considered. Another consideration is the compatibility between the proposed or likely development and the existing use and surrounding land.

Clause 14.01-2S Sustainable agricultural land use

The objective of this clause is to encourage sustainable agricultural land use. Relevant strategies include:

- ensure agricultural and productive rural land use activities are managed to maintain the long-term sustainable use and management of existing natural resources
- support the development of innovative and sustainable approaches to agricultural and associated rural land use practices
- support adaptation of the agricultural sector to respond to the potential risks arising from climate change.

Clause 14.02-1S Catchment planning and management

The objective of this clause is to assist the protection and restoration of catchments, waterways, estuaries, bays, water bodies, groundwater and the marine environment. The relevant strategies seek to ensure that any adverse impacts on water catchments are appropriately managed to maintain water quality for environmental and human use purposes.

Clause 14.02-2 Water quality

The objective of this clause is to protect water quality. Relevant strategies seek to prevent water contamination and ensure incompatible land use activities are avoided in areas subject to water quality disturbances such as flooding, soil degradation, salinity or other hazards.

Clause 14.03-1S Resource exploration and extraction

The objective of this clause is to encourage exploration and extraction of natural resources in accordance with acceptable environmental standards. Strategies include ensuring appropriate buffer areas between extractive activities and sensitive uses, including incorporating performance standards identified in relevant legislation.

Clause 14.03-1R Resource exploration and extraction – Great South Coast

This regional clause builds on the state level provision with the key strategy to facilitate access to key construction material resources in the region, including on-site quarrying.

Clause 15.01-6S Design for rural areas

The objective of this clause is to ensure development respects values areas of rural character. Relevant strategies include ensuring the built form of proposed projects respect the siting, scale and appearance of rural character, protecting visual amenity of valued rural landscapes and character areas and minimising impacts on surrounding natural scenery and landscape features.

Clause 15.02-1S Energy and resource efficiency

The objective of this clause is to encourage land use and development that is energy and resource efficient, supports a cooler environment and minimises greenhouse gas emissions. Relevant strategies include to improve efficiency in energy use through greater use of renewable energy technologies and energy efficiency upgrades and to encourage retention of existing vegetation and planting of new vegetation as part of development and subdivision proposals.

Clause 15.03-1S Heritage conservation

The objective of this clause is to ensure the conservation of places of heritage significance and seeks to provide for the protection of natural heritage sites and man-made resources. Development that respects places with identified heritage values is encouraged.

Clause 15.03-2S Aboriginal cultural heritage

The objective of this clause is to ensure the protection and conservation of places of Aboriginal cultural heritage significance. Relevant strategies include to provide for the protection and conservation of pre-contact and post-contact Aboriginal cultural heritage places and to ensure that permit approvals align with the recommendations of relevant CHMP approved under the AH Act.

Clause 17.01-1S Diversified economy

The objective of this clause is to strengthen and diversify the economy. A relevant strategy includes to support rural economies to grow and diversify.

Clause 17.01-1R Diversified economy – Great South Coast

This regional clause builds on the state level clause and contains the following relevant strategies:

- support agricultural as a primary source of economic prosperity and increase the region's contribution to the nation's food production
- support rural production and associated economic development opportunities including rural industry, rural sales, accommodation and tourism.

Clause 18.01-1S Land use and transport integration

The objective of this clause is to facilitate access to social, cultural and economic opportunities by effectively integrating land use and transport. The relevant strategies seek to make use of existing infrastructure without detriment to the transport system or amenity.

Clause 18.02-3S Road system

The objective of this clause is to manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure.

Clause 18.02-7S Airports and airfields

The objective of this clause is to strengthen the role of Victoria's airports and airfields within the state's economic and transport infrastructure, facilitate their siting and expansion and protect their ongoing operation. Relevant strategies include to protect airports from incompatible land uses and to plan the visual amenity and impact of any use or development of land on the approaches to an airfield to be consistent with the status of the airfield.

Clause 19.01-1S Energy supply

The objective of this clause is to facilitate appropriate development of energy supply infrastructure. The strategies to achieve the objectives include:

- support the development of energy facilities in appropriate locations where they take advantage of existing infrastructure and provide benefits to industry and the community
- support transition to a low-carbon economy with renewable energy and greenhouse emission reductions including geothermal, clean coal processing and carbon capture and storage
- facilitate local energy generation to help diversify the local economy and improve sustainability outcomes.

Clause 19.01-2S Renewable energy

The objective of this clause is to promote the provision of renewable energy in a manner that ensures appropriate siting and design considerations are met. Relevant strategies include to facilitate renewable energy development in appropriate locations and to consider the economic and environmental benefits to the broader community of renewable energy generation while also considering the need to minimise the effects of a proposal on the local community and environment. The clause recognises that economically viable wind energy facilities are dependent on locations with consistently strong winds over the year.

The Policy and Planning Guidelines (DELWP, July 2021f) is listed as a reference document under this clause.

6.2.2 Local Planning Policy Framework

This section outlines the Clauses of the Municipal Planning Strategy and local planning policy of the Moyne Planning Scheme relevant to the application. An assessment of the project against these clauses is provided in Chapter 7.

Clause 21.02 Municipal overview

This clause provides a municipal profile and identifies key development pressures in the municipality. Wind farms are identified as a potential infrastructure pressure on the landscape.

Clause 21.03 Factors influences future planning and development

This clause identifies a number of key factors which are of importance to Moyne Shire's future land use and development. Agricultural productivity, landscape character and native vegetation retention are identified as key factors to consider in development applications.

Clause 21.04 Municipal vision

This clause sets out Council's desired direction for growth and is a plan for how the municipality will manage its affairs. Agriculture remains an economic focus for the municipality. There is a strong environmental focus while seeking to balance new development against protection of the natural environment.

Clause 21.06 Environment

This clause outlines the environmental directives for development in the municipality. The clause identifies some natural features such as the volcanic crater in the Tower Hill State Game Reserve, volcanic crater and lava landscapes in Budj Bim National Park (formerly known as Mount Eccles National Park), Mount Shadwell and the peak volcanic crater. Retention of remnant native vegetation and appropriate treatment of significant landscapes are identified as key concerns.

Clause 21.07 Economic development

Agriculture and associated enterprises are identified as being key activities for the local economy. Objectives include to protect scenic landscapes and agricultural land that contribute to tourism and agricultural productivity.

The clause notes that wind farms are established in the shire and that there is continuing pressure for the development of new wind farms.

Clause 21.08 Infrastructure and particular uses

This clause outlines Council's priorities with respect to particular infrastructure and uses, including roads, energy and power, telecommunications, fire fighting and transport. Increased cost of power supply establishment is identified as an issue for Council. Relevant objectives include to encourage development in locations where a range of infrastructure and appropriate community services are available, and to provide clear and consistent guidelines for the planning, design and construction of infrastructure. Relevant strategies seek to maintain and enhance key infrastructure, and encourage major development close to high priority road routes.

Clause 22.01-1 Aboriginal Heritage

The objective of this clause seeks to promote the protection and appropriate management of Aboriginal cultural heritage values.

Clause 22.02 Environment

This clause contains various directives relating to flora and fauna management, rare and threatened species, and landscape management. Of particular relevance are Clause 22.02-2 Rare and Threatened Species, and Clause 22.02-8 Flora and Fauna Local Policy.

Key considerations include protection of flora and fauna, given the largely cleared nature of the municipality. Reference is made to Selected Biodiversity Components – LGA of Moyne (DNRE, May 1996) to determine whether the land could potentially contain the habitat of a Victorian Rare and Threatened Flora or Fauna species.

Clause 22.03 Economic development

Clause 22.03-4 Agricultural Production relates to all land in Farming Zones. The relevant objectives seek to protect natural resources for agricultural production and prevent land use conflicts between agriculture and other land uses.

Clause 22.03-8 Fire Protection Local Policy covers all Farming Zoned land and seeks to ensure that fire risks are appropriately considered in any significant development project.

6.2.3 Zones

The project site is primarily within the Farming Zone, with small areas of land affected by the Special Use Zone and Transport Zone, as described in Table 6-1 and shown in Figure 6-1.

Table 6-1 Summary of zoning permit triggers

Planning zone	Purpose	Relevance to project	Permit required?
Clause 35.07 **Farming Zone**	The purposes of the Farming Zone (FZ) are: • to implement the Municipal Planning Strategy and the Planning Policy Framework • to provide for the use of land for agriculture • to encourage the retention of productive agricultural land • to ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture • to encourage the retention of employment and population to support rural communities • to encourage use and development of land based on comprehensive and sustainable land management practices and infrastructure provision; and • to provide for the use and development of land for the specific purposes identified in a schedule to this zone.	The project site is primarily within the FZ.	A permit is required for: • the use of land and building and works within a Farming Zone for a wind energy facility (which is a Section 2 use) and must meet the requirements of Clause 52.32 (Wind Energy Facility) • a utility installation (which is a Section 2 use) • earthworks. In accordance with Clause 62.01 (Uses Not Requiring a Permit), the use of land for earth and energy resources industry (i.e., a quarry) does not require a permit under the Farming Zone if the conditions of Clause 52.08 (Earth and Energy Resources Industry) are met (refer to Section 6.2.6 *Earth and energy resources industry* below)
Clause 37.01	The purposes of the Special Use Zone (SUZ) are:	Special Use Zone Schedule 6 (SUZ6) relates to	A permit is required within the SUZ6 for use and development of

Planning zone	Purpose	Relevance to project	Permit required?
Special Use Zone Schedule 6	• to implement the Municipal Planning Strategy and the Planning Policy Framework • to recognise or provide for the use and development of land for specific purposes as identified in the schedule to this zone. The purposes of Schedule 6 to the SUZ are: • to facilitate the development and use of a gas-fired power station • to provide for electricity generation using natural gas as the energy source.	the Tarrone Power Station.	a wind energy facility and utility installation.
Clause 36.04 **Transport Zone 2**	The purposes of the Transport Zone (TRZ) are: • to implement the Municipal Planning Strategy and the Planning Policy Framework • to provide for an integrated and sustainable transport system. • to identify transport land use and land required for transport services and facilities. • To provide for the use and development of land that complements, or is consistent with, the transport system or public land reservation. • To ensure the efficient and safe use of transport infrastructure and land comprising the transport system	Transport Zone 2 (TRZ2) is for the purpose of the principal road network. Woolsthorpe-Heywood Road is a Transport Zone 2 road. An access point and turn-out from the TRZ2 is proposed. A section of Woolsthorpe-Heywood Road would also require upgrades.	A permit is required for use and development of a wind energy facility and utility installation, which are Section 2 uses.

6.2.4 Overlays

Parts of the site are affected by planning overlays, as described in Table 6-2 and shown in Figure 6-1. Overlays apply additional controls to the use and development of land. Overlays apply to land where there are identified special features.

Table 6-2 Summary of overlay permit triggers

Planning zone	Purpose	Relevance to project	Permit required?
Clause 42.01 **Environmental Significance Overlay** Schedule 4 and Schedule 5	The relevant purposes of the Environmental Significant Overlay (ESO) are: • to implement the Municipal Planning Strategy and the Planning Policy Framework • to identify areas where the development of land may be affected by environmental constraints • to ensure that development is compatible with identified environmental values. The environmental objectives to be achieved under the ESO4 are: • to ensure that the development and use of the Shaw River Power Station not constrained by the establishment of potentially conflicting accommodation uses and developments nearby • to ensure that potential noise impacts are considered in any decision regarding accommodation land use and development • to apply acoustic measures in the design of any accommodation developments in proximity to the Shaw River Power Station. The environmental objectives to be achieved under the ESO5 are: to ensure that the development and use of the Tarrone Power Station is not constrained by the establishment of potentially conflicting accommodation uses and developments nearby to ensure that potential noise impacts are considered in any decision regarding accommodation land use and development to apply acoustic measures in the design of any accommodation developments in proximity to the Tarrone Power Station.	The ESOs relate to the permitted Shaw River (Schedule 4) and Tarrone power stations (Schedule 5) within the Special Use Zones. There is no infrastructure associated with the project in the ESO4 however a small patch of "Basalt Shrubby Woodland" is required to be removed. Infrastructure associated with the project in the ESO5 includes access tracks, turbines, underground cables, substation, battery energy storage system, operations and maintenance facility, and grid connection infrastructure.	No planning permit is required for the development or use of a wind energy facility or utility installation under the ESO4 and ESO5. However, a permit is required to remove, destroy or lop any vegetation, including dead vegetation.

Planning zone	Purpose	Relevance to project	Permit required?
Clause 44.06 **Bushfire Management Overlay**	The relevant purposes of the Bushfire Management Overlay (BMO) are: • to implement the Municipal Planning Strategy and the Planning Policy Framework • to ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire • to identify areas where the bushfire hazard warrants bushfire protection measures to be implemented • to ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.	The BMO affects a small portion of the land in the south-west of the project site. The overlay covers plantation forestry land outside of the project site and extends into the project site by approximately 100 metres in the west of the project site.	The BMO does not trigger a planning permit for the project. An assessment of bushfire safety including against the requirements of the CFA Guidelines is provided in Section 7.5.4 of this report.

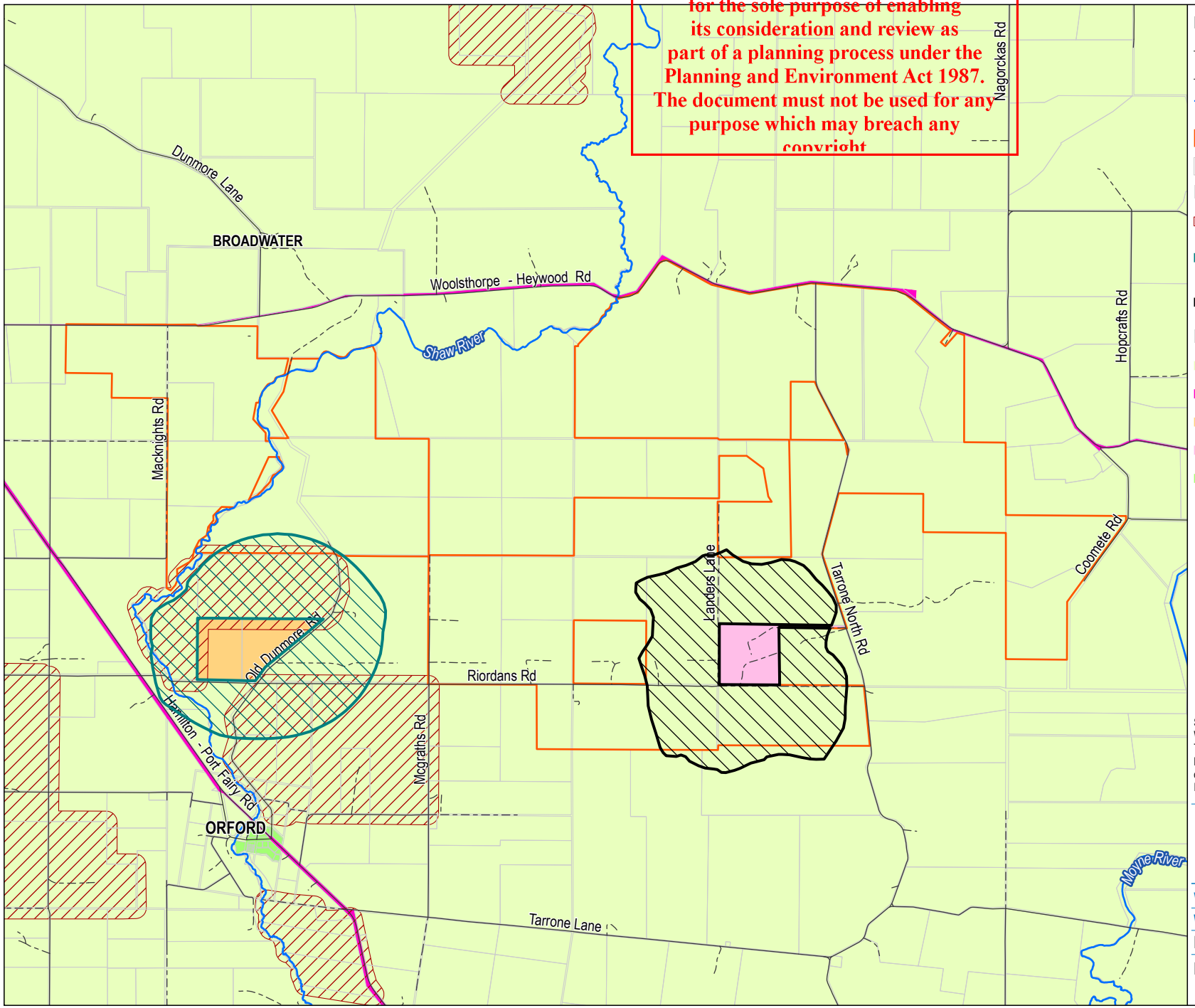
6.2.5 Other permit triggers

A range of other planning permit triggers are also relevant to the project as shown in Table 6-3.

Table 6-3 Other planning permit triggers

Particular Provision	Purpose	Relevance to project	Permit required?
Clause 52.05 Signs	The relevant purposes of this clause are: • To regulate the development of land for signs and associated structures. • To ensure signs are compatible with the amenity of visual appearance of an area, including the existing and desired future character. • To ensure signs do not contribute to excessive visual clutter or visual disorder. • To ensure that signs do not cause loss of amenity or adversely affect the natural or built environment or the safety, appearance or efficiency of a road.	Business identification signage will be required to identify the project site.	Yes. A permit is triggered for business identification signage.
Clause 52.17 Native Vegetation	This clause regulates the removal of native vegetation. A permit is required under this provision to remove, destroy or lop native vegetation, including dead vegetation. The purposes of this clause are: • To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying	The project will require the removal of native vegetation both on the project site and the haulage route to the site from the Port.	Yes. A permit is triggered for the removal of native vegetation pursuant to the Moyne Planning Scheme.

Particular Provision	Purpose	Relevance to project	Permit required?
	the following three step approach in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning, 2017b) (the Native Vegetation Guidelines): 1. avoid the removal, destruction or lopping of native vegetation 2. minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided 3. provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation. • To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.		
Clause 52.29 Land Adjacent to the Principal Road Network	This clause regulated the creation or alteration of access to a road in the Transport Zone 2 (Woolsthorpe-Heywood Road).	The project will require alteration to the road to facilitate the haulage route for over-dimensional vehicles.	Yes.
Clause 52.32 Wind Energy Facility	This clause regulates the considerations for a wind energy facility.	The project is a wind energy facility and associated infrastructure.	Yes. A permit is triggered for the wind energy facility pursuant to this clause.
Clause 52.33 Post Boxes and Dry Stone Walls	The purpose of this clause is to conserve historic post boxes and dry stone walls.	Dry stone walls will be altered by the project.	Yes. A permit is triggered for alteration of a dry stone wall.



LEGEND

- Road
- Track
- Watercourse
- Willatook Wind Farm boundary
- Property

Planning Overlay

- Bushfire management overlay
- Environmental significance overlay - Schedule 4
- Environmental significance overlay - Schedule 5

Planning Zone

- Farming zone
- Transport zone 2
- Special use zone - schedule 5
- Special use zone - schedule 6
- Township zone

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Terminal station from Tetra Tech Coffey.
Roads, transmission line, watercourses, property and planning overlay from Vicmap.
Imagery from ArcGIS Online (various capture dates).

N

0 2 km

SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 6.1

Planning zones and overlays

DATE: 30.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F002_GIS DOC REFERENCE: 287657_02_FIGS_A.APRX_V02

6.2.6 Particular provisions

Particular provisions apply in certain circumstances and are in addition to any zone and overlay controls. There are several particular provisions which are relevant to the project, with the key provision being Clause 52.32 Wind energy facility.

Clause 52.05 Signs

Clause 52.05 regulates the development of land for signs and associated structures. Proposed signage would be within Farming Zone which, under Clause 35.07-7 and Clause 52.05-14, is within Category 4 – Sensitive Areas (maximum limitation).

The purpose of Clause 52.05 Signs is:

- to regulate the development of land for signs and associated structures
- to ensure signs are compatible with the amenity and visual appearance of an area, including the existing or desired future character
- to ensure signs do not contribute to excessive visual clutter or visual disorder
- to ensure that signs do not cause loss of amenity or adversely affect the natural or built environment or the safety, appearance or efficiency of a road.

A small business identification sign is proposed to be located at the site main entrance on Tarrone North Road. The detail and dimensions of the sign are shown in the book of plans which accompanies this application (Appendix A). The sign will be non-illuminated, 2 metres by 1.33 metres (total area of 2.66 square metres). The signage will be discrete and typical of similar sized wind farm project across Victoria, compatible with the context and visual appearance of the area. There would be no impact on road safety.

A permit is required to construct business identification signage up to an area of 3 square metres. Business identification signage exceeding 3 square metres is prohibited.

Clause 52.06 Car parking

Clause 52.06 outlines the relevant provisions for car parking under the scheme.

No permit is required under this provision as no rate is specified in Table 1 to Clause 52.06-5 for a wind energy facility or utility installation. However, under Clause 52.06-6, before a new use commences, car parking spaces must be provided to the satisfaction of the responsible authority.

This planning application comprises a request for the responsible authority's approval under this clause.

Clause 52.08 Earth and energy resources industry

Clause 52.08 regulates use and development of land for earth and energy resources industry.

A permit is not required for the proposed extractive industry (quarry) under Clause 52.08-1 if the project complies with Section 77T of the MRSD Act.

Section 77T states that a planning permit is not required for the quarry if an EES (including consideration of the quarry) has been prepared under the EE Act, the Minister's assessment of the EES has been submitted to the Minister, and a work authority has subsequently been granted by the Minister. A preliminary work plan for the proposed on-site quarry is included as an attachment to the EES (Attachment II – *Draft quarry work plan*). Following publication of the Minister's assessment, a detailed work plan would be prepared for formal review and endorsement by ERR.

Clause 52.17 Native vegetation

Clause 52.17 regulates the removal of native vegetation. A permit is required under this provision to remove, destroy or lop native vegetation, including dead vegetation.

The purposes of this clause are:

- to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with

the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning, 2017b) (the Native Vegetation Guidelines):

4. avoid the removal, destruction or lopping of native vegetation
5. minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided
6. provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation

- to manage the removal, destruction or lopping of native vegetation to minimise land and water degradation.

The project construction requires the loss of up to 4.6 hectares of native vegetation and six large trees (of which 0.04 hectares would be within Glenelg Shire). Losses of native vegetation and large trees would be offset according to the Native Vegetation Guidelines.

Under Clause 66, applications under the Detailed Assessment Pathway or on Crown land which is occupied or managed by the responsible authority must be referred to the Secretary to DELWP as a recommending referral authority.

Clause 52.29 Land adjacent to the Principal Road Network

Clause 52.29 regulates the creation and alteration of access to main roads.

A permit is required to create or alter access to a road in Transport Zone 2 (TRZ2) under Clause 52.29-2.

One access point to the project site from Woolsthorpe-Heywood Road (TRZ2) (approximately 250 metres west of Macknights Road) is proposed to be created/altered triggering this provision.

The relevant purposes of this clause are:

- to ensure appropriate access to the Principal Road Network or land planned to form part of the Principal Road Network.

An application to create or alter access to, or to subdivide land adjacent to, a road declared as a freeway or arterial road under the *Road Management Act 2004*, land owned by the Head, Transport for Victoria for the purpose of a road, or land in a Public Acquisition Overlay if the Head, Transport for Victoria is the acquiring authority for the land, must be referred to the Head, Transport for Victoria under section 55 of the Act.

Clause 52.32 Wind Energy Facility

Clause 52.32 is a key clause relevant to a wind energy facility application and sets out the relevant policy directives, including reference document *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* (DELWP, 2021f) (Policy and Planning Guidelines).

A permit is required under this clause to use and develop land for a wind energy facility.

The purpose of this clause which provides key context for consideration of the application is:

- to facilitate the establishment of expansion of wind energy facilities, in appropriate locations, with minimal impact on the amenity of the area.

The Policy and Planning Guidelines are a reference document under the planning scheme and listed within the decision guidelines under Clause 52.32. Key thematic considerations are noise, blade glint, shadow flicker, electromagnetic interference, landscape and visual impact, flora and fauna, aircraft safety, construction impacts and decommissioning.

This clause is a primary consideration in guiding decision making for wind energy facilities and includes a number of mandatory application requirements.

Under Clause 52.32-3, all applications must be accompanied by the consent of the owners of any existing dwellings within 1 kilometre of a wind turbine (measured from the centre of the tower at ground level), including:

- a plan showing all dwellings within 1 kilometre of a proposed turbine, which should include the dwelling, the proposed location of a turbine within 1 kilometre of the dwelling, and the distance between the dwelling and the proposed turbine
- evidence of the written consent of any owner as at the date of the application of an existing dwelling located within 1 kilometre of a proposed turbine. The evidence of written consent should include the name and address of the owners of the dwelling, the address of and title particulars for the land on which the dwelling is located, and a statement that the owner consents to application being made that includes a turbine(s) located as shown on an attached plan.

Under Clause 52.32-4 all applications must be accompanied by a site and context analysis, and a design response.

Clause 52.32-4 also outlines the mandatory requirement for a noise assessment, including:

- a pre-construction (predictive) noise assessment report demonstrating that the project can comply with the New Zealand Standard NZS6808:2010, *Acoustics – Wind Farm Noise*, including an assessment of whether a high amenity noise limit is applicable under Section 5.3 of the New Zealand Standard
- an environmental auditor appointed under Part 8.3 of the *Environment Protection Act 2017* must prepare a report that verifies if the acoustic assessment undertaken for the purpose of the pre-construction (predictive) noise assessment report has been conducted in accordance with the New Zealand Standard.

Clause 52.33 Post boxes and dry stone walls

Clause 52.33 aims to conserve historic post boxes and dry stone walls.

A permit is required under this clause to alter a dry stone wall along Landers Lane.

Under this clause a permit is required to demolish, remove or alter a dry stone wall constructed before 1940 on land specified in the schedule to the provision. All land in Moyne Shire is specified in the schedule to the provision.

This does not apply to:

- the demolition or removal of a section of a dry stone wall to install a gate
- the reconstruction of damaged or collapsing walls which are undertaken to the same specifications and using the same materials as the existing walls.

Impacts to the dry stone wall along Landers Lane will include four new access tracks (gates, no permit required), and four sections of temporary demolition for cabling laying. After cabling laying, these sections of wall would be reconstructed to the condition of the surrounding wall (like for like), however since the wall is not being reconstructed due to being damaged or collapsing, a permit is required.

6.2.7 General provisions

General provisions under Clause 60 include various administrative matters, and referral provisions.

The following general provisions relate to the project:

- Clause 62.01 Uses Not Requiring a Permit

  The use of land for earth and energy resources industry does not require a permit under the Farming Zone if the conditions of Clause 52.08 (Earth and Energy Resources Industry) are met. The project will meet the conditions of Clause 52.08 as outlined in this report.

- Clause 65 Decision Guidelines

  Pursuant to Clause 65, before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate:

  - the matters set out in section 60 of the Act
  - any significant effects the environment, including the contamination of land, may have on the use or development
  - the Municipal Planning Strategy and the Planning Policy Framework
  - the purpose of the zone, overlay or other provision
  - any matter required to be considered in the zone, overlay or other provision
  - the orderly planning of the area
  - the effect on the environment, human health and amenity of the area
  - the proximity of the land to any public land
  - factors likely to cause or contribute to land degradation, salinity or reduce water quality
  - whether the proposed development is designed to maintain or improve the quality of stormwater within and exiting the site
  - the extent and character of native vegetation and the likelihood of its destruction. Whether native vegetation is to be or can be protected, planted or allowed to regenerate
  - the degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard
  - the adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts
  - the impact the use or development will have on the current and future development and operation of the transport system.

- Clause 66 Referral Provisions

  Planning Scheme referrals under Clause 66 Referral and Notice Provisions include:

  - Clause 66.02-2 Native Vegetation – Secretary to DELWP – recommending referral authority.
  - Clause 66.02-4 Major electricity line or easement – The relevant electricity transmission authority – AusNet Services – determining authority.
  - Clause 66.03 Referral of Permit Applications under other State Standard Provisions - Clause 52.29 Land Adjacent to the Principal Road Network – Head, Transport for Victoria – determining authority.

6.2.8 Operational provisions

Operational provisions under Clause 70 relate to administration and enforcement of the planning scheme.

The following are key operational provisions that relate to the project:

- Clause 72.01-1 Responsible Authority for this Planning Scheme.

The Minister for Planning is the responsible authority for this application as it is in relation to the use and development of land for:

- an energy generation facility with an installed capacity of 1 megawatt or greater
- a utility installation used to:
  - transmit or distribute electricity
  - store electricity if the installed capacity is 1 megawatt or greater.

6.3 Permit triggers summary

Based on the above relevant planning controls, a planning permit is required for the project under the following clauses of the Moyne Planning Scheme:

- Clause 35.07 (Farming Zone): Use and development of a wind energy facility, and use and development of a utility installation.
- Clause 36.04 (Transport Zone): Use and development of a utility installation.
- Clause 37.01 (Special Use Zone Schedule 6): Use and development of a wind energy facility, and use and development of a utility installation.

- Clause 42.01 (Environmental Significance Overlay Schedule 4): Removal of vegetation.
- Clause 52.05 (Signs): Development of business identification signage in Farming Zone (Category 4 – Sensitive areas).
- Clause 52.17 (Native Vegetation): Removal of native vegetation.
- Clause 52.29 (Land Adjacent to the Principal Road Network): Create or alter access to a road in the Transport Zone 2 (Woolsthorpe-Heywood Road).
- Clause 52.32 (Wind Energy Facility): Use and development of a wind energy facility.
- Clause 52.33 (Post Boxes and Dry Stone Walls): Demolish, remove or alter a dry stone wall.

This application also seeks approval for car parking spaces provided to the satisfaction of the responsible authority in accordance with Clause 52.06-6.

It is noted that under Clause 52.08 of the Moyne Planning Scheme and Section 77T of the MRSD Act a permit is not required for the use and development of land for a quarry if an EES and subsequent work authority applies. Consequently, a permit is not sought for a quarry as part of this planning application.

6.4 Referral agencies

6.4.1 Department of Transport

Under Clause 52.29-4 and 66.03 an application to create or alter access to a road in the Transport Zone 2 must be referred to the Head, Transport for Victoria as a determining referral authority under Section 55 of the P&E Act.

6.4.2 Secretary to DELWP

Under Clause 52.17 and Clause 66.02-2, native vegetation removal applications under the Detailed Assessment Pathway or on Crown land which is occupied or managed by the responsible authority must be referred to the Secretary to DELWP as a recommending referral authority.

6.4.3 AusNet Services

Under Clause 66.02-4, an application to construct a building or construct or carry out works on land within 60 metres of a major electricity transmission line (220 kilovolts or more) or an electricity transmission easement, must be referred to the relevant electricity transmission authority (AusNet Services) as a determining referral authority.

6.4.4 Workcover

Under Clause 66.02-7 an application for a utility installation where a fire protection quantity is exceeded under the Dangerous Goods (Storage and Handling) Regulations 2012 must be referred to the Victorian WorkCover Authority as a determining referral authority. The fire protection quantity for lithium-ion batteries is 20 tonnes under the Dangerous Goods (Storage and Handling) Regulations 2012. The weight of lithium-ion batteries that is proposed will exceed this quantity therefore referral is required.

Chapter 7

Assessment

The following section provides an assessment of the project against all relevant sections of the Moyne Planning Scheme, including against the purposes and decision guidelines of the relevant provisions outlined in this report, the decision guidelines in Clause 65, and any other relevant matter.

The primary considerations relating specifically to wind farm applications include the provisions of Clause 52.32 Wind Energy Facility, including the Policy and Planning Guidelines and the key overarching policy statement at Clause 19.01-2 Renewable energy.

The following assessment is structured thematically with consideration of these provisions, followed by other relevant planning scheme considerations, as follows:

- contribution to government policy objectives
- consistency with zoning and overlay provisions
- addressing mandatory requirements for applications
- amenity impacts
  - noise
  - blade glint
  - shadow flicker
  - electromagnetic interference
  - landscape and visual impacts
- impacts on the natural environment
  - surface and groundwater
  - ecology
- heritage considerations
- community and safety
  - aircraft safety
  - traffic and road impacts
  - blade drop
  - fire prevention and safety
  - air quality
- economic and social aspects
- other matters
- cumulative impacts
- environmental management.

Each section explains its purpose, the assessment, relevant management and mitigation measures and refers to the relevant planning scheme, policy provisions and guidelines against which it is being assessed.

7.1 Planning and land use

7.1.1 Contribution to achieving government policy objectives

The primary considerations relating specifically to wind farm applications include the provisions of Clause 52.32 Wind Energy Facility, including the Policy and Planning Guidelines, which seeks "*to facilitate the establishment and expansion of wind energy facilities, in appropriate locations, with minimal impact on the amenity of the area"*, and the key overarching policy statement at Clause 19.01-2 Renewable energy which seeks "*to promote the provision of renewable energy in a manner that ensures appropriate siting and design considerations are met*".

The project responds positively to the balance of policies by providing a large-scale renewable energy project in an appropriate location with a high quality wind resource. Due consideration has been given to the

range of potential impacts as demonstrated throughout the following assessment sections of this report. Impacts on the local community and environment have been appropriately minimised.

Renewable energy would be promoted in accordance with Clauses 19.01-1S and 19.01-2S. Construction of the proposed wind farm would require installation of high voltage electrical plant and the completion of high voltage line works that would contribute to the ongoing strengthening of Victoria's electricity grid.

The project would assist in the reduction of greenhouse gas emissions and minimises the adverse impacts of climate change in accordance with Clauses 13.01-1S and 15.02-1S. The project would result in efficiencies for the network resulting from economies of scale and would also allow consolidation of transmission investment, further reducing costs and greenhouse gas emissions for Victoria and for the national electricity network.

Effective land use planning would be promoted more broadly, promoting economic development and protection of community amenity and environmental and cultural heritage values in accordance with Clauses 13.05-1S and 13.07-1S. The project is located in an area dominated by non-intensive agriculture (primarily grazing) and away from population centres. The area is sparsely populated relative to other areas in Victoria, is close to transmission infrastructure and therefore presents a good general land use outcome and location for wind energy facility development. Cumulative impacts are considered, with cumulative amenity impacts on the few private rural residences in the vicinity being the main consideration. The full impact of the facility in terms of amenity and cumulative impacts is further considered in the following assessment sections of this report.

7.1.2 Consistency with planning provisions

Zones

Clause 35.07 Farming Zone

On balance, the proposed use and development is consistent with the relevant purposes of the FZ.

The proposed project is located in an area dominated by grazing and agricultural activities. The area is sparsely populated with the nearest population centre being Orford (population 105), approximately 3 kilometres south-west of the project site. There are no significant concentrations of small lot rural living properties or sensitive agricultural land uses in the immediate vicinity. There would be no unreasonable detrimental impacts on sensitive interfaces including residential properties. Amenity impacts are discussed further in Section 7.2.

There would be no significant impact on agricultural productivity. The project would occupy approximately 2.4% of the total site area of 4,154 hectares, which is a negligible reduction of agricultural land noting that the land is not used for irrigated horticulture or other high intensity agricultural activities. The remainder of the project site would be available for continued use of the existing non-intensive agriculture and/or other agricultural activities. Most access tracks, which make up a significant portion of the 2.4% of land used for the project, could be used and beneficial for existing farming operations.

The proposal is a complimentary use for existing agricultural operations. By adding a new and drought-proof income stream for the owners involved in the wind farm, the proposed use and development of the site will contribute towards the diversification and resilience of farming and agriculture in the Moyne Shire. A diversified local economy, particularly rural economies, is identified as a priority in policies at Clause 17.01-1S and 19.01-1S. Construction of the wind farm would support local manufacturers, heavy industry and small business via the supply of concrete, road building materials, electrical cabling, equipment hire, accommodation, consumables, and hospitality services, thereby contributing to the resilience of the local economy. The sustainability of agricultural enterprise and the accompanying retention of employment is supported by the project in accordance with the purposes of the zone.

Agreements with stakeholders (participating landowners) have been put in place to ensure that the owners/occupiers can continue to farm during the construction period, and once the wind farm is in operation, farming activities can continue around the wind turbines. Wind farms are compatible with agricultural use and therefore meet the objectives of the zone as well as of Clause 14.01, which seeks to maintain sustainable agricultural land.

Clause 37.01 Special Use Zone

Infrastructure proposed within the SUZ6 includes the connection point to the Tarrone Terminal Station and access tracks. Main site facilities including on-site substation, battery energy storage system, construction compound and operations and maintenance facility also straddle the border between of the FZ and SUZ6, with the bulk of the built form of these facilities outside the SUZ6 area and within the FZ.

The SUZ6 land has not been developed for a power station. The land is currently occupied by the Tarrone Terminal Station with the balance of the land under use for agriculture (grazing). AGL states on their Tarrone Power Station project website that they have 'no immediate plans to begin construction of this project'.

Regardless of the progress or otherwise of the Tarrone Power Station, the project would not impact on the development or operations of the power station and therefore would not be inconsistent with the purposes of the zone. The proposal is not inconsistent with the objectives of SUZ6 as the components of the project proposed in these locations are not accommodation uses or otherwise are not sensitive land uses. Should the proposed wind farm be approved and built, the ability to construct a gas fired power station on the SUZ land would be remain unconstrained by the proposal. No sensitive uses are proposed, therefore there are no potential amenity issues introduced within the area of the proposed power station.

Clause 36.04 Transport Zone 2

The purpose of the Transport Zone 2 (TRZ2) is to manage impacts on the principal road network. Woolsthorpe-Heywood Road is a TRZ2 road along the northern border of the project site. An access point and turn-out is proposed along Woolsthorpe-Heywood Road in the western section of the project, with a section of this road also requiring upgrades. This upgrade would involve widening of the road seal to two lanes (currently single lane) and would occur within the existing road pavement as opposed to widening the road corridor itself.

There would not be any significant adverse impacts on the road network as a result of the operation of the project. Routine maintenance would not exceed the capacity of the road network and would be low to negligible impact.

Construction impacts would consist of impacts generated by staff travelling to/from the site, over dimensional vehicles for deliveries and other heavy vehicles for smaller components and construction materials. Construction impacts would be appropriately managed via the relevant Traffic Management Plan and are discussed further in Section 7.5.2 of this report.

Traffic impacts are detailed in the traffic and transport assessment prepared by Ratio Consultants provided in Appendix F.

Development, operation and safety of the transport system would not be compromised, in accordance with the purposes of the TRZ2 at Clause 36.04 and in accordance with the Planning Policy Framework at Clause 18.02-3S. The project has a minor to negligible impact on the TRZ2. The project would not require any alterations to land adjacent to the TRZ2.

Overlays

Clause 42.01 Environmental Significance Overlay

The purpose of ESO4 is to protect the use and development of the Shaw River Power Station, primarily to protect the area from encroachment from residential development and conflicting uses so as not to restrict the potential development and operation of the power station.

The incorporated document Shaw River Power Station, Orford, October 2010, contains the following expiry clause:

> ***Expiry of this Control***
>
> *This control expires if:*
>
> - *the development is not started within 4 years of the amendment coming into effect*
> - *the development is not completed within 15 years after commencement.*

Amendment C036 for the Shaw River Power Station was gazetted 1 November 2010. The incorporated document for the power station has expired and it is understood the proponent (Santos) is no longer progressing with the project.

The project would not affect the development of the proposed Shaw River Power Station as there is no conflicting infrastructure or sensitive uses proposed that could affect the power station development. No accommodation or other sensitive uses are proposed near the Shaw River site and no vegetation that is proposed to be removed is important to protect the amenity of existing dwellings from potential Shaw River Power Station operations. The project is not inconsistent with the purposes of the ESO4.

Clause 44.06 Bushfire Management Overlay

There is no permit trigger for the project under the Bushfire Management Overlay, however an assessment of bushfire safety including against the requirements of the CFA Guidelines is provided in Section 7.5.4 of this report.

Particular provisions

Clause 52.32 Wind Energy Facility

The potential impacts associated with wind farms are identified in Clause 52.32 (Wind energy facility) of the Moyne Planning Scheme and also discussed in the Policy and Planning Guidelines (DELWP, 2021f). A summary of how the project responds to the requirements of these guidelines is included in Table 7-1.

Table 7-1 Wind energy provisions assessment

Provisions	Requirement	Assessment
Turbine must not be within 1 kilometre of a dwelling	Clause 52.32-3 states that if an existing dwelling is located within one kilometre of any turbine (measure from the centre of the tower at ground level) that forms part of a proposed wind energy facility, the permit application must be accompanied by evidence of the written consent of the owner of the dwelling. The application is prohibited by the planning scheme where evidence of written consent is not provided.	Dwelling owners within 1 kilometre have consented to the project.
Site context and analysis requirement	Clause 52.32-4 states that a site and context analysis is required to include: • site, dimensions and size of the project • orientation and elevational information • explanation of the current land use, landscape, above ground utilities, access to infrastructure • wind characteristics.	The project has been designed to respond to the site opportunities and constraints. The layout has considered the location and avoidance of native vegetation, heritage assets and natural features.
Noise and vibration assessment	Clause 52.32-4 states that an application must be accompanied by a pre-construction (predictive) noise assessment report demonstrating the proposal can comply with the New Zealand Standard NZS6808:2010, Acoustics – Wind Farm Noise. An environmental verification report of the pre-construction (predictive) noise assessment report has been prepared by an accredited environmental auditor (Appendix J2 – *Pre-construction noise assessment verification report*). A post-construction noise assessment report prepared in accordance with the New Zealand Standard NZS6808:2010, Acoustics – Wind Farm Noise, demonstrating whether the wind energy facility complies with the Standard, must be submitted to the Responsible Authority. Each post-construction noise assessment report must be accompanied by an environmental audit report prepared by an environmental auditor.	An assessment against the standard is provided Appendix J1 – *Environment noise assessment report*. Necessary noise assessments, including an environmental audit, would be submitted with the planning application. In accordance with the standard, compliance has been demonstrated at all wind speeds at all non-stakeholder dwellings and non-residential noise sensitive locations near the project site. A post-construction noise assessment report and associated environmental audit would be a permit condition of the project.

Provisions	Requirement	Assessment
Shadow flicker, blade glint and electromagnetic interference	Clause 52.32-5 requires an assessment of the effect of the project on the surrounding area in terms of blade glint, shadow flicker and electromagnetic interference. The shadow flicker experienced immediately surrounding the area of a dwelling (garden fenced area) must not exceed 30 hours per year as a result of the operation of the wind energy facility. Blades should be finished with a surface treatment of low reflectivity to ensure that glint is minimised. The potential for electromagnetic interference from the generation of electricity from a wind energy facility should be minimised, if not eliminated, through appropriate turbine design and siting. The siting of wind turbines in the 'line of sight' between transmitters and receivers should be avoided.	An assessment of blade glint, shadow flicker (Appendix L) and electromagnetic interference (Appendix M) have been prepared. All non-stakeholder dwellings would experience less than 30 hours of shadow flicker per year. In relation to blade glint, all modern wind turbines are finished with a surface treatment of low reflectivity. If required, management measures would be used to avoid or minimise electromagnetic interference to the services assessed in Appendix M – *Electromagnetic interference*.
Views and visual impact	Clause 52.32-4 requires that an application provide a site and context analysis which includes: • the landscape of the site • view to and from the site, including view from existing dwellings and key vantage points including major roads, walking tracks, major roads, airports, aerodromes and existing and proposed wind energy facilities • a written report, which includes an assessment of the visual impact of the proposal on the surrounding landscape.	A landscape and visual assessment (Appendix K1) has been prepared which outlines the existing landscape characteristics of the project site. This assessment identified that the sensitivity of the landscape surrounding the project to the proposed changes is low, and the proposed levels of visual change can be accommodated.
Biodiversity and natural environment and systems	Clause 52.32-4 requires that an application provide a response to impacts of the proposal on any species listed under the FFG Act or the EPBC Act.	The project has been designed to avoid and minimise the loss of native vegetation. The current footprint of the wind farm development would result in the removal of up to 4.6 hectares of native vegetation and eight large trees, representing less than 1% of the native vegetation within the site. An assessment of impacts to species listed under the FFG Act and the EPBC Act has been completed Appendix P – *Biodiversity.*
Cultural heritage	Clause 52.32-4 (Application requirements) of the planning scheme requires that an application provide a response to impacts of the proposal on Aboriginal or non-Aboriginal cultural heritage.	A CHMP is being prepared for the project. A Planning Permit cannot be issued before a CHMP has been approved.
Aircraft safety	Clause 52.32-5 requires the responsible authority must consider as appropriate the impact of the facility on aircraft safety.	An aviation impact assessment has been prepared for the project (Appendix O – *Aviation*).
Environmental Management	Clause 52.32-4 requires that any written report includes an environmental management plan, including any rehabilitation and monitoring requirements.	An Environmental Management Plan would address managing and monitoring matters.

7.2 Amenity impacts

7.2.1 Noise and vibration

Purpose

Both Clause 52.32 of the Moyne Planning Scheme and the Policy and Planning Guidelines stipulate that a wind energy facility must comply with the noise limits in the New Zealand Standard NZS 6808:2010 Acoustics – Wind Farm Noise. This standard provides methods for the prediction, measurement, and assessment of sound from wind turbines and is used as a regulatory guideline in several States and Territories within Australia.

Clause 52.32 stipulates that a wind farm planning permit application must be accompanied by a pre-construction (predictive) noise assessment report demonstrating that the proposal can comply with the New Zealand Standard NZS6808:2010, *Acoustics – Wind Farm Noise*, including an assessment of whether a high amenity noise limit is applicable under Section 5.3 of the New Zealand Standard.

An application must also be accompanied by a report prepared by an environmental auditor appointed under Part 8.3 of the *Environment Protection Act 2017* that verifies the predictive noise assessment has been conducted in accordance with the New Zealand Standard.

This section outlines the findings of the noise and vibration assessments undertaken for the project, provided in Appendix J1 (*Environmental Noise Assessment report*), prepared by Sonus Pty Ltd.

A report prepared by an environmental auditor verifying the results of the predictive noise assessment by Sonus was undertaken by EnviroRisk Management (see Appendix J2). EnviroRisk Management is an accredited environmental auditor under Part 8.3 of the *Environment Protection Act 2017*. An independent peer review of the impact assessment report and management plan was also undertaken by Resonate Consultants (Appendix J3 – *Noise Report Peer Review*).

Assessment

Noise

Noise would be generated by the construction, operation and decommissioning of the project.

Background noise monitoring was undertaken at 12 dwellings within and around the project site, measured in 10-minute intervals, to determine the baseline conditions and operational noise criteria. The results from the noise monitoring indicate that background noise levels are typically less than 50 dB(A) at all wind speeds, with some monitoring locations recording noise levels between 50–60 dB(A) at wind speeds above 6 metres per second. These noise levels are typical of rural environments. The noise data collected at each monitoring location was correlated with the wind speed at hub height (i.e., 169 metres) for each 10-minute measurement period to determine the noise criteria at the monitoring locations. 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 compliance monitoring.

To comply with the general environmental duty relating to noise, the approach has been to first avoid or limit potential impacts by creating appropriate separation distances between proposed project infrastructure (such as the quarry, concrete batching plants and the wind turbines) and sensitive receptors (in this case dwellings). Further management controls would then be implemented in accordance with relevant regulations and guidelines prior to and during construction, operation and decommissioning.

During project construction, potential noise- and vibration-generating activities would include works associated with access track construction, civil works, excavation, foundation construction, electrical infrastructure works and turbine erection. A detailed assessment of the noise from these construction activities, based on maximum overall sound power levels, was undertaken as part of the Environmental Noise Assessment report preparation (Appendix J1). This assessment has been prepared in accordance with EPA Victoria Publication 1834: *Civil construction, building and demolition guide*. Potential vibration impacts during construction were assessed in accordance with relevant standards for building damage.

Noise emissions from the project during construction, operation and decommissioning are required to meet the general environmental duty, as contained within the EP Act. The general environmental duty requires

risks of harm to human health and the environment from polluting activities to be eliminated so far as reasonably practicable. Where it is not reasonably practicable to eliminate such risks, they are required to reduce them so far as reasonably practicable. For this project, this involved comprehensive assessment of siting of project infrastructure in the planning and design process to minimise the risks to sensitive areas. Mitigation measures were developed and included in the noise modelling assessment; however, these will be further developed in the site-specific noise and vibration management plan.

Under the EP Act, the noise modelling is used as a tool to assist in understanding risks. Any model predicted exceedances of noise criteria (in EPA guidance documents) help to identify an unacceptable level of risk; however, the noise criteria do not represent levels below which no action is required.

Construction

Wind turbines and concrete batching plants noise

The noise levels from typical construction activities, which would occur at each wind turbine site and concrete batching facility location, have been predicted as a typical worst-case scenario for the various stages of construction.

The predicted noise levels from construction of wind turbines, the substation and battery, and operation of the concrete batching plants at the closest dwellings are predicted to be less than the reference levels outlined within EPA Victoria's Publication 1834: *Civil construction, building and demolition guide*. Further detail on the predicted noise levels from these activities are provided in Section 4.2 – *Prediction model* and Section 4.3 – *Noise levels* of the Construction Noise Assessment attached to Appendix J.

The reference level of 40 dB(A) for weekend or evening works (outside normal working hours) is achieved for all proposed activities associated with the construction of wind turbines, substation and battery, and concrete batching plants, based on the separation distances from the closest non-stakeholder dwellings. The loudest wind farm construction activities at a distance of 1,500 metres are predicted to be associated with the preparation of the nacelle and hub for installation (35 dB(A)), with both requiring the use of hand tools and a crane. Noise from the substation and battery construction is predicted to be up to 40 dB(A) at a distance of 890 metres, which is the distance to the nearest dwelling. Noise from concrete batching activities at 1,200 metres is predicted to be up to 37 dB(A).

At stakeholder dwellings, which are closer to construction activities, higher noise levels would be experienced. The noise level at the closest occupied stakeholder dwelling, an addition of 7 dB(A) can be applied to the predicted levels for turbine sites, 2 dB(A) for the substation and battery site, and 3 dB(A) for the concrete batching plant sites. At times, some construction activities are predicted to be marginally above the "outside of normal working hours" reference level of 40 dB(A). The higher noise levels are generally accepted given that the dwellings are associated with the project and its outcomes.

The "night time" reference level (30 dB(A)) is only achieved for one proposed construction activity at the closest non-stakeholder dwelling, however works are not proposed to occur at night unless they are unavoidable and are approved by the responsible authority. In reality, noise levels would likely be less than those predicted as a result of topography and barriers at the construction site.

Operation

Wind turbine noise

The noise level at stakeholder and non-stakeholder residences is provided in the Environmental Noise Assessment report (Appendix J) in tabulated form for wind turbine operation.

For wind energy facilities, the New Zealand Standard NZS 6808:2010 *Acoustics – Wind Farm Noise* specifies that any sound levels associated with the facility should not exceed a 40 dB(A) ($L_{A90(10min)}$) noise limit at noise sensitive locations (outdoors) or exceed existing background sound levels by more than 5 dB(A) (whichever is the greater). In 'high amenity areas' (i.e., areas where a higher degree of amenity protection for the sound environment is required) the noise limit becomes the background noise level plus 5 dB(A), or a level of 35 dB(A) (whichever is the greater). Noise sensitive locations outside the 35 dB(A) ($L_{A90(10\ min)}$) contour do not need to be considered.

Noise from the wind turbines was modelled within the SoundPLAN 8.2 noise modelling software using the CONCAWE and ISO 9613 noise models. Both methods were used so that the most conservative (i.e., most

onerous) noise prediction model could be used to place wind turbines, with some stakeholders having shown an interest in both modelling methods.

Modelling of the project operational wind turbine noise for each of the dwellings in the vicinity was based on 59 Vestas V162 wind turbines with a hub height of 149 metres and tip height of approximately 230 metres. Although increasing a source height can sometimes result in higher noise levels (because of less absorption of sound waves by the ground surface), increasing the tip height to the proposed maximum (169 metre hub height and 250 metre tip height) does not result in higher noise predictions. This is because the ground attenuation near the noise source is already removed by the 230-metre height and as such, there is a negligible change from increasing the height to 250 metres.

New Zealand Standard NZS 6808:2010 provides the definition of 'high amenity areas' and reduced noise limits. The determination of whether a particular area should be considered as a high amenity area is based on the following test, which is defined in Section 5.3 of New Zealand Standard NZS 6808:2010:

- Does the planning schedule relevant to the location of non-stakeholder residential properties where the predicted wind farm noise level is at or above 35 dB require a high level of amenity?
- If the relevant planning schedule requires a high level amenity, is the high amenity area noise limit justified based on the calculation detailed in Comment C5.3.1 of NZS 6808:2010?

All dwellings within the 35 dB(A) contour are located within the Farming Zone. The Victorian Civil and Administrative Tribunal determination and panel report for the Cherry Tree Wind Farm (Cherry Tree Wind Farm Pty Ltd v Mitchell Shire Council, 2013) found that Farming Zones do not promote a higher degree of protection of amenity related to the sound environment. The determination is referenced and supported in the Golden Plains Wind Farm panel report. As such, it is considered that the criteria for 'high amenity areas' do not apply to the project.

Both CONCAWE and ISO 9613 models predict that the wind turbine operational noise complies with the New Zealand Standard at all non-stakeholder dwellings (i.e., the predicted noise level is no more than 39 dB(A)), thereby achieving the noise criteria of 40 dB(A). The highest predicted noise level at a stakeholder dwelling is 43 dB(A), which achieves the 45 dB(A) criterion of the Policy and Planning Guidelines.

The results for both models are shown in the noise prediction contours for the highest predicted noise level wind speed (11 metres per second) (see Figure 7-1 (CONCAWE) and Figure 7-2 (ISO 9613)).

Predictions for the final layout and turbine selection would be included in a pre-construction noise assessment, which would indicate if the noise criteria can be achieved at all dwellings at all wind speeds. Compliance monitoring would be undertaken during operation to ensure the noise criteria are achieved at dwellings. Further background noise monitoring, in addition to that already performed in 2010, would be undertaken pre-construction to compare with post-construction (i.e., operational) compliance monitoring. If any noise exceedances are identified, modifications (such as operation of wind turbines in noise reduced modes under specific wind conditions) would be required.

On-site substation and battery facility noise

The noise level at stakeholder residences is provided in the Environmental Noise Assessment report (Appendix J) the grid noise maps for the substation and battery facility.

The highest predicted noise level at residences in the vicinity of the substation/battery facility is at dwelling D8, which is a stakeholder dwelling. Without treatment of the site, noise levels at this residence are predicted to be 38 dB(A) during the day/evening period and 36 dB(A) during the night (inclusive of a 2 dB(A) penalty for potential tonality). With the inclusion of the treatment recommended in the report, being a "reduced noise level transformer", the noise levels are reduced to 36 dB(A) and 34 dB(A) respectively (see Figure 7-3).

When considering the cumulative noise levels, which include operation of the approved, but not constructed, gas-fired power station, the predictions increase to 36 dB(A) during the night and 37 dB(A) during the day/evening period. No penalties are applied to the cumulative predictions given the likelihood that the combination of sources would result in tonality from transformers being masked.

Based on the predicted noise levels above, the criteria would be achieved in all instances, with the exception of during the night period with the gas fired power station operating.

Should the power station proceed to construction, the Willatook substation/battery facility can be further treated to ensure the night time criterion is achieved. If necessary, a barrier will be designed to reduce the noise levels from the transformers and containerised batteries such that the cumulative noise level is reduced to 34 dB(A) during the night period.

There is the potential for the noise from transformers to be tonal in character. When the noise has this character then an adjustment is required if the noise is just detectable or prominent, as defined in the EPA Noise Protocol.

Sound power level data for the proposed transformers and battery facility are summarised in Appendix J1 – *Environmental Noise Assessment*.

Given the distance from the sensitive receptors (all dwellings in the case of the project), any tone from transformers may be just detectable. In this situation and in accordance with the Noise Protocol, a 2 dB(A) adjustment (increase) would be applied for the noise tonal character, increasing the predicted noise levels to 37 dB(A) during the day and evening periods, and 35 dB(A) during the night. Where an adjustment applies, there is the potential for the 34 dB(A) night time noise criteria to be exceeded. In addition to "standard" substation transformer noise levels, the Australian/New Zealand Standard AS/NZS60076.10:2009, *Power transformers – Determination of sound levels* also defines a "reduced" sound power level. The project would ensure that the sound power level of the transformer would be no more than the specified reduced sound power level. With the adoption of a reduced sound power level for the transformer and a 2 dB(A) adjustment, the noise level at the closest dwelling is predicted to be 35 dB(A) during the day and evening and 33 dB(A) during the night.

Noise character can be described as:

- **Tonal:** noise typically associated with a particular frequency (pure tone) and can often be more annoying. Tonal noise can be generated by rotating equipment (e.g., fan blades).
- **Impulsive:** sharp, brief increases in noise volume. Impulse noise can be generated by voltage spikes in equipment.
- **Intermittent:** noise that starts and stops.

Factoring in these measures, the noise from the on-site substation and battery facility would achieve the Noise Protocol criteria at all dwellings. Compliance with the Noise Protocol is expected to assist with meeting the general environmental duty

Vibration

Construction

It is expected that the main sources of vibration would be from the operation of earth moving equipment and blasting at the quarry site, as well as during the construction of the wind turbine foundations. The level of vibration will depend on the energy input of the equipment, as well as the local ground conditions.

Vibration from earth moving activities is unlikely to be detectable to humans at a distance of 100 metres. As the nearest dwellings are significantly more than 100 metres from these construction activities, vibration impacts are expected to be negligible.

Operation

Vibration from wind turbine operation was assessed against International Standard ISO 10137:2007 and based on previous measurements of ground vibration for Challicum Hills Wind Farm, located east of Ararat in western Victoria. Modern wind farms produce very low levels of ground vibration.

Based on previous ground vibration measurements at Challicum Hills Wind Farm and the recommendation of International Standard ISO 10137:2007 for 'critical working areas', ground vibration from the wind turbines would be undetectable at nearby dwellings.

Cumulative noise

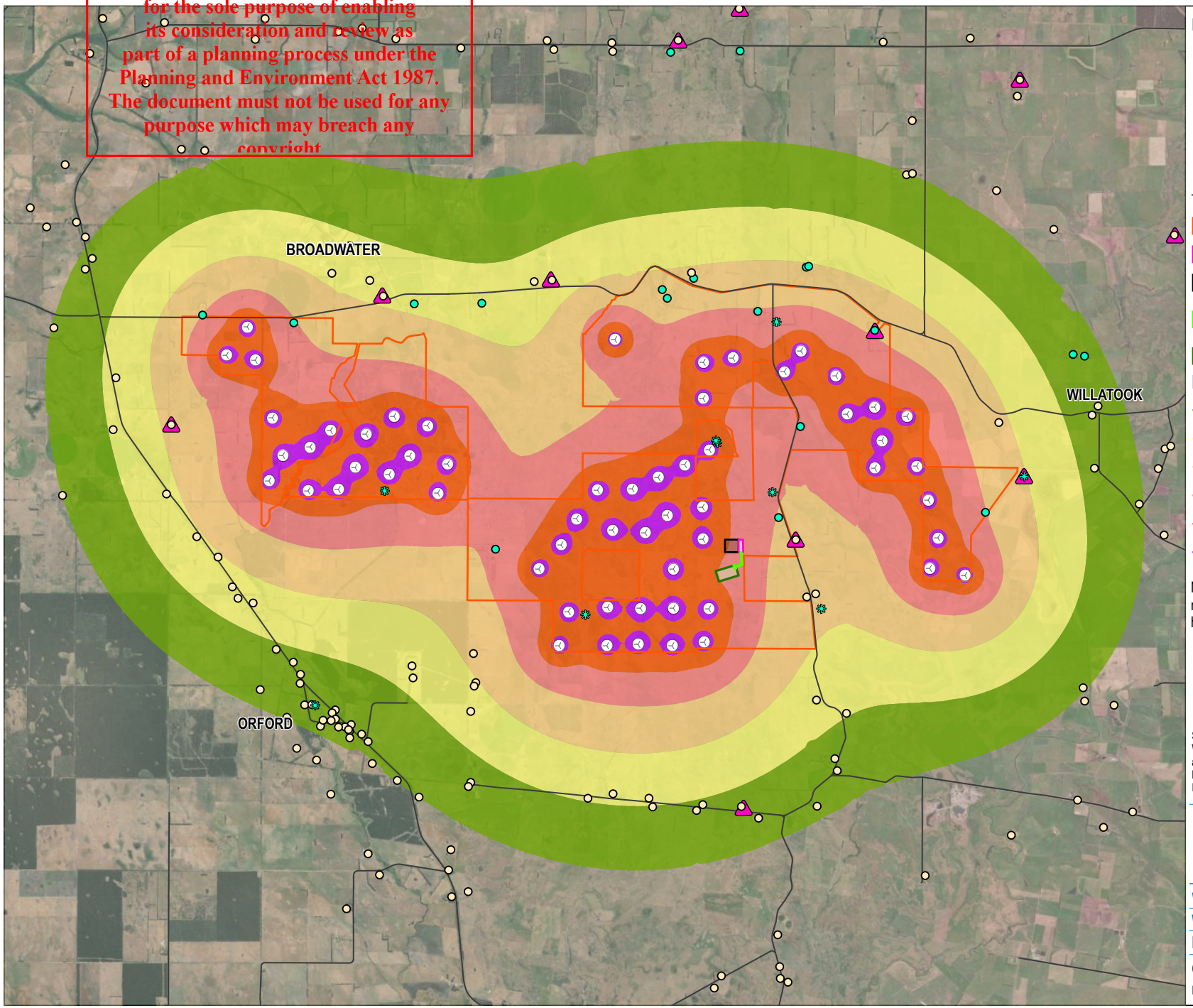
There are four wind farms within 15 kilometres of the project site that are either in operation or have already received planning approval. Based on the distance between the project and these wind farms no cumulative noise impacts are predicted. Nonetheless the closest operating wind farm to the project was assessed quantitatively. This is the Macarthur Wind Farm, located approximately 7 kilometres north from the closest proposed project wind turbine.

Based on a conservative modelling approach of the noise receiver being downwind of both the Macarthur and project wind farms, predictions indicate that the noise level at high wind speeds at non-stakeholder dwellings between the two wind farms would be less than 40 dB(A). As such, the baseline noise criteria of 40 dB(A) for all wind speeds at all dwellings between the Macarthur and the project wind turbines would be achieved. Cumulative noise prediction contours for the project and Macarthur Wind Farm are included in Appendix J1.

The project would not increase the noise levels or result in non-compliance with the noise criteria when the Ryan Corner, Hawkesdale or Woolsthorpe wind farms are also considered. Those wind farms (and wind turbines) are too far away to contribute noise to a point where the criteria are exceeded (refer to Appendix J1 for a more detailed explanation). As such, the cumulative noise impact of the Ryan Corner, Hawkesdale and Woolsthorpe wind farms was not considered further.

The Tarrone gas-fired power station (located at the Landers Lane/Riordans Road intersection in the south-east portion of the project site) was approved in 2012, however it has not been developed. An existing substation, associated with the Macarthur Wind Farm, is also located at this site. The noise and vibration assessment considered the combined noise level from the operation of the proposed gas-fired power station, existing substation, and the project on-site substation and battery facility. Based on the modelled combined (cumulative) noise levels from these noise sources, the noise criteria for utilities (i.e., 34 dB(A) during the night time, 45 dB(A) during the day and 39 dB(A) during the evening) would be achieved at the non-stakeholder dwellings closest to the proposed gas-fired power station.

Noise modelling predicts that the project noise criteria of 40 dB(A) for the operation of the wind turbines would be achieved at all non-stakeholder dwellings. Similarly, noise predictions from the on-site substation and battery energy facility are predicted achieve the relevant noise criteria.



LEGEND

- Noise monitoring location
- Turbine location
- Non-involved stakeholder dwelling
- Involved stakeholder dwelling
- Dilapidated dwelling
- Major road
- Willatook Wind Farm boundary
- Substation 33kV/220kV
- Battery energy storage system
- Transmission line and grid connection infrastructure
- Tarrone Terminal Station

Noise level (db(A))

- >= 25
- >= 30
- >= 35
- >= 40
- >= 45
- >= 50

Noise (dBA) modelled using Vestas V162 model at a wind speed of 11m/s at a hub height of 149 meters.

SOURCE:
Willatook Wind Farm boundary, dwellings, noise contours and noise monitoring locations from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 1 2 km

SCALE 1:95,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

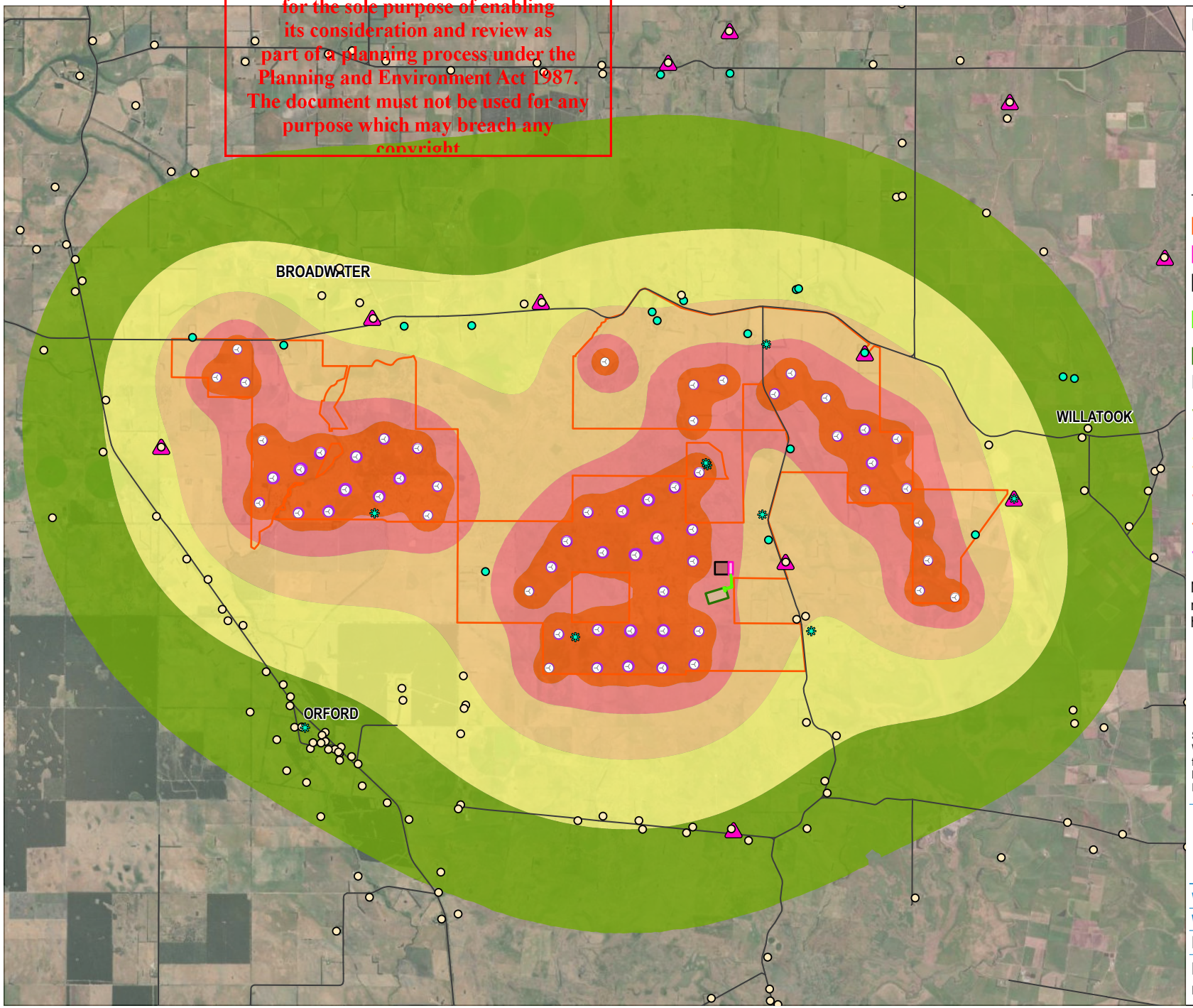
WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.1

CONCAWE prediction model noise contours

DATE: 24.02.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F043_GIS DOC REFERENCE: 287657_02_FIGS_D APRX_V02



LEGEND

- Noise monitoring location
- Turbine location
- Non-involved stakeholder dwelling
- Involved stakeholder dwelling
- Dilapidated dwelling
- Major road
- Willatook Wind Farm boundary
- Substation 33kV/220kV
- Battery energy storage system
- Transmission line and grid connection infrastructure
- Tarrone Terminal Station

Noise level (dB(A))

- >= 25
- >= 30
- >= 35
- >= 40
- >= 45
- >= 50

Noise (dBA) modelled using Vestas V162 model at a wind speed of 11m/s at a hub height of 149 meters.

SOURCE:
Willatook Wind Farm boundary and noise contours from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

N

0 1 2 km

SCALE 1:95,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

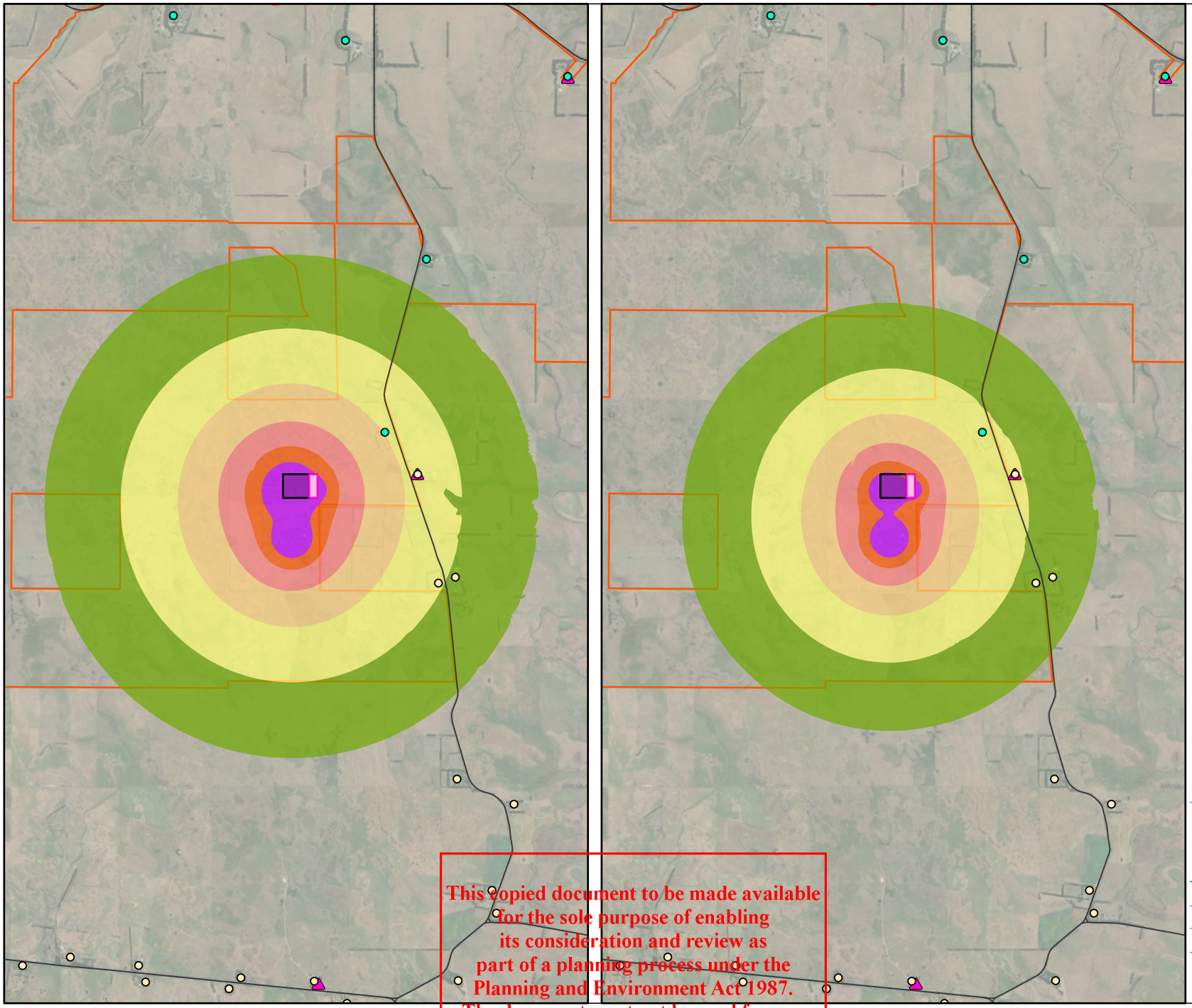
WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.2

ISO 9613 prediction model noise contours

DATE: 24.02.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F042_GIS DOC REFERENCE: 287657_02_FIGS_D_APRX_V01



LEGEND

- Non-involved stakeholder dwelling
- Involved stakeholder dwelling
- Noise monitoring location
- Major road
- Substation 33kV/220kV
- Battery energy storage system
- Willatook Wind Farm boundary

Noise level (dB(A))

- >= 25
- >= 30
- >= 35
- >= 40
- >= 45
- >= 50

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary and noise level measurements from Wind Prospect.
Imagery from ArcGIS Online (various capture dates).

N

0 1 km

SCALE 1:50,000
PAGE SIZE: **A4**
PROJECTION: **GDA 94 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 13.8

Predicted ancillary infrastructure noise contours using a reduced noise level transformer for day (left) and night (right)

DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.

DATE: 12.05.22 PROJECT: 754-MELEN287657 FILE: 287657_01_F053 DOC REFERENCE: 287657_02_FIGS_F.APRX_V02

Mitigation

The three temporary concrete batch plants have been located to provide convenient access to all wind turbines, with consideration of setback distances from dwellings. The closest dwelling (sensitive receptor) to a proposed concrete batch plant is approximately 1,200 metres. The closest non-stakeholder dwelling is approximately 1,800 metres to a proposed concrete batch plant.

Adoption of a reduced sound power level mode of the substation is proposed, as defined under the Australian/New Zealand Standard AS/NZS60076.10:2009, *Power transformers – Determination of sound levels*, ensuring compliance with the Noise Protocol.

There have been concerns raised by the community regarding potential noise impacts associated with the project and the nearby Macarthur Wind Farm operating at the same time. The project has been designed so it does not exceed 40 dB(A) measured at neighbouring dwellings, inclusive of any noise contributions from the Macarthur Wind Farm.

Wind farm projects often undergo a degree of micro-siting of infrastructure (including wind turbines) during detailed design, and so preparation of a 'pre-construction noise assessment' will be required for the final project layout and equipment selection. Noise predictions for the final layout will be included in that assessment, which would ensure the noise criteria are achieved at all non-stakeholder dwellings under all wind speeds prior to construction commencing.

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 prior to the commencement of construction.

Consistency with planning provisions

As required by Clause 52.32, a pre-construction (predictive) noise assessment has been completed and submitted with the planning application (Appendix J1). This assessment has been undertaken to assess the 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 (predictive) noise assessment has been undertaken in accordance with the requirements of the New Zealand Standard NZS 6808:2010 Acoustics – Wind Farm Noise.

The noise and vibration assessment was undertaken for the project construction and operation phases in accordance with:

- the general environmental duty under the *Environment Protection Act 2017*
- the Environment Protection Amendment (Interim) Regulations 2021
- EPA Victoria Publication 1834: *Civil construction, building and demolition guide*
- German Standard DIN for the impact of vibration on structures during construction
- Earth Resources Regulation blast vibration limits
- DELWP's Policy and Planning Guidelines and New Zealand Standard for the impact of wind turbine operational noise
- EPA Victoria Publication 1826.4 (Noise Protocol) for the impact of the on-site substation, battery facility and quarry operational noise
- International Standard ISO 10137:2007 for the impact of vibration (human annoyance) during operation.

A post-construction noise assessment would be undertaken in accordance with the New Zealand Standard and regulations under the EP Act to demonstrate that the project is compliant. This assessment would be provided to the Responsible Authority for endorsement.

The project meets the objectives of Clause 13.05-1S as the project seeks to control noise effects on sensitive uses through locating infrastructure and operations suitable distances from sensitive receptors (all dwellings in the case of the project). The requirements of Clause 52.32 are met in relation to noise amenity impacts, with compliance with the New Zealand Standard achieved at all non-stakeholder receivers for operational noise. Construction noise would meet the requirements of all standards and guidelines outlined above. Operational noise of ancillary components would be achieved with mitigation in the form of reduced power mode for the substation transformer. Cumulative impacts have been assessed and accounted for in the noise and vibration assessment.

There would not be any unreasonable noise amenity impacts on the surrounding area as a result of the project. Noise impacts have been minimised and are acceptable in accordance with the relevant policies outlined above and in accordance with the Policy and Planning Guidelines.

7.2.2 Blade glint, shadow flicker and electromagnetic interference

Blade glint

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that wind farm planning permit application must consider the effect of the project on the surrounding area in terms of blade glint.

Blade glint occurs when sunlight is reflected off the rotating blades of a wind turbine. Modern wind turbine manufacturers avoid potential blade glint nuisance by finishing their blades with a low-reflectivity treatment. As such, blade glint is not considered an issue for the project.

Shadow flicker

Purpose

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that a wind farm planning permit application must consider the effect of the project on the surrounding area in terms of shadow flicker.

Shadow flicker can occur where the shadow cast by rotating wind turbine blades causes a flickering effect which can cause nuisance, especially inside dwellings. This shadow flicker assessment was prepared by DNV Australia Pty Ltd and is provided in Appendix L – *Shadow Flicker*. It includes an assessment of the potential theoretical and actual shadow flicker related impacts on non-stakeholder (neighbouring) and stakeholder dwellings.

Assessment

The Policy and Planning Guidelines establish a shadow flicker limit of 30 hours per year experienced in the area immediately surrounding a dwelling, while the *National wind farm development guidelines – draft* (Draft National Guidelines) (Environment Protection and Heritage Council, 2010) provide a more stringent recommendation, with a limit of 30 hours per year of 'theoretical' shadow flicker duration and 10 hours per year of 'actual' shadow flicker.

The DNV shadow flicker assessment was undertaken using geometrical modelling, which was based on the guidance provided in the Draft National Guidelines.

The Draft National Guidelines outline methodologies for two scenarios:

- a theoretical worst-case scenario, and
- an 'actual' real-world scenario incorporating predictable meteorological mitigating factors.

There are no non-stakeholder landowners that would experience theoretical or actual shadow flicker impacts in excess of the limits provided in the Policy and Planning Guidelines or the Draft National Guidelines. 'Actual' shadow flicker duration experienced within the 50 metre boundary of any non-stakeholder dwelling does not exceed 6.6 hours per year. This, along with the theoretically modelled maximum duration of 28.6 hours per year, demonstrate that no non-stakeholder dwellings would receive unacceptable levels of shadow flicker effects.

Excluding dilapidated dwellings, seven stakeholder dwellings are predicted to experience theoretical shadow flicker greater than the 30-hours per year recommended in the Draft National Guidelines within 50 metres of their dwelling. The predicted 'actual' shadow flicker for these stakeholder dwellings is also predicted to be above the 10 hours per year recommended limit, taking into consideration cloud coverage and wind direction. Relevant project stakeholders have agreed to include a maximum annual shadow flicker duration of 30 hours at their dwellings (including dilapidated dwellings) with the proponent. Agreements would be executed in accordance with the model permit conditions contained as an appendix to the Policy and Planning Guidelines in terms of execution time frame and agreement content. The project would meet this shadow flicker limit (30 hours per annum) at all pre-existing dwellings evidenced through pre-construction modelling. For stakeholder dwellings, agreed shadow flicker limits would be met through the micro siting of turbines in the final design, conducting strategic screen plantings, using smaller wind turbine blades or implementation of a curtailment strategy, if required.

Adherence to these agreed limits and the limits of the Policy and Planning Guidelines and the Draft National Guidelines would be demonstrated through pre-construction modelling and (for stakeholders) the design and implementation of a curtailment strategy.

Mitigation and management

Avoidance by design has been the primary measure to limit shadow flicker impacts on non-stakeholder dwellings. Following changes to the wind turbine layout during the project design development process to avoid other environmental constraints (e.g., Brolga buffers), the project team reviewed the revised wind turbine layout to ensure there was no excessive shadow flicker nuisance on non-stakeholder (neighbour) dwellings (more than the guidelines).

Following the assessment of shadow flicker impacts, minor adjustments to the layout of the project design were made to move turbines contributing to predicted shadow flicker impacts further from dwellings so that the duration of their predicted impacts would decrease to below the guideline limits.

A pre-construction assessment of the potential effects of shadow flicker from turbines on existing dwellings is to be undertaken for the final turbine layout in accordance with Policy and Planning Guidelines, and to the satisfaction of the responsible authority.

The project would meet shadow flicker limits (30 hours per annum) at all pre-existing dwellings evidenced through pre-construction modelling. For stakeholder dwellings, shadow flicker limits (30 hours per annum) would be met through the micro siting of turbines in the final design, conducting strategic screen plantings, using smaller wind turbine blades or implementation of a curtailment strategy, if required.

Consistency with planning provisions

The project has been designed to avoid unacceptable levels of nuisance from shadow flicker, and the assessment undertaken by DNV confirms that the project satisfies the limits established in the Policy and Planning Guidelines at all non-stakeholder dwellings. Compliance with the shadow flicker limits would be met at all non-stakeholder dwellings and any shadow flicker at stakeholder dwellings exceeding the standards would be managed in accordance with individual landowner agreements generally in accordance with model permit conditions. Shadow flicker amenity impacts are therefore acceptable and comply with policy at Clause 52.32 and generally throughout the scheme as it relates to residential amenity.

Electromagnetic interference

Purpose

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that wind farm planning permit applications must consider the effect of the project on the surrounding area in terms of electromagnetic interference. An assessment of the electromagnetic interference has been prepared by DNV Australia Pty Ltd and is included in Appendix M – *Electromagnetic Interference*.

Assessment

Operating wind turbines have the potential to interfere with radiocommunication services (i.e., cause electromagnetic interference) to communication signals such as television broadcast signals and fixed point-to-point signals.

A broader investigation area of 75 kilometres from the project site was used to identify mobile phone and NBN fixed wireless towers, and radiocommunication towers and licences listed in the Australian Communication and Media Authority Register of Radiocommunication Licences database.

As per the recommendations of the Draft National Guidelines, consultation was undertaken with relevant radiocommunication operators within 20 kilometres of a wind turbine or within 250 nautical miles of an aeronautical or meteorological radar site.

The electromagnetic interference assessment considered all identified dwellings within five kilometres of the project site. This area encompasses 136 dwellings, of which 23 are stakeholder dwellings.

Based on a review of the Australian Communication and Media Authority Register of Radiocommunication Licences database, there are limited radiocommunication services are in the vicinity of the project, with only one point-to-point link (operated by AusNet Services) passing over the project site and three point-to-multipoint stations located within 20 kilometres of the site (operated by Aussie Broadband, Powercor and Wannon Region Water Corporation). Radiocommunications service providers, emergency services, mobile phone providers, NBN, Bureau of Meteorology, operators of fixed point-to-point communications links and radio services were consulted to determine the potential for electromagnetic interference. The operators of these services were asked to assess if the proposed project would interfere with their services and to provide possible mitigation measures where they deemed them necessary. Respondents typically advised that no impacts, or acceptable (negligible) levels of impact were expected. Where they advised of potential impacts, respondents provided a range of feedback on conditions they require the project adopt (e.g., Bureau of Meteorology).

Mitigation and management

Avoidance by design has been the primary measure to limit electromagnetic interference impacts. This has been an iterative process whereby:

- the specialist engineer assessed potential electromagnetic interference impacts based on the concept design
- the specialist engineer provided recommendations in relation to position of some turbines to minimise or avoid potential electromagnetic interference
- these recommendations were incorporated into the design and assessed by other specialists for their potential to impact other values.

Key measures that were implemented during the design process to minimise electromagnetic interference across the project site and region included:

- identifying a single point-to-point communication link crossing the site and incorporating an appropriate buffer (20 metres plus blade length of 95 metres), into the project design based on consultation with the link operator
- adding an additional uncertainty buffer of 20 metres to the communications link buffer based on recommendations
- relocating several turbines located adjacent to the communications buffer as recommended by the specialist engineer.

To ensure that mobile phone, NBN, broadcast radio and broadcast television are not negatively impacted, a Signal Strength Survey at neighbouring dwellings would be conducted prior to construction, and then after construction if issues are identified. The proponent would undertake measures necessary to rectify any impacted services.

Following the implementation of design and management controls, the project is unlikely or has a low potential to cause interference. Further consultation with the operators of communications and other service providers would occur during detailed design to confirm the avoidance of electromagnetic interference impacts, and to address any impacts identified.

Consistency with planning provisions

The assessment considers the effect of the project on the surrounding area in terms of electromagnetic interference, as is required by Clause 52.32-6. Consistent with the Policy and Planning Guidelines, potential electromagnetic interference from the project has been minimised through appropriate turbine siting.

7.2.3 Air quality

Purpose

This section provides an overview of the local meteorology and existing air quality environment of the project investigation area, as well as an assessment of potential impacts to local air quality resulting from project construction, operation and decommissioning. The information is based on the assessment prepared by Jacobs Group (Australia) Pty Ltd and presented in Appendix N – *Air quality*.

The use of land for earth and energy resources industry (i.e., a quarry) does not require a permit under the Farming Zone if the conditions of Clause 52.08 (Earth and Energy Resources Industry) are met. That is, if an EES has been prepared under the EE Act, the Minister for Planning's assessment of the EES has been submitted to the Minister for Resources, and a work authority has subsequently been granted by the Minister for Resources. The assessment of air quality in relation to the planning application therefore confines its discussion to the impact of the on-site quarry, concrete batching plants and general construction emissions.

Assessment

Air quality impacts can occur when air pollutant emissions from an industry or activity cause a deterioration in ambient (i.e., outdoor) air quality.

The existing air quality at the project site is good and typical of air quality for rural Australia, which is typically better than the metropolitan areas of Melbourne and Geelong.

Construction and operation of the quarry was identified as the most significant source of air emissions, having the greatest potential of all project activities to impact air quality for nearby sensitive receptors. To obtain a work authority from ERR under section 77I of the MRSD Act, the project must prepare a work plan for the proposed quarry that includes a rehabilitation plan and a community consultation plan. Quarry work plans require statutory endorsement by ERR, in consultation with relevant agencies, before any quarrying can commence.

The focus of the air quality impact assessment involved quantitative modelling of quarry emissions and their potential impacts. Emissions modelled were PM_{10}, $PM_{2.5}$, respirable crystalline silica and dust deposition. A qualitative assessment was also undertaken for the potential impacts on air quality from the construction, operation and decommissioning from all other project activities.

The general environmental duty requires risks of harm to human health and the environment from air emission activities to be eliminated so far as reasonably practicable. Where it is not reasonably practicable to eliminate such risks, they are required to reduce them so far as reasonably practicable. For this project, this involved comprehensive assessment of siting of the project infrastructure in the planning and design process (outside of the air quality assessment) to minimise the risks to sensitive areas. Dust mitigation measures were developed and included in the modelling assessment; however, these will be further developed in the site-specific dust management plan.

Under the EP Act, dispersion modelling is used as a tool to assist in understanding air pollution risks. Any model predicted exceedances of pollutant criteria help to identify an unacceptable level of risk; however, the pollutant criteria do not represent concentrations below which no action is required.

Construction

Concrete batching plants

Dust emissions from the operation of the project concrete batching plants would be of relatively short duration and small scale (i.e., with low dust generation intensity). Concrete batching is not expected to contribute significantly to the overall air emissions, and it is expected that these emissions can be effectively managed using targeted dust mitigation measures at each site.

Other project activities

Construction dust emissions for each turbine foundation site are expected to be significantly less than those for the quarry and would occur over relatively short periods for each site. Similarly, the construction of the on-site substation, battery energy storage system and temporary construction offices would have significantly lower dust emissions compared to the quarry site and will be of short duration.

The closest concrete batch plant, used for the construction of the wind turbine sites, is approximately 1.2 kilometres from the nearest sensitive receptor. This distance is ten times greater than the minimum separation distance of 100 metres for concrete plants under the guideline *Recommended separation distances for industrial residual air emissions* (EPA Victoria, 2013) which is applied to minimise off-site air quality impacts arising from industrial activities including concrete batching. As such, activities at these sites are unlikely to have any significant impact to ambient air quality for sensitive receptors.

Operation

During project operation, light vehicles and small trucks would travel from the site office and maintenance yard to individual turbines and substation, mostly via internal unsealed roads. Larger vehicles may occasionally deliver large equipment. Dust generated from vehicle movements on unsealed roads during operation and decommissioning (outside of the quarry activities) are expected to be minor and of short duration. Overall, the emissions from the activities across the broader project site are not expected to be significant contributors to the dust impact of the project.

Management and mitigation

To address its general environmental duty relating to air quality, the project has included design measures (where feasible) to avoid potential air impacts for nearby sensitive receptors.

The closest sensitive receptor to any of the concrete batch plants is approximately 1.2 kilometres (also greater than the required minimum separation distance).

A site-specific dust management plan (sub-plan of the Construction Environmental Management Plan (CEMP)) will document potential and existing dust sources and outline best practice design controls and management practices to minimise dust.

All project concrete batching plants will be designed and operated to adequately control dust emissions, as per guidelines set out in EPA Victoria Publication 1806: *Reducing risk in the premixed concrete industry*.

Consistency with planning provisions

It is considered that the project can achieve the relevant policy objectives of Clause 13.06 – 1S Air Quality by utilising siting and mitigation measures *"to assist the protection and improvement of air quality*" through the strategy to *"ensure, wherever possible, that there is suitable separation between land uses that reduce air amenity and sensitive land uses".*

7.2.4 Landscape and visual impact

Purpose

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that proponents of wind farms must address the potential impact of the wind farm on landscape values and visual amenity.

The landscape and visual impact assessment was prepared by Landform Architects and is included in Appendix K1 – *Landscape and visual*. The impact of the development on significant views, including visual corridors and sightlines is addressed in this section. Views from both the public and private realm, including views from dwellings, have been considered in the assessment.

The project site is within the Moyne Shire Council local government area. However, the northern part of the landscape and visual investigation area extends into the Southern Grampians Shire, and part of the northern and western areas of the investigation area includes the Glenelg Shire. The southeast extent of the landscape and visual investigation area near Warrnambool is within the Warrnambool City Council area. As such, the Moyne, Southern Grampians, Glenelg and Warrnambool Planning Schemes apply to the landscape and visual assessment for the project.

Assessment

The construction of the project would have a visual impact on the landscape, as wind turbines, meteorological masts and other project infrastructure would be visible from many locations within the surrounding area.

Investigation area

Zones of Visual Influence' is a method of categorising the likely dominance of vertical infrastructure within the investigation area based on the height of the infrastructure. The investigation area is defined by the distance where project wind turbines would comprise 5% of the vertical field of view (i.e., 28.6 kilometres) (Figure 7-4). At this distance, the wind turbines would be visually insignificant but noticeable on clear days with good visibility.

Existing conditions

The project site is situated in a broad-acre rural landscape, which has been altered over time due to a range of activities, including farming and grazing, timber plantations and utilities, which include the 500 kV Moorabool to Heywood and 132 kV Macarthur Wind Farm to Tarrone transmission lines, the Tarrone Terminal Station and the Macarthur Wind Farm. The existing topography and geomorphology are dominated by volcanic features such as basalt plains, volcanic cones and crater lakes are prominent in the landscape. The volcanic cones tend to include the greatest extent of native forest cover, as the surrounding flatter areas have been cleared for agriculture or plantation timber.

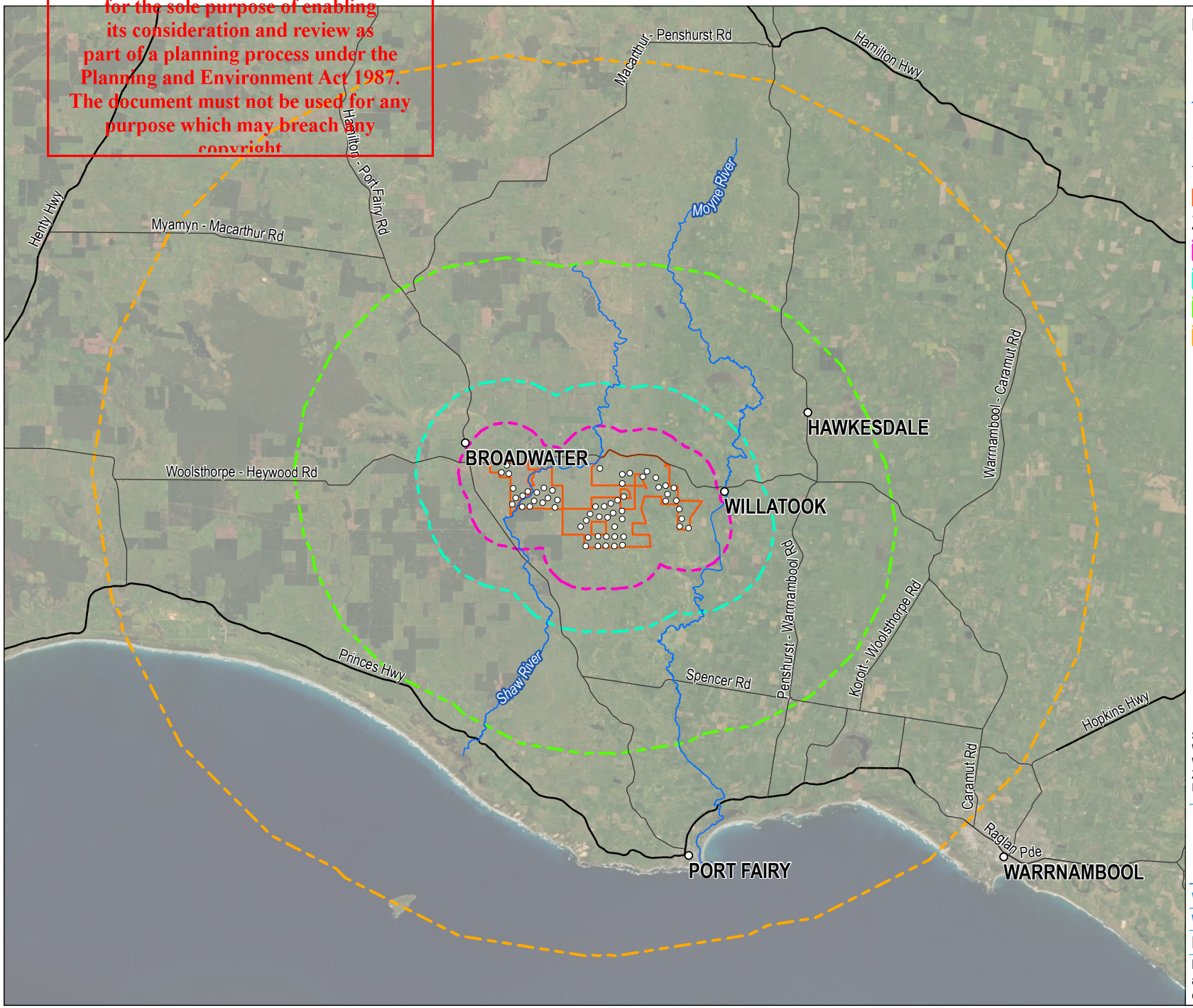
Large patches of remnant vegetation exist in the reserves across the project viewshed, including the Budj Bim National Park, nearby state forests (including Mount Napier State Park) and Woolsthorpe Nature Conservation Reserve. Most of the land within the investigation area is comprised of exotic pastures and grasses for grazing. In these areas, trees have been cleared, leaving scattered trees in paddocks. Planted trees of primarily exotic species are present within shelterbelts along property boundaries. Most of the taller trees within the investigation area are confined to these shelterbelts, as well as roadsides, fence lines, property boundaries, watercourses and natural drainage lines.

Method

The landscape and visual assessment considered the landscape sensitivity and potential visual impact of the project on key viewpoints, including from publicly available locations (such as roads and significant landscape sites) and residential dwellings. Photomontages illustrating the likely 'as built' view of the project were developed to assist the assessment of landscape and visual impacts. Potential cumulative effects were also considered with respect to existing operating or approved wind farms and other power infrastructure in the area.

The visual impacts are influenced by various factors, including the characteristics of the wind farm (such as the number and height of turbines, and presence of transmission lines and access tracks), the existing land use or modification of the landscape, and the visibility and distance to the wind farm infrastructure.

The assessment of landscape and visual impacts is subjective as the change in visual amenity is influenced by how the change is perceived by the viewer. Factors that can influence viewer perceptions of the landscape character includes viewer location, type (e.g., resident or visitor), the importance of the view, and the presence of wind farms or other energy infrastructure in the landscape.



LEGEND

- Locality
- Turbine location
- Watercourse
- Highway
- Road
- Willatook Wind Farm boundary

Zone of visual influence

- 3km
- 6km
- 14.5km
- 28.6km

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Watercourses and roads from Vicmap.
Zone of visual influence from Landform Architects 2022.
Imagery from ESRI (various capture dates).

0 5 10 km

SCALE 1:375,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.4

Landscape and visual investigation area and Zones of Visual Influence of the project

DATE: 08.04.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F069_GIS DOC REFERENCE: 287657_02_FIGS_HAPRX_V01

The assessment of the landscape and visual impacts of the project included a qualitative and quantitative assessment:

- The quantitative assessment included defining the extent of the visual study area based on the scale of project infrastructure, identifying landscape significance and protection within planning policy and strategic documents, sensitive uses, patterns of project visibility and likely viewer numbers.
- The qualitative assessment, informed by the quantitative assessment, considered the impact of the project from representative viewpoints through the consideration of following key assessment criteria:
  - Visibility: the ability to see or perceive the project, which can be influenced by topography, vegetation, built form and weather conditions.
  - Distance: the greater the distance from the project, the lower the visibility and dominance of project infrastructure (the Zones of Visual Impact provides an indication of visual dominance and potential impact based on distance).
  - Landscape character and sensitivity: landscape character is based on visual features such as topography, vegetation, land use and the naturalness of the area. Typically, a modified landscape is less sensitive than one that is perceived as natural or protected for its environmental, ecological or cultural values.
  - Viewer numbers: where there are fewer people able to view the project, the overall level of visual impact will decrease.

The scale of visual effect used in the assessment of visual impacts ranges from nil to high, as shown in Table 7-2.

Table 7-2 Magnitude of change assessment description

Magnitude of change	Description
Nil	The project would be screened by topography, vegetation, or buildings and structures.
Negligible visual impact	Effect that is barely discernible over ordinary day-to-day effects, usually assessed as a 'negligible' level of visual impact based on distance (e.g., project at a distance that it would be a minute element in the view or would be predominantly screened by intervening topography, vegetation, or buildings and structures).
Low visual impact	Visual impacts that are noticeable but that would not cause any significant adverse impacts, where several of the four assessment criteria (visibility, distance, viewer numbers, landscape sensitivity) is assessed as low.
Medium visual impact	Where several of the four assessment criteria (visibility, distance, viewer numbers, landscape sensitivity) are considered as higher than 'low'. Visual impacts may be able to be mitigated or remedied.
High visual impact	All criteria (visibility, distance, viewer numbers, landscape sensitivity) are assessed as high level of visual impact. For example, a highly sensitive landscape, viewed by many people, with the project in close proximity and visible. Significant adverse effects cannot be avoided, remedied, or mitigated.
Positive visual impact	Where a visual change improves the outlook or view. For renewable energy projects, a positive visual impact may be experienced where the viewer appreciates the view of wind turbines in the landscape or the connection to renewable energy.

Assessment of visual impacts from residential dwellings was also undertaken. This assessment examines the potential impacts on non-stakeholder dwellings within 6 kilometres of a project turbine. This distance is the zone, or geographical distance at which a 250 metre high turbine would have the potential to be "highly visible and would usually dominate the landscape" where the whole of the turbine would be visible. This zone is the area within which previous wind farm projects have been required to offer landscape screening to residential dwellings where turbines may be visible from the dwelling.

- dwellings within this zone were identified through a desktop review of Google Earth, Google Earth Street View and VicPlan Aerial Imagery, and from publicly accessible locations
- dwellings were selected for inclusion in the ground-truthing assessment where:
  - the setting, orientation of views or influence of vegetation was not obvious through desktop reviews
  - dwellings appear to be representative of views form a cluster of dwellings
  - residents have specifically requested visual assessment be undertaken.

The viewpoints identified by a Seen Area Analysis are summarised in Table 7-3 below, and their location is shown in Figure 7-5. The identified Landscape Character Units are discussed in Appendix K1– *Landscape and visual*.

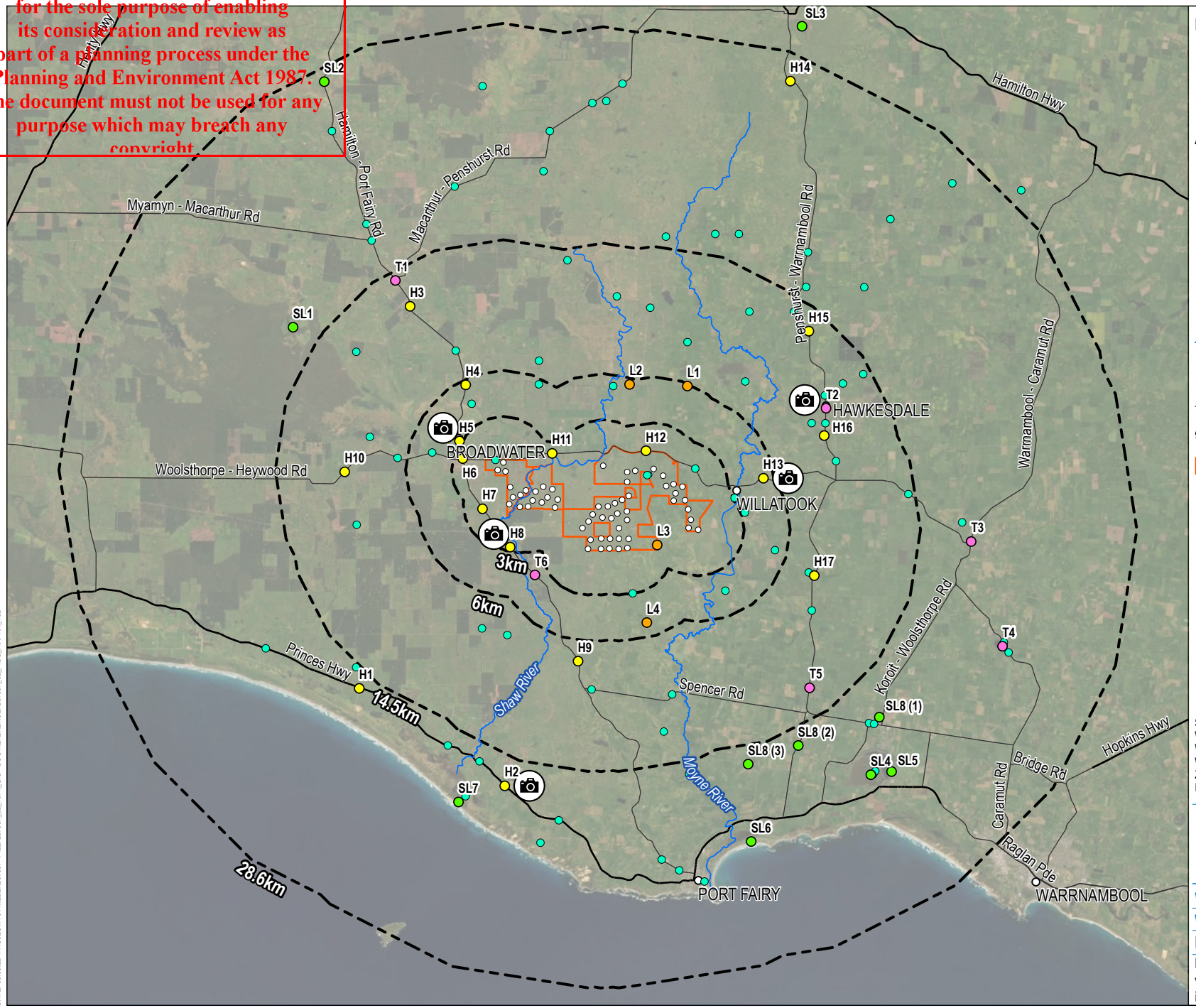
Table 7-3 Publicly accessible viewpoints within the project viewshed

Viewpoint type	Identified viewpoints	Viewpoint landscape character units	Viewpoint sensitivity	Nearest turbine to viewpoints
Significant landscapes and vantage points	• **SL1:** Budj Bim National Park (Budj Bim Summit) • **SL2:** Harmans Valley Lookout • **SL3:** Mount Rouse Lookout • **SL4:** Tower Hill Lookout (interior) • **SL5:** Tower Hill Lookout (Cairn Hill) • **SL6:** Port Fairy Coast • **SL7:** Yambuk Lake Caravan Park and boat ramp • **SL8:** Port Fairy to Warrnambool Rail Trail	3 – Plains farmland 5a – Native forests 6b – Lava flows: Valleys and rivers 8 – Volcanic cones and craters, natural forests 9 – Coastal landscapes	Low, Medium-High and High	15.4–30.4 kilometres

Viewpoint type	Identified viewpoints	Viewpoint landscape character units	Viewpoint sensitivity	Nearest turbine to viewpoints
Major roads (highways) and connector roads	• **H1 & H2:** Princes Highway (two viewpoints assessed) • **H3, H5, H7, H8 & H9:** Hamilton-Port Fairy Road (five viewpoints assessed) • **H4:** Hamilton-Port Fairy Road intersection with Kangertong Road • **H6:** Hamilton-Port Fairy Road intersection with Woolsthorpe–Heywood Road • **H10, H11 & H13:** Woolsthorpe-Heywood Road (three viewpoints assessed) • **H12:** Woolsthorpe-Heywood Road intersection with Tarrone North Road • **H14 & H15:** Penshurst-Warrnambool Road (two viewpoints assessed) • **H16:** Penshurst-Warrnambool Road intersection with Nardoo Road • **H17:** Penshurst-Warrnambool Road intersection with Willatook-Warrong Road	3 – Plains farmland 5b – Plantation forests 6a – Lava flows: Farmland, swamps and wetlands, stony-rises 9 – Coastal Landscapes 10b – Rural wind farm (costal)	Low, Low-Medium and Medium	1.2–26.7 kilometres*
Local roads	• **L1:** Kangertong Road intersection with Nagorkas Road • **L2:** Kangertong Road • **L3:** Tarrone North Road • **L4:** Faulkners North Road (Tarrone)	3 – Plains farmland 6a – Lava flows: Farmland, swamps and wetlands, stony-rises 10a – Rural wind farm (inland)	Low and Low-Medium	1.9–5.7 kilometres*
Townships	• **T1:** Macarthur Township • **T2:** Hawkesdale Township • **T3:** Woolsthorpe Township • **T4:** Winslow Township • **T5:** Kirkstall Township • **T6:** Orford Township	1 – Urban Areas and Townships 2 – Rural residential	Medium and Medium-High	3.8–21.2 kilometres

* The viewpoints assessed from major, connector and local roads were selected as representative viewpoints within the investigation area, demonstrating a range of views and viewing angle distances and key approaches towards the project within the investigation area. At some locations along roads within the investigation area the project would be closer than the viewpoints assessed.

There are 170 dwellings within 6 kilometres of a turbine. The location of these dwellings in relation to the project site are shown in Figure 7-6.



LEGEND

- Locality
- Turbine location
- Visited viewpoints

Assessed viewpoints

- Local roads
- Major roads (highways) and connector roads
- Significant landscapes and vantage points
- Townships
- Viewpoint photomontage capture
- Watercourse
- Highway
- Road
- Zone of visual influence
- Willatook Wind Farm boundary

SOURCE:
Willatook Wind Farm boundary and viewpoint locations from Wind Prospect.
Watercourses and roads from Vicmap.
Zone of visual influence from Landform Architects 2022.
Imagery from ESRI (various capture dates).

0 5 10 km

SCALE 1:350,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

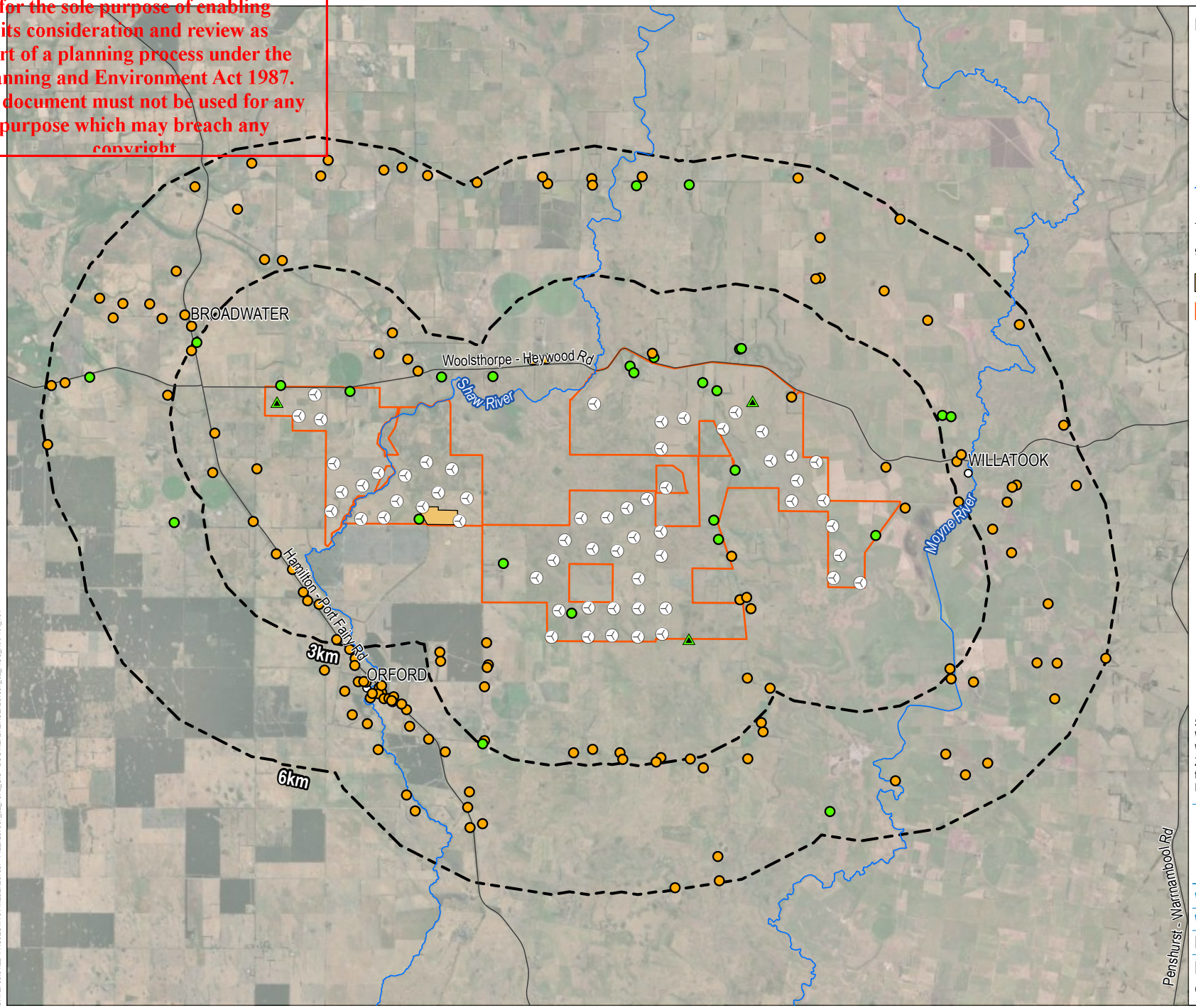
WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.5

Location of publicly accessible viewpoints within the investigation area

DATE: 05.05.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F071_GIS DOC REFERENCE: 287657_02_FIGS_HAPRX_V02



LEGEND

- Locality
- Turbine location
- Non-stakeholder dwelling
- Stakeholder dwelling
- Met mast location
- Watercourse
- Road
- Zone of visual influence
- Quarry area
- Willatook Wind Farm boundary

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Watercourses and roads from Vicmap.
Zone of visual influence and dwelling locations from Landform Architects 2022.
Imagery from ESRI (various capture dates).

0 1.5 3 km

SCALE 1:125,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.6

Dwellings within 6 kilometers of the project site

DATE: 08.04.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F072_GIS DOC REFERENCE: 287657_02_FIGS_HAPRX_V01

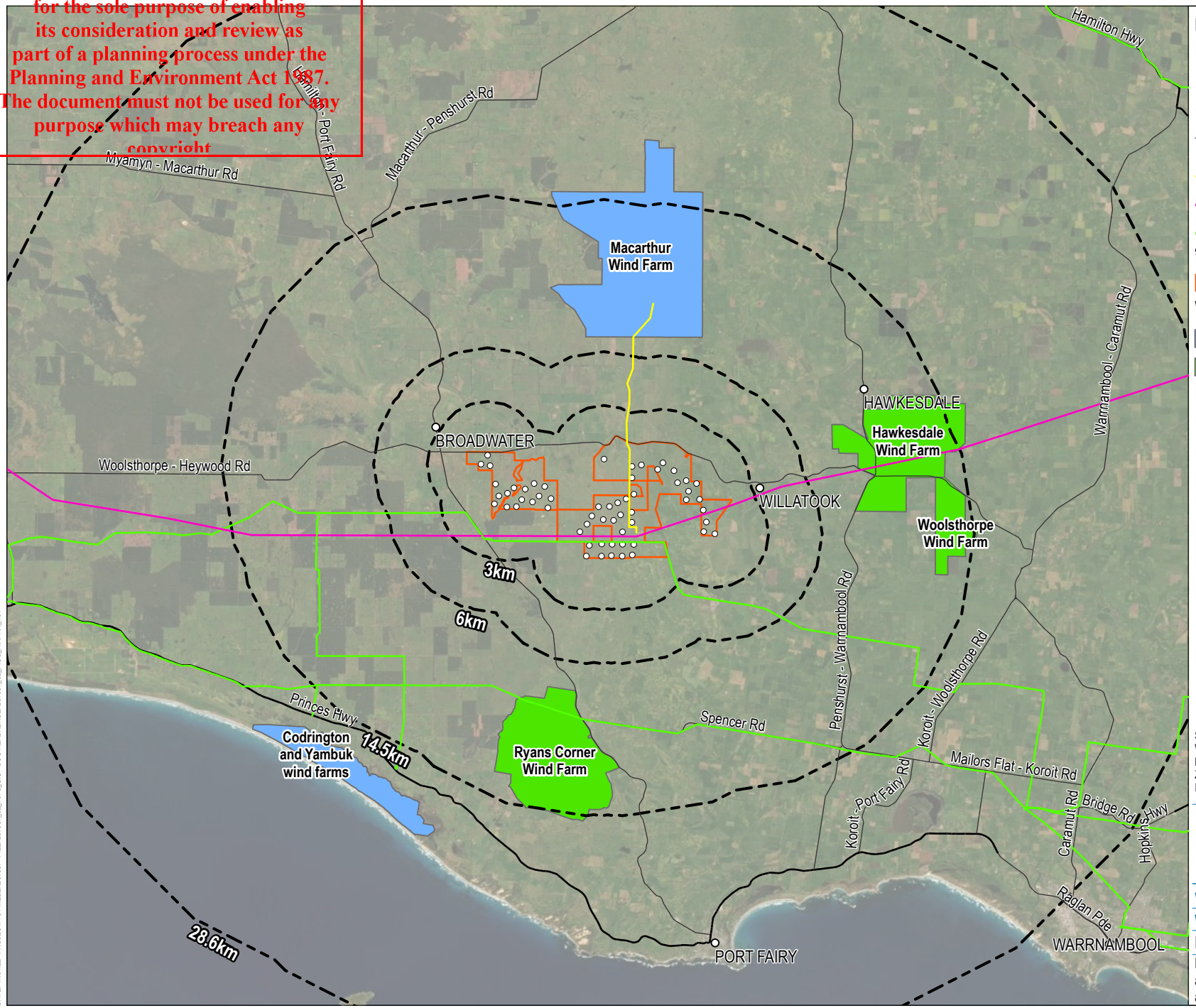
Operating and approved wind farms within the investigation area are outlined in Table 7-4 below.

Table 7-4 Operating and approved wind farms within the project viewshed

Project status	Project name	Approved or constructed maximum turbine height (blade tip azimuth)	Approx. distance from project Site (boundary to boundary)
Operating	Macarthur Wind Farm	145 metres	5.8 kilometres
	Codrington Wind Farm	86 metres	14.6 kilometres
	Yambuk Wind Farm	105 metres	14.5 kilometres
Approved	Hawkesdale Wind Farm	180 metres	6.3 kilometres
	Woolsthorpe Wind Farm	180 metres	11.4 kilometres
	Ryan Corner Wind Farm	180 metres	7.4 kilometres

The 132 kilovolt Macarthur Wind Farm high voltage transmission link bisects the project site, linking to the 500 kilovolt Moorabool to Heywood transmission line at the Tarrone Terminal Station.

Operating and approved wind farms and existing high voltage transmission lines within the project viewshed are shown in Figure 7-7.



LEGEND

- Locality
- Turbine location
- Highway
- Road
- 123KV transmission line
- 500KV transmission line
- 66KV transmission line
- Zone of visual influence
- Willatook Wind Farm boundary

Wind farms

- Operating
- Approved - not constructed

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Roads and localities from Vicmap.
Zone of visual influence Landform Architects 2022.
Imagery from ESRI (various capture dates).

0 4 8 km

SCALE 1:300,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.7

Existing operating and approved wind farms and transmission infrastructure

DATE: 11.04.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F073_GIS DOC REFERENCE: 287657_02_FIGS_HAPRX_V01

Viewpoints

Significant landscapes

It is a requirement of the Policy and Planning Guidelines (DELWP, 2021f) to consider the potential for impacts on views and amenity from significant conservation and recreation areas, water features, tourist routes, and walking tracks.

A summary of the impact assessment for significant landscape and vantage points within the project investigation area is provided in Table 7-5.

Table 7-5 Visual impact assessment from significant landscape and vantage points within the project investigation area

Viewpoint	Zone of visual influence	Overall visual impact
SL1: Budj Bim National Park: Budj Bim Summit	Views toward the project site are filtered through the existing vegetation surrounding the clearing. Views toward the project site are possible through gaps in this vegetation. The nearest project turbines would form a noticeable, but not a dominant, element in the landscape. Other areas of the Budj Bim cultural landscape are located further to the south-west and would not experience elevated views like the peak.	Low – Negligible
SL2: Harmans Valley Lookout	The Seen Area Analysis modelling identifies that the project turbines would not be visible at this location due to the distance to the project site, topography and vegetation.	Nil
SL3: Mount Rouse Lookout	The project would be located behind and to the left of the Macarthur Wind Farm, which has turbines approximately 150 metres in height. Although the project turbines are 100 metres taller than those located within the Macarthur Wind Farm, due to distance (being approximately 30.4 kilometres to the nearest project turbine) they would less noticeable and would not form a dominant element in the landscape.	Negligible
SL4: Tower Hill Lookout (interior)	Visibility toward the project site is largely limited from the designated elevated viewing locations due in part to the orientation of views being generally toward the coast, vegetation which filters or screens views to the north, and distance. glimpses of the project when looking north may be possible through gaps in vegetation. The project turbines would be at a distance that, if visible through vegetation, would be a noticeable but not a dominant element in the landscape.	Nil to Negligible
SL5: Tower Hill Lookout (Cairn Hill)	Views to the north-west toward the project site are partially screened and filtered by vegetation. The project may be visible along the horizon in long-range views. However, due to the distance to the project, turbines that are visible would be a noticeable, but not dominant, element in the landscape. The filtering and screening of these views by the nearby vegetation would assist to reduce the visual impact from this lookout.	Nil to Negligible
SL6: Port Fairy Coast	The Seen Area Analysis indicates theoretical visibility of the project wind turbines at this location. However, due to the overall distance to the project and screening by vegetation, it is unlikely that project wind turbines would be visible. If visible, they would not be a dominant element in the view.	Nil to Negligible
SL7: Yambuk Lake Caravan Park and boat ramp	The Seen Area Analysis identifies this area as having theoretical visibility of the project wind turbines. However, due to the screening effect of smaller, local changes in topography and vegetation, the project would not be visible from the public areas and facilities at Yambuk Lake and Caravan Park.	Nil
SL8: Port Fairy to Warrnambool Rail Trail	The trail at its closest point is approximately 15 kilometres to the nearest project wind turbine. At this distance, the project wind turbines would not be visually dominant features. Existing roadside vegetation and windbreaks would further filter views.	Negligible

Major roads (highways) and connector roads

Major roads to the east and west of the project are frequently used by the local community, having a medium number of local road users. Views from major roads vary and include open clear views towards the project, more discreet and localised views with gently undulating topography screens, and limited views across the landscape. Example photomontages illustrating the likely 'as built' view of the project from viewpoints assessed along Woolsthorpe-Heywood Road and Hamilton-Port Fairy Road and are included in the plan book which accompanies this application.

Overall, the visual impact of the project in views from major roads is assessed as low. This is due to the majority of views towards the project being limited by vegetation within roadsides, plantation areas and adjoining farming properties, and screening provided by the topography.

Local roads

The project would be clearly visible and dominant in views in the landscape at local road viewpoints assessed. However, due to the low viewer numbers and low sensitivity of the landscape in views towards the project, the overall visual impact of the project from local roads is low-negligible.

Townships

From most locations within the townships assessed in the viewpoint analysis, existing vegetation and built form, including dwellings and shops assist to screen or filter views toward the project. However, there is the potential for the tips of project turbines to be visible from some locations within the Hawkesdale, Macarthur, and Kirkstall townships. For the Orford township (the closest township to a project wind turbine), project turbines would be located above and behind the plantation on the hills in background of this viewpoint. Roadside and residential vegetation throughout the township would further assist in filter and screen views to the turbines

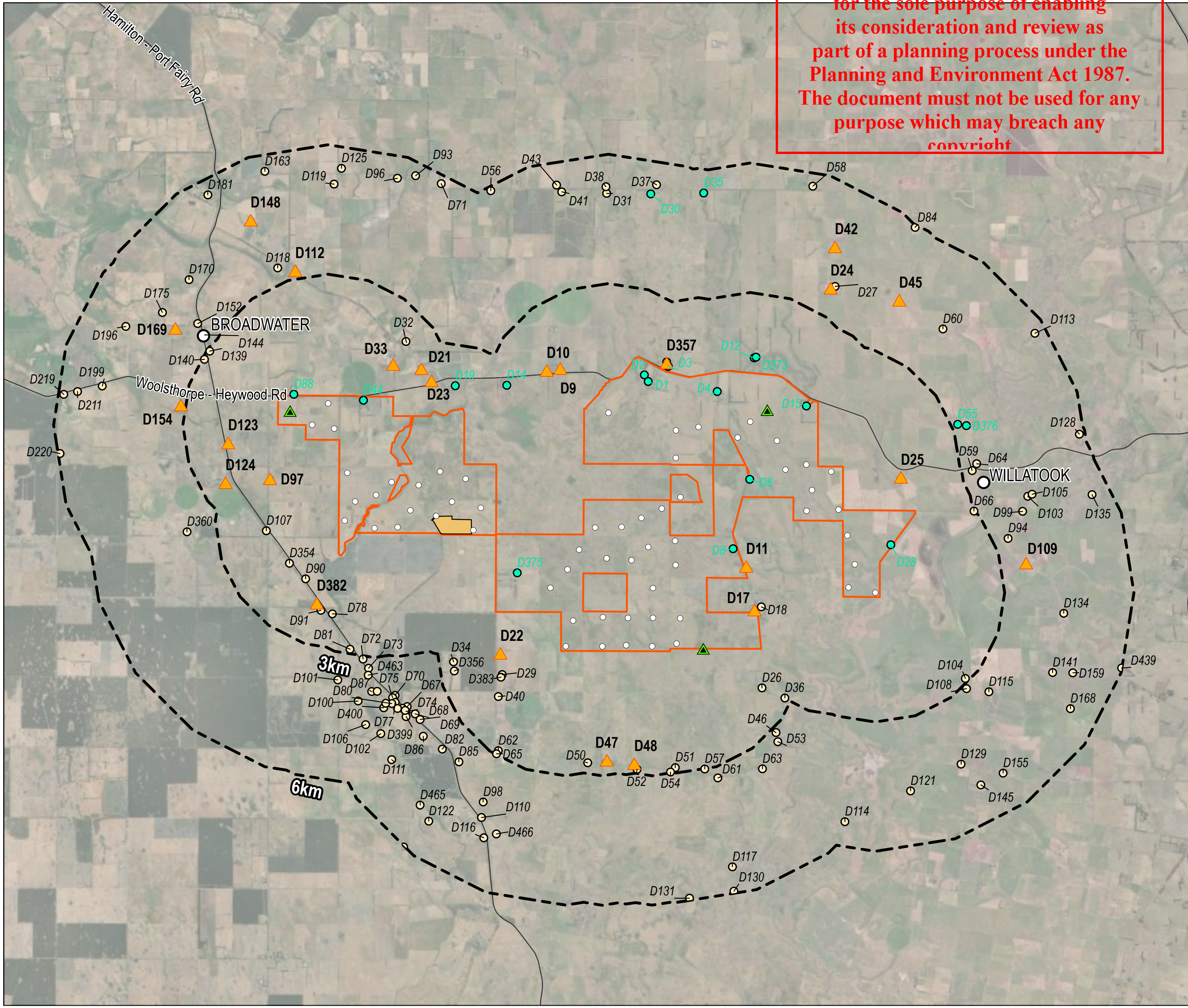
While there may be locations where the visual impact is potentially medium or even high, based on Seen Area Analysis, these locations would be few and would not elevate the overall visual impact, which considers that range and predominantly available views. As such, the overall visual impact from township areas is negligible-nil to low.

Residential dwellings

The greatest potential for visual impacts to occur is from neighbouring, non-stakeholder dwellings within 6 kilometres of a 250 metre high turbine. The visual impact is assessed by considering the number and scale of wind turbines in particular views, however the perceived visual impact is influenced by the individual viewer.

Based on the selection criteria for inclusion in the ground-truthing assessment, visual impacts were assessed at 16 non-stakeholder dwellings within 1.5 to 3 kilometres of a project turbine and nine non-stakeholder dwellings within 3 to 6 kilometres of a turbine. The results of 12 of these dwellings were provided directly to the landowners and not included within the EES documentation at their request.

Figure 7-8 shows the location of these 25 dwellings, and Table 7-6 summarises the findings of this assessment.



LEGEND

- Locality
- Turbine location
- Met mast location
- Viewpoint
- Non-stakeholder dwelling
- Stakeholder dwelling
- Road
- Quarry area
- Zone of visual influence
- Willatook Wind Farm boundary

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Localities and roads from Vicmap.
Zone of visual influence and viewpoint locations
from Landform Architects 2022.
Imagery from ESRI (various capture dates).

0 1.5 3 km
SCALE 1:125,000
PAGE SIZE: A4
PROJECTION: GDA 1994 MGA Zone 54

WIND PROSPECT
WILLATOOK WIND FARM
FIGURE 7.8
Dwellings assessed in ground-truthing assessment

DATE: 13.05.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F074_GIS DOC REFERENCE: 287657_02_FIGS_H.APRX_V02

Table 7-6 Dwelling visual impact assessment summary

Dwelling ID	Distance to nearest project turbine	Overall visual impact	Landscape mitigation and residual impact
D11	1.6 kilometres west	Medium-high	If required, new plantings along the northern and eastern boundaries of the house yard would assist to filter or screen views to project turbines to the north and east. This would reduce the visual impact to low.
D17	1.7 kilometres west	Low	If required, new plantings in cleared areas to the west and north of the house yard would assist to filter or screen views to project turbines. This would reduce the visual impact to negligible-nil.
D22	1.5 kilometres east	High	Landscape mitigation may include strategic plantings of trees or mid-height shrubs in a similar location. This would reduce the visual impact to low.
D24	3.6 kilometres south-west	Low-medium	If required, supplementary plantings installed along the southern boundary of the sheep yards would assist to filter these views. This would reduce the visual impact to low.
D25	1.6 kilometres west	Negligible	Not required in the short term. Consideration should be given to succession planting.
D27	3.7 kilometres south-west	Negligible	Not required.
D42	4.5 kilometres south-west	Low	Possible to screen/filter views of project turbines using landscape mitigation if required. This would reduce the visual impact to negligible-nil.
D45	4.3 kilometres south-west	Negligible-nil	Not required.
D47	2.6 kilometres north	High	Existing vegetation indicates that vegetation can achieve heights needed to filter views to project turbines if required. New plantings to the north-east would assist to partially screen or filter views to project turbines. This would reduce the visual impact to low-medium.
D48	2.7 kilometres north	Low-negligible	Localised plantings in the area to the north of the dwelling would assist to screen or filter views of project turbines where visible through breaks in existing vegetation.
D97	1.6 kilometres north-east	Negligible	Not required.
D109	3.6 kilometres south-west	Low	If required, landscape mitigation to the west of the dwelling would assist to filter or screen views to project turbines.
D382	2.0 kilometres north-east	High	Mitigation would be possible to the north of the dwelling to filter or screen views to visible project turbines. This would reduce the visual impact to low.

Many of the dwellings assessed were set among vegetation at a height and scale that would partially screen or filter views of the project turbines. Where screening is not present, existing vegetation in private and public areas demonstrate that landscape screening would be effective, if required. No views from dwellings were identified as key views (e.g., to protected features or landscapes) that would require re-siting or removal or project turbines.

For dwellings near Orford, residential views would be dependent on the proximity and orientation of the dwelling towards the project, the extent of existing plantings near dwellings, and existing timber plantations and vegetation across the broader landscape.

Eight dwellings assessed to have medium-high or high visual impacts prior to mitigation. With the implementation of suggested mitigation (i.e., post mitigation), there was one dwelling predicted to have a high visual impact, and no medium-high impacts. In this instance, mitigation was assessed as being challenging to mitigate views of the project as mitigation at this dwelling may also remove views considered to be desirable.

Cumulative visual impacts

An assessment of potential cumulative visual impacts of the project was undertaken by considering other constructed and approved wind farms in the area. A 'cumulative visual impact' is the combined effect of changes brought about by a proposed development as well as other similar developments in an area. Cumulative visual impacts due to the presence of multiple power-generating infrastructures, transmission lines, and/or substations in the project area may cause changes to the perceptions of the local community or a visitor to the region.

Cumulative visual impact can occur either by:

- sequential views to multiple wind farms (e.g., views driving along roads may include in a number of wind farms, seen one after another)
- simultaneous views to wind turbines from publicly accessible viewpoints or private viewing locations (i.e., where two or more wind farms may be visible at the same time, from one location).

As the landscape contains several operating and approved wind farms, and the addition of the project to these views would not significantly alter a viewer's perception of the landscape, the cumulative visual impact from sequential views along the connector roads is low, and low – negligible for local roads.

The overlap of multiple view of operating or approved projects would occur along a section of the Princes Highway, inland connector roads and a number of local roads. In these instances, the nearest wind farm is the most obvious contributor to views and the impact from another wind farm in the distance does not alter the level of impact. As such, the simultaneous visual impact of the project is medium – negligible.

Potential cumulative visual impacts to dwellings would depend on the visibility of turbines and the proximity of the dwelling to turbines (affecting their visual scale). These impacts can only be assessed on a case-by-case basis.

Photomontages from VP H2, VP H13, and VP T2 provide a visual representation of the likely cumulative views and are shown in Appendix K1 – *Landscape and visual*.

Lighting impacts

The aviation impact assessment, contained within Appendix O, determined that the project would not require aviation obstacle lighting. However, should this lighting be required as a condition of the project planning permit, the overall visual impact of the aviation obstacle lighting from the road network and residential dwellings is assessed as negligible – low due to the screening of views by vegetation and the presence of light sources contributing to night views.

Security lighting is proposed for areas including the operations and maintenance facilities and on-site substation. However, there are few residential dwellings near these locations, and they are at a distance where most views would be screened or filtered by existing vegetation.

Implementing the mitigation measures (discussed below) would result in a negligible – nil visual impact from this lighting.

Management and mitigation

Measures to minimise visual impacts to nearby residential dwellings and townships applied in the project design phase include:

- 1.5-kilometre buffer of neighbouring residences, not participating in the project (i.e., non-stakeholder dwellings), to the nearest wind turbine. This buffer distance is greater than the 1 kilometre buffer required in the Victoria Planning Provisions
- 3-kilometre buffer of surrounding townships to the nearest project wind turbine.
- landscape screening would be offered to residential dwellings within 6 kilometres where there are views of a wind turbine. This has been shown to be an effective measure for other wind farms in the region.

Other proposed management measures include:

- development of an off-site landscaping plan for vegetation screening of eligible dwelling rooms, in consultation with the landowner on a case-by-case basis
- re-siting of project infrastructure from sensitive viewing areas and key view lines
- development of an on-site landscaping plan to screen substations, buildings and lower infrastructure.

Consistency with planning provisions

The project has been sited with regard to views to the site from both public and private locations in accordance with Clause 19.01-2S. Amenity impacts to dwellings have been considered in accordance with Clause 52.32 and Clause 65.

The low impact of the development on significant views, including visual corridors and sightlines, is considered consistent with Clause 52.32-6. In relation to Clause 21.06 Environment, the assessment takes into consideration the landscape character of the townships which surround the project as well as the relevant valued landscapes identified in the provision. The impact of the development on townships and significant views has been considered and it has been determined that there will be minimal visual impact as a result of the project, which is consistent with the provisions of Clause 52.32.

In relation to the Southern Grampians Planning Scheme Clause 12.03-2 Environmental and Landscape values, and Clause 12.05-2L of the Glenelg Planning Scheme, and Warrnambool Planning Scheme Clause 21.03-4 Significant Environments and Landscapes, the project does not adversely impact the landscape, environmental setting, or presentation of those councils.

7.3 Physical and natural environment

7.3.1 Surface water

Purpose

This section describes the surface water environments within and surrounding the project site and defines key surface water features and environmental values. It describes potential impacts of the construction and operation of the project on these values. The following summary is based on the findings of the hydrogeological and hydrological impact assessment prepared by Water Technology Pty Ltd, and (Appendix G) and the biodiversity impact assessment prepared by Nature Advisory Pty Ltd (Appendix P).

There are state planning policies which relate to the environment, water and water quality. Surface water relates to groundwater which also influences ecology.

Assessment

Existing conditions

The project is situated within the Shaw River and Moyne River catchments. The Shaw River is the main surface water feature in the project site, which is fed by Kangaroo Creek and Carmichael Creek. Back Creek, a tributary of the Moyne River, is another surface water feature that passes through the project site. During summer, these watercourses would typically consist of a series of isolated pools with limited or no base flow. There are also several smaller tributary drainage lines that join the Shaw River and Back Creek.

Due to the relatively flat topography of the site, and influence of lava flows and stony rises, there are depressions within the site that can became inundated during winter and spring, forming ephemeral wetlands during some years. These areas then dry and form modified grasslands, which are grazed by sheep and cattle. Within the central part of the site there is a series of low-lying areas that can become linked during periods of high rainfall through both drainage channels and flood overflows form the Shaw River. This area is known as Cockatoo Swamp. These wetland areas are ephemeral (fluctuating with rainfall) and are typically vegetated with Common Tussock Grass, introduced pasture grasses and sedges.

The Environmental Reference Standard identifies four types of surface waters: rivers and streams, wetlands (including lakes and swamps), estuarine, and marine. To define the environmental values relevant to water, each of these surface water types are comprised of ‘segments’ in the Environmental Reference Standard. Surface water within the project site falls within the ‘Murray and Western Plains’ segment of the ‘rivers and

streams' surface water type, and 'lakes' and 'swamps' segments of 'wetlands' surface water type. Environmental values applicable to these segments and considered relevant to the project are:

- water dependent ecosystems and species
- agriculture and irrigation
- Traditional Owner cultural values.

Impact assessment

Key impacts to surface water features during project construction and operation and include physical disturbance from watercourse crossings (shown in Figure 7-9), reduced water quality from sediment laden runoff from construction works areas during periods of high rainfall, accidental spills of hazardous materials such as fuels and oils and uncovering of acid sulphate soils during earthworks. Construction of project infrastructure also has the potential to alter existing hydrology of the site.

To determine the potential flooding impacts, flood behaviour within the project catchments was assessed using hydrologic and hydraulic modelling. Hydraulic modelling was used to assess the potential surface water impacts to the quarry site, watercourse crossing points and turbine locations for the 1% Annual Exceedance Probability (AEP) event (i.e., flood that has a one in a hundred chance of being exceeded in any year). Hydrology

The construction of roads and larger infrastructure has the potential to alter existing drainage patterns if not accounted for during design. Prolonged changes to drainage patterns can lead to permanent changes to vegetation structure. Hydrological effects have the potential to occur over a large area, due to the nature of the shallow topographical relief of floodplain systems.

Depending on the watercourse characteristics and construction crossing method, there is likely to be temporary disruption to surface water flows (within flowing watercourses). To enable crossings of watercourses, partial or complete diversion may be required if the watercourse is flowing at the time of construction.

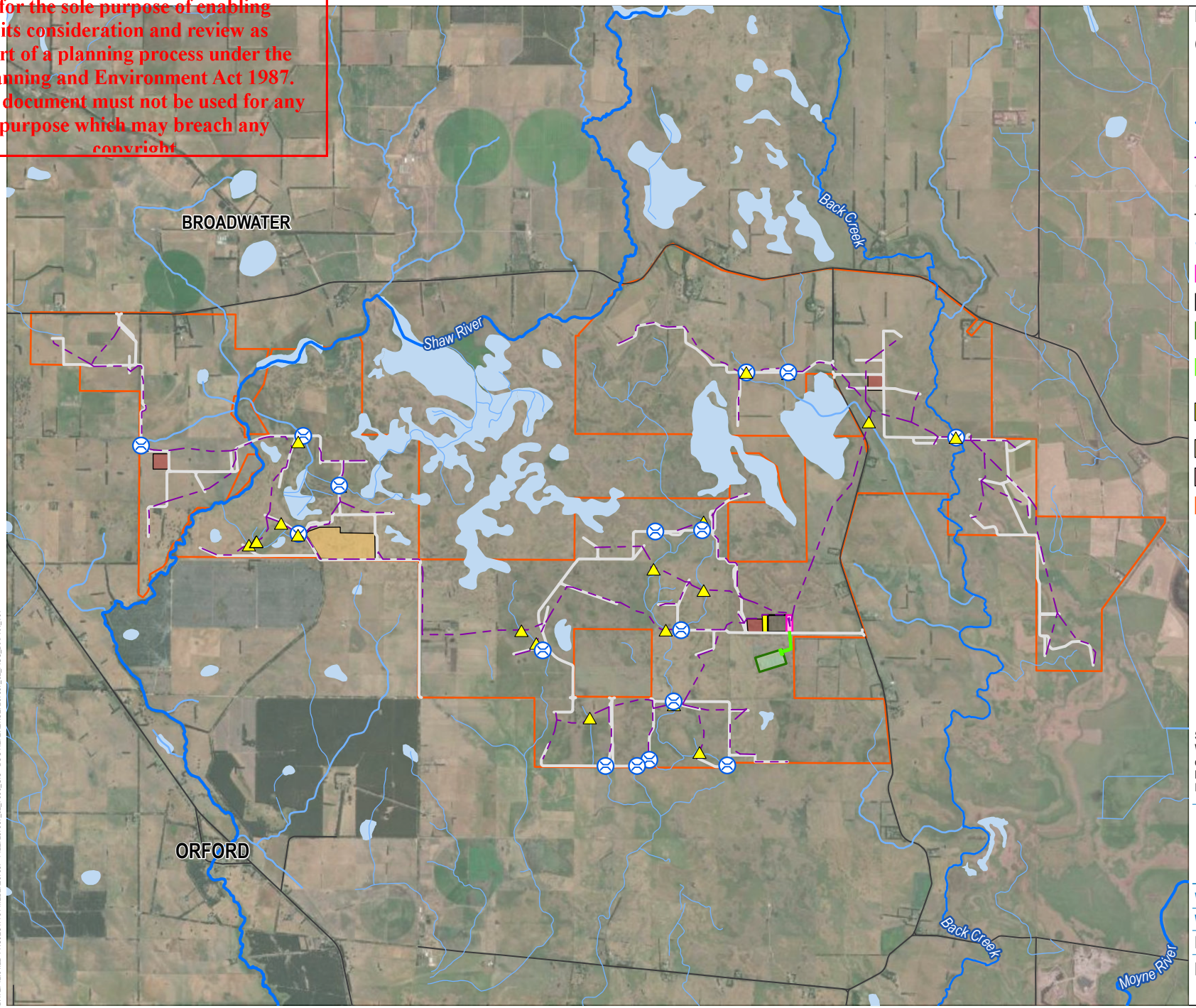
Construction of impervious hardstand areas and infrastructure (e.g., wind turbines) also has the potential to alter flow paths.

Water quality

Changes in water quality may affect the environmental values protected by the Environmental Reference Standard. The first impact pathway to water quality is the potential for a temporary increase in sedimentation from construction at the watercourse crossing locations, and to a lesser extent other construction works areas upstream. A secondary and less likely impact pathway relates to contamination of surface water resources during the construction and operations phases.

Increased sedimentation has the potential to reduce water quality, which can cause impacts for other users of a watercourse or for aquatic flora and fauna. Sedimentation may result from general construction or operations activities, such as runoff from stockpiles or cleared areas, or from watercourse crossing construction or use. The latter has the potential to result in direct disturbance to streambeds, banks or floodplains.

Contamination of surface waters has the potential to occur from spills of hydrocarbons (e.g., fuels and lubricants) or other chemicals, if construction controls and spill prevention and abatement techniques are not properly implemented. Uncontrolled release of water that has been collected in construction works areas (e.g., foundations and trenches) also has the potential to reduce water quality if it is more saline or turbid that receiving waters.



LEGEND

Crossing type

- Cable watercourse / drain crossing
- Acces track / watercourse crossing
- Major watercouse
- Underground cable
- Access track
- Major road
- Mapped wetlands (DELWP)
- Substation 33kV/220kV
- Battery energy storage system
- Tarrone Terminal Station
- Transmission line and grid connection infrastructure
- Operations and maintenance facility
- Quarry area
- Construction compound
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, wetlands, watercourse crossings and site infrastructure from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 1 2 km

SCALE 1:70,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.9

Proposed water course crossings

DATE: 12.04.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F036_GIS DOC REFERENCE: 287657_02_FIGS_D_APRX_V01

DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.

Significant rainfall events (e.g., flash flooding) are likely to result in increased erosion and sedimentation. These events can also mobilise trace amounts of hydrocarbon- or chemical-impacted sediments contaminated by construction activities or erode exposed potential acid sulfate soils that may then enter local watercourses.

Management and mitigation

The surface water modelling estimated the inundation depth, velocity and flowrates at each project infrastructure location. This modelling was used determine the location and sizing of culverts and bridges, the location of access tracks, wind turbines and hardstand areas (to avoid areas susceptible to inundation), and the watercourse cable crossing methodology. Conceptual designs of the two main watercourse crossings of the Shaw River and Back Creek are shown in Appendix A – Map book. Other design mitigations to avoid potential surface water impacts include designing the project with buffers around all mapped wetlands, and minimisation of watercourse crossings through siting of access tracks.

To further minimise potential impacts to surface water features (and their supporting values) management controls to be implemented during the design, construction, operation and decommissioning of the project include:

- development of the detailed drainage design in consultation with the Glenelg Hopkins Catchment Management Authority, considering best practice design guidelines
- development and implementation of a Sediment, Erosion and Water Quality Management Plan, in consultation with the Glenelg Hopkins Catchment Management Authority and EPA Victoria. Erosion and sediment control measures within the construction site would adopt a treatment train approach
- implementation of an approved Quarry Work Plan that includes risk treatment plans to manage and monitor surface water impacts in accordance with the Work Authority
- implementation of a risk-based approach to management of potential acid sulfate soil, in accordance with EPA Victoria Publication 655.1 (2009) *Acid sulfate soil and rock*. If acid sulfate soil is encountered it would be managed as a priority waste in accordance with EPA Victoria Publication 1968 *Guide to classifying industrial waste*
- measures to manage potential pollutants from entering waterways (e.g., spills risk assessment and response plan, storage of liquid fuels and chemicals within containment facilities)
- management of water collected dewatering of excavations in accordance with the Environment Protection Regulations 2021.

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 CEMP.

Works within a designated watercourse require a Works on a Waterway licence from Glenelg Hopkins Catchment Management Authority. Works would be undertaken in accordance with the requirements of the Catchment Management Authority licence.

Consistency with planning provisions

The project is consistent with the objective of Clause 12.03-1S River Corridors, Waterways, Lakes and Wetlands, which seeks to protect and enhance river corridors, waterways, lakes and wetlands. The project provides for buffers to assist in the protection of water bodies and ground water, consistent with Clause 14.02-1S Catchment Planning and Management. Appropriate construction management measures would be put in place to protect water quality and ensure that any discharge or waste would not impact the quality of the surface water, consistent with Clause 14.02-2S Water Quality.

7.3.2 Groundwater

Purpose

This section describes the groundwater within and surrounding the project site and defines key values associated with it. It describes potential impacts of the construction and operation of the project on these values, and measures that were taken to avoid and minimise these impacts. This assessment is based on

the findings of the hydrogeological and hydrological impact assessment (Appendix G), prepared by Water Technology Pty Ltd.

Assessment

Existing conditions

Groundwater within the project site is classified as falling within Segments B to C of the Environmental Reference Standard, which are defined by the concentration of total dissolved solids in the groundwater. Groundwater environmental values, defined by the Environment Reference Standard, relevant to the project include 'water dependent ecosystems and species' and 'agriculture and irrigation (stock watering)'. In general, groundwater in the project site is too brackish and hard for potable domestic use but of sufficient quality to be used for irrigation, stock and some industrial processes.

The geology across most of the project site consists of basalt flows and stony rises. There are also isolated occurrences of alluvium and colluvium restricted to lower lying areas near drainage channels and floodplains. The main aquifer within the project site occurs in the Newer Volcanic Group basalt. Depth to groundwater is typically between 1 and 12 metres below ground level, depending on the season. The highest groundwater levels occur in late spring after recharge by winter rainfall, and the lowest levels occur in late summer.

Mapped potential aquatic Groundwater Dependent Ecosystems within the project site include 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. Terrestrial Groundwater Dependent Ecosystems include six terrestrial vegetation wetland, woodland and shrubland communities typically in isolated fragments or along major watercourses. Mapped potential aquatic and terrestrial Groundwater Dependent Ecosystems and groundwater bores within the project site are shown in Figure 7-10.

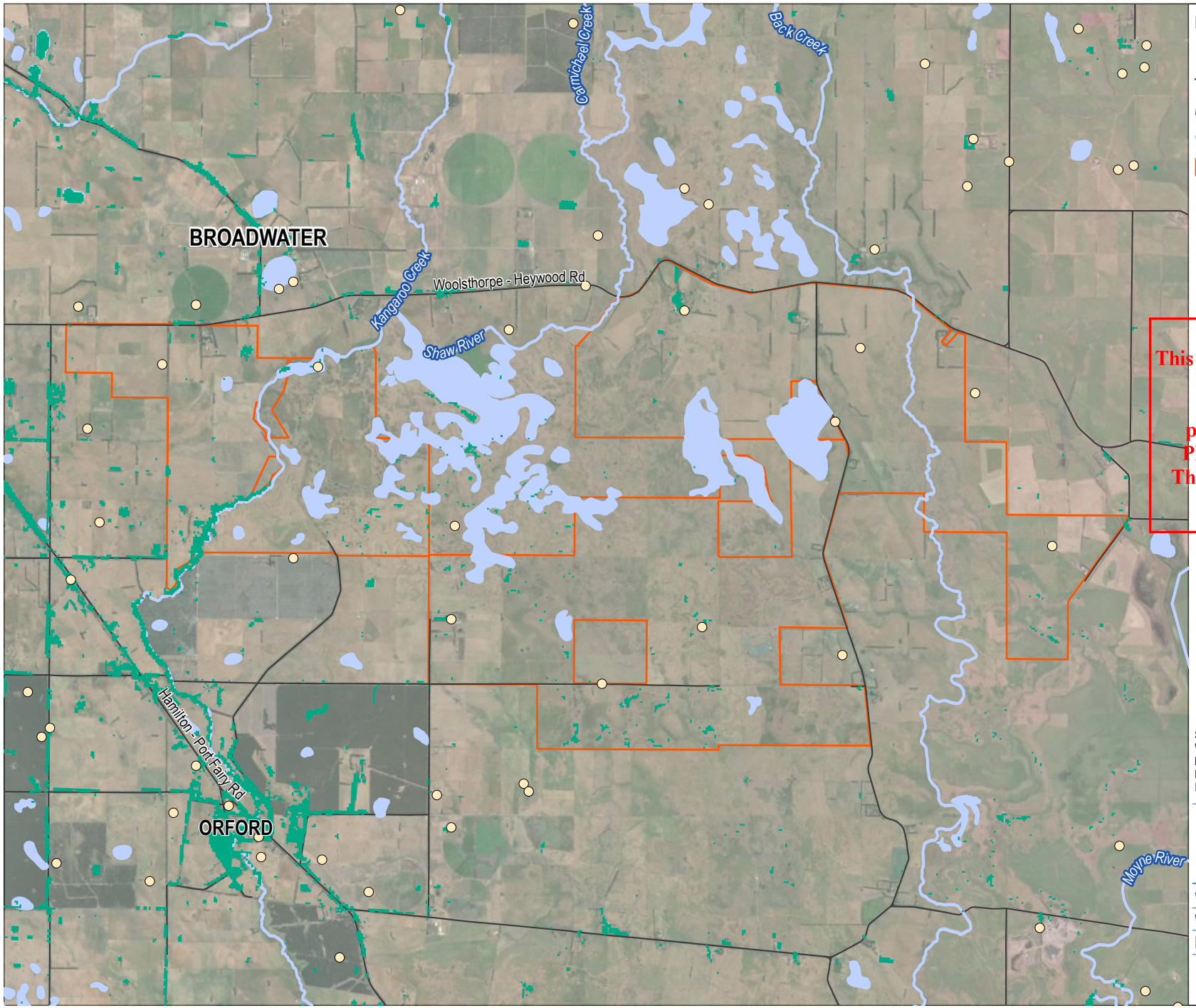
Impact assessment

The potential for groundwater-related issues associated with the construction and operation of the project relate to the potential for adverse impacts to existing users of groundwater and to Groundwater Dependent Ecosystems, because of reduced levels and associated impacts to the supply of groundwater. Impacts may also occur due to reduced groundwater quality.

These impacts could occur through the following potential impact pathways:

- dewatering of groundwater during construction, lowering the water table and resulting in groundwater drawdown that affects water availability
- disruption of groundwater recharge and flow, such as from introduction of impermeable surfaces and physical barriers in the form of wind turbine foundations
- disruption of groundwater discharge to waterways or waterbodies by intersecting groundwater discharge water features (e.g., natural springs) or from a reduction in groundwater availability (e.g., due to dewatering)
- groundwater contamination, including from accidental spills or formation of acid sulphate soils.

The degree of impact would depend on the reliance that existing users and Groundwater Dependent Ecosystems have on groundwater and the extent and duration of impacts.



LEGEND

- Groundwater bore
- Road
- Terrestrial GDE
- Aquatic GDE
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, GDEs and boreholes from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 1 2 km

SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.10

Groundwater bores and potential GDEs

DATE: 01.12.21 PROJECT: 754-MELEN287657 FILE: 287657_02_F027_GIS DOC REFERENCE: 287657_02_FIGS_C.APRX_V01

Management and mitigation

Design measures were put in place, based on known environmental constraints, to avoid potential groundwater impacts to local groundwater users and environmental values. These included:

- locating the quarry away from environmental values like groundwater bores and areas of potential GDEs. This is a key design mitigation measure aimed at avoiding, or at least substantially limiting, potential impacts to local groundwater users and environmental values
- applying a 100-metre buffer around all mapped aquatic Groundwater Dependent Ecosystems to exclude all project infrastructure within the buffered area. This area was selected as a means of avoiding physical disturbance to the Groundwater Dependent Ecosystems and their fringes, and to limit surface water runoff, and entrained sediment loads reaching these Groundwater Dependent Ecosystems from construction works zones
- applying a single, large buffer around a series of wetlands that form the Cockatoo Swamp in response to Brolga impact mitigation. This area contains most of the potential aquatic and terrestrial Groundwater Dependent Ecosystems mapped within the site
- avoiding areas of mapped native vegetation (which have the potential to be Groundwater Dependent Ecosystems) where possible based on site surveys that have progressively refined the understanding of the presence and distribution of native vegetation. This has included re-routing access tracks and underground cabling, and moving proposed wind turbines and other infrastructure.

Because aquatic Groundwater Dependent Ecosystems have a high likelihood of being inflow systems (i.e., they depend on local surface water inflows), hydrological modelling of the site was considered during the project design to ensure natural flow paths (hydrological connectivity) are not interrupted by the project.

In addition to the design measures described above, management measures to further manage potential impacts to groundwater include:

- obtain a Work Authority (through approval by Earth Resources, Department of Jobs, Precincts and Regions) for the quarry construction and operation and adhere to its requirements
- consult with relevant landowners about potential impacts to bores would occur prior to commencement of construction
- conduct further groundwater monitoring and mapping prior to and during construction to establish local groundwater levels and groundwater quality
- a Water Management Plan would be developed and its requirements carried out by the contractor, and approved by the Responsible Authority, prior to the commencement of project construction
- construction activities and temporary works that may impact on surface permeability and groundwater would be included within the contractor's CEMP
- measures to manage potential impacts to groundwater quality (e.g., site-specific risk analysis for any hazardous chemicals, storage of fuels and chemicals within containment facilities).

The use of quarry water would be in accordance with a Take and Use licence under Section 51 of the *Water Act 1989* and in accordance with Environment Protection Regulations 2021. Water collected dewatering of excavations would also be managed in accordance with the Environment Protection Regulations 2021.

With the implementation of these measures, the following are anticipated:

- Disturbance and potential impacts on groundwater levels in the quaternary aquifer would be highly localised and temporary.
- The nearest groundwater bore to the quarry is about 1,000 metres away. As such, impacts to water levels in groundwater bores from quarry dewatering and drawdown are not anticipated to occur.
- No material impact is predicted to nearby Groundwater Dependent Ecosystems based on a negligible reduction in groundwater levels predicted.
- Water levels in existing bores may be impacted if dewatering of excavations is required, mainly during times of high groundwater levels in winter and spring. This impact is considered to be temporary given

the short duration of turbine excavation (i.e., up to two weeks). Measurable impacts to groundwater bore water levels are not anticipated.

- Any changes to groundwater flow and recharge are unlikely to affect bores or ephemeral wetlands and springs.
- If accidentally released, fuels and chemicals stored within the project site could result in localised contamination of the groundwater system.
- No impact to Port Campbell Limestone aquifer is anticipated.

Overall, impacts to groundwater users and groundwater quality from the project construction, operational and decommissioning are considered to be low to very low.

Consistency with planning provisions

The project meets the policy objective relating to Clause 14.02-1S Catchment Planning and Management as the measures employed will assist the protection and restoration of catchments, water bodies, groundwater, and the marine environment.

7.3.3 Biodiversity

Purpose

Protection of the environment, including landscapes and landscape character, is found in Clause 21.06 and 22.02. Clause 21.06 gives an overview of the environmental and landscape context of Moyne Shire. Particular importance is placed on protection of remnant flora and fauna given the history of heavy land clearing, and identification and preservation of significant landscapes. Clause 22.02-2 seeks to maintain and enhance biodiversity in Moyne. The decision guidelines at Clause 52.32-5 include for the responsible authority to consider the impact of the project on the natural environment and natural systems.

Clause 12.01-1S states that the cumulative impacts on biodiversity should be considered. This is also a requirement of the Planning and Policy Guidelines.

A comprehensive flora and fauna assessment has been prepared by Nature Advisory and is included in Appendix P. This assessment was informed by a number of surveys and investigations undertaken over many years, and is a requirement of Clause 52.32 and the DELWP Native Vegetation Guidelines. A permit is triggered for the removal of native vegetation pursuant to Clause 52.17. A separate assessment has been undertaken regarding Brolga (Appendix Q). Biosis have completed an independent peer review (Appendix P-2) in relation to Brolga and the Southern Bent wing bat.

At the national level, responsible authorities and proponents need to be aware of the following:

- Commonwealth EPBC Act, which provides for the protection of matters of national environmental significance, including nationally significant threatened species and wetlands protected under the Convention of Wetlands of International Importance (the Ramsar Convention).
- Habitat values of wetlands and wetland wildlife habitat designated under the Ramsar Convention, or utilised by designated species under the *Japan-Australia Migratory Birds Agreement* (JAMBA), the *China-Australia Migratory Birds Agreement* (CAMBA) and/or the *Republic of Korea – Australia Migratory Birds Agreement* (ROKAMBA).

At the state level, responsible authorities and proponents must consider (as relevant) the following:

- *Flora and Fauna Guarantee Act 1988*, which provides protection for species and ecosystems that are of state importance.
- Planning Policy Framework, which sets out the state planning objectives for protection and conservation of biodiversity (refer to Clause 12.01 Biodiversity of the Victoria Planning Provisions).
- Clause 52.17 (Native vegetation) of the Victoria Planning Provisions, which provides the relevant decision-making framework for native vegetation protection and conservation.

Possible impacts of a wind energy facility on biodiversity can be considered under six categories as set out in the Native Vegetation Guidelines:

- direct removal of native vegetation and habitat

- native fauna casualties resulting from construction activities
- bird and bat casualties resulting from collisions with moving turbine blades
- bird and bat casualties resulting from collisions with stationary infrastructure (for example towers, anemometers, fences, powerlines)
- indirect habitat loss
- cumulative effects associated with other developments in the region.

The impacts of the project on the state-threatened Brolga have been assessed in accordance with the Interim Brolga Guidelines. The results of this work are presented in a stand-alone report by Nature Advisory, provided in Appendix Q.

This section describes the flora and fauna attributes of the project site, the potential impacts, and the proposed mitigation and management measures for the project.

Native vegetation

This section relates specifically to the permit trigger for the removal of native vegetation in accordance with Clause 52.17 of the planning scheme.

Method

A combination of desktop information and field-based survey techniques were used to characterise native vegetation within the project site and surrounding areas.

Fifteen vegetation and flora surveys have been carried out at the project site. The initial surveys were done by Ecology Partners Pty Ltd from 2009 to 2017, and then by Nature Advisory Pty Ltd from 2018 onwards. A detailed description of each of these surveys is provided in Appendix P.

Existing conditions

The project is within the Victorian Volcanic Plain bioregion. Volcanic activity in the region has, over long geological period, deposited thin broad shields or long lava flows of basalt, creating extensive flat to undulating plains interspersed with volcanic cones. Within this landscape are scattered shallow lakes and incised watercourses. Native grasslands occur in areas where these flows have experienced long periods of weathering, producing heavy grey, red or black cracking clay soils, which are generally fertile but poorly drained. In contrast, the youngest relatively unweathered lava flows are known as stony rises and have thin soils and support woodland vegetation. Trees and shrubs are either absent or are restricted to watercourses, swamps or rocky hills and slopes bordering the plains.

Overall, species diversity of this region is low because of its pastoral and agricultural history, dating from the late 1830s and early 1840s. In most areas the native plants have been replaced by pasture grasses and cropping. Remnants of the native flora are fragmented, and mostly confined to the sides of roads and railways, rocky areas or to small forest reserves that have not been cultivated or modified.

Within the project site, nine Ecological Vegetation Classes (EVCs) were mapped within the investigation area, covering an area of 848 hectares as shown in

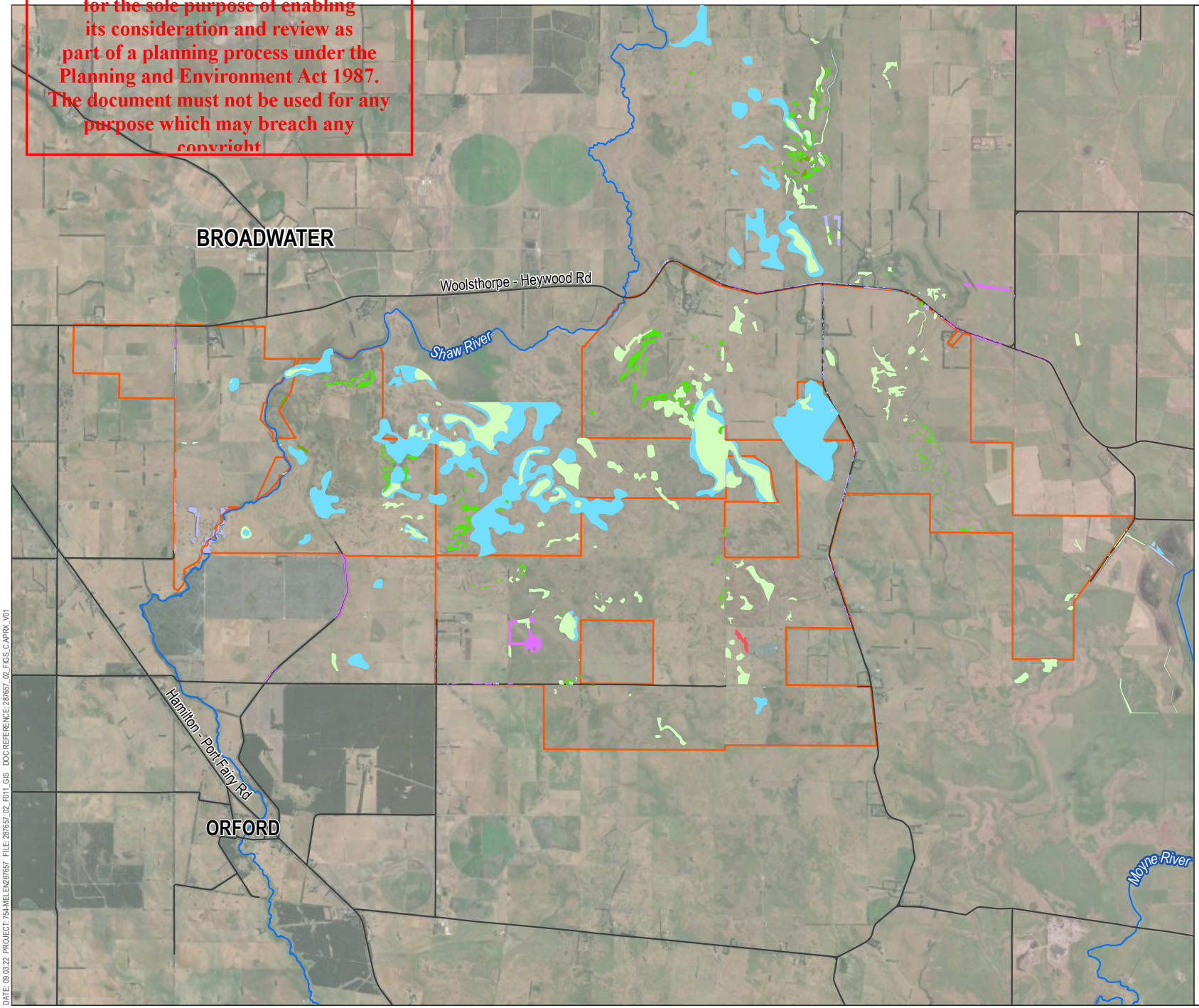
Figure 7-11. This includes 501 hectares of mapped wetlands, which are treated as native vegetation. Areas not supporting remnant native vegetation have a high cover (>90%) of exotic grass species, many of which have been direct seeded for use as pasture. Scattered native grasses are generally present in these areas, however, are less than the required 25% cover to be considered a remnant patch of native vegetation.

Roadside reserves at areas potentially requiring upgrades for over dimensional loads (i.e., intersections) were dominated by pasture grasses. Six EVCs were recorded in these areas, totalling about 0.7 hectares (including DELWP mapped wetlands).

A total of 133 scattered trees were mapped in the investigation area, comprising:

- 75 large scattered trees (≥ 70 centimetres diameter at breast height (DBH) for Eucalypts and ≥ 40 centimetres DBH for Wattles)
- 63 small scattered trees (< 70 centimetres DBH and < 40 centimetres DBH for Wattles).

No scattered trees were recorded in the over dimensional route study area.



LEGEND

- Road
- Watercourse
- Willatook Wind Farm boundary

Ecological vegetation class (EVC)

- Aquatic Herbland
- Plains Grassland
- Swamp Scrub
- Tall Marsh
- Unassessed
- Basalt Shrubby Woodland
- Higher Rainfall Plains Grassy Woodland
- Plains Grassy Wetland
- Stony Knoll Shrubland
- Swampy Riparian Woodland
- Current Wetlands

SOURCE:
Willatook Wind Farm boundary and EVCs from Wind Prospect.
Road and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 1 2 km

SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.11

Mapped native vegetation within the project site

DATE: 09.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F011_GIS DOC REFERENCE: 287657_02_FIGS_C.APRX_V01

Four ecological communities listed under the EPBC Act were identified to have the potential to occur within the investigation area. Based vegetation field surveys and a review of published descriptions and condition thresholds, two of these ecological communities were identified within the investigation area. These communities, both listed as 'critically endangered' under the EPBC Act, are:

- Grassy Eucalypt Woodland of the Victorian Volcanic Plain

  Two patches of Higher Rainfall Plains Grassy Woodland EVC (EVC 55_63) within the investigation area were found to meet the condition thresholds for Grassy Eucalypt Woodland of the Victorian Volcanic Plain EPBC Act listed ecological community. These patches are around 0.8 hectares in size.

- Seasonal Herbaceous Wetland of the Temperate Lowland Plain

  The Seasonal Herbaceous Wetland of the Temperate Lowland Plain EPBC Act listed ecological community is associated with the Plains Grassy Wetland EVC (EVC 125). Patches of Plains Grassy Wetland EVC surveyed in 2018 and 2021 were found to meet the threshold criteria for Seasonal Herbaceous Wetland of the Temperate Lowland Plain and therefore this community was recorded as present within the investigation area.

Management and mitigation

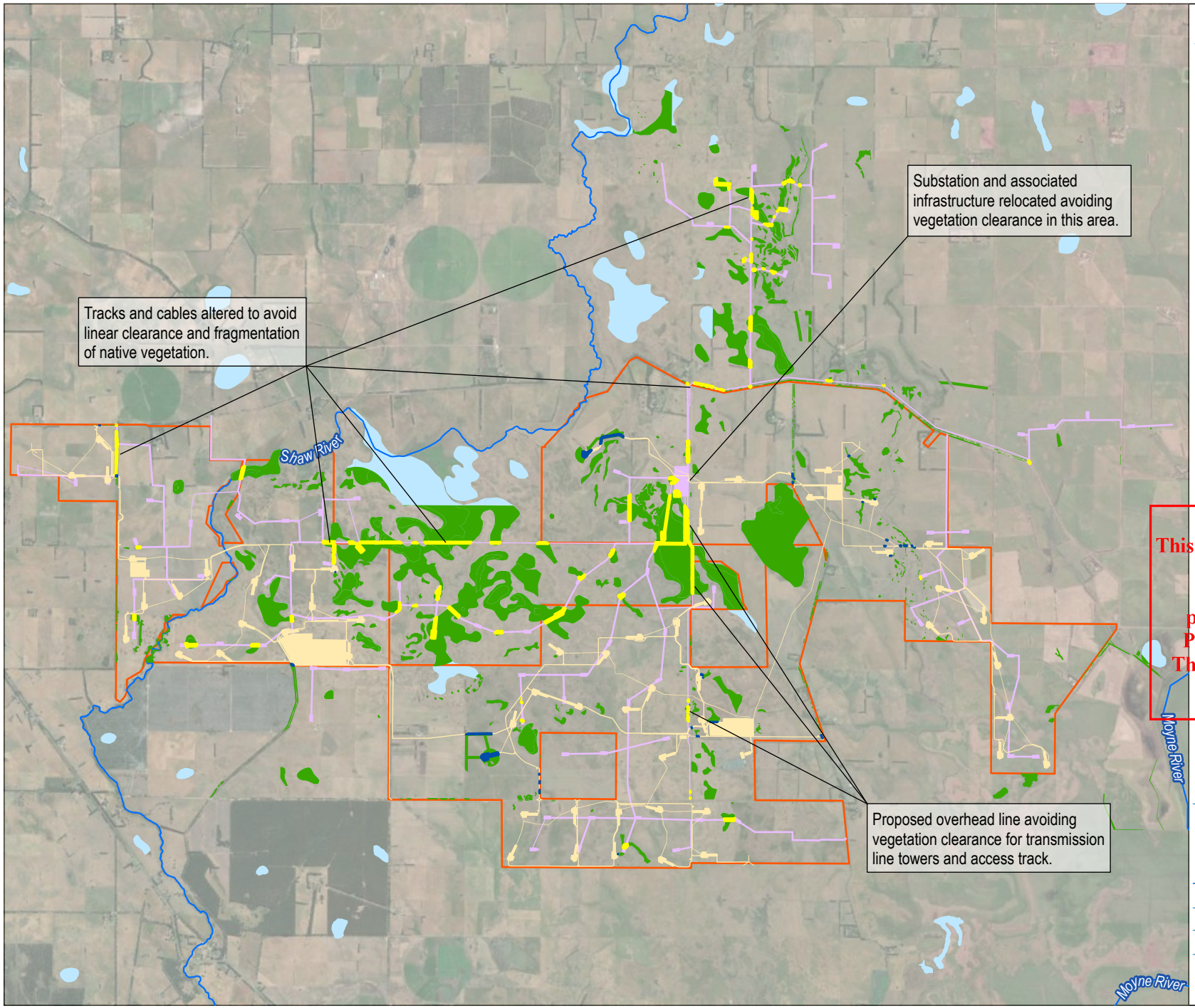
Native vegetation surveys have progressively refined the understanding of native vegetation coverage and habitat for threatened flora and fauna across the site. Throughout the design process there have been significant efforts made to avoid the clearance of native vegetation.

The proposed construction footprint consists of approximately 222 hectares of expected ground disturbance. As the construction footprint has been derived in accordance with the 'avoid' and 'minimise' principles, the majority of the native vegetation has been avoided and would be retained.

The original project design as envisaged in 2010, which largely avoided areas of native vegetation, would have resulted in the need to remove at least 20 hectares of native vegetation. A range of subsequent design changes were made as part of the project's concept design that was referred to DELWP in 2018, including re-routing of site tracks and underground cabling, repositioning three wind turbines and associated hardstands, and repositioning a further four hardstands. As a result, the referred concept design would have resulted in the need to remove at least 9 hectares of native vegetation.

Further avoidance measures were carried out throughout the EES process to arrive at the current project reference design, estimated to result in the clearance of 4.6 hectares of native vegetation.

Areas of avoided native vegetation clearance based on the conceptual design of the project are shown in Figure 7-12 along with areas of proposed native vegetation clearance. Detailed mapping of areas of proposed vegetation clearance are show in Figure 7-12.



LEGEND

- Watercourse
- Concept design construction footprint
- Current project construction footprint
- Areas of native vegetation (mapped EVCs)
- DELWP mapped wetlands
- Areas of avoided vegetation clearance
- Proposed areas of vegetation clearance
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, EVC and construction footprints from Wind Prospect.
Watercourses from Vicmap.
Wetlands from DELWP.
Imagery from ArcGIS Online (various capture dates).

0 1 km

SCALE 1:72,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.12

Areas of avoided and proposed native vegetation clearance

DATE: 04.02.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F0498_GIS DOC REFERENCE: 287657_02_FIG5_E_APRX_V02

Other management measures relating to native vegetation 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 cleared areas
- ensure all construction personnel are appropriately briefed before works start
- ensure that no construction personnel, machinery or equipment are placed inside vegetation/tree protection zones.

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 EVCs
  - tree protection zones
  - any other areas of special concern noted during pre-clearance inspections.
- Clearly mark access tracks to prevent establishment of secondary tracks and disturbance to native vegetation.

Revegetation of disturbed areas would include:

- planting locally occurring native shrubs, trees and groundcover plants, selected in consultation with DELWP, to recreate the target vegetation community
- incorporating rocks, logs, dead trees, and stumps in the restoration and rehabilitation works to provide fauna habitat
- maintaining plantings in accordance with the rehabilitation sub-plan
- managing weeds and pest animals.

Impact assessment

Construction of the project would result in the loss of 4.132 hectares of native vegetation from patches; seven scattered trees, including six large scattered trees; and 0.486 hectares of EPBC Act listed ecology community Seasonal Herbaceous Wetland of the Temperate Lowland Plain. Of this a total of 3.518 hectares is on private land and 0.613 hectares on public land.

The area of native vegetation proposed to be cleared occurs in patches of relatively poor condition (average condition score of 29). This represents about 0.5% of native vegetation mapped within the project site and immediately adjacent roadsides.

Native vegetation unable to be retained during the design and construction phases would be offset according to the Native Vegetation Guidelines. The amount of native vegetation required to be offset for the project is presented in Table 7-7 and discussed in detail in Appendix P - *Flora and fauna*. All offsets would be secured before the removal of native vegetation.

Table 7-7 Project offset requirements

Aspect	Offset requirement
Wind farm site (Moyne Shire)	
General offset amount	1.207
Vicinity	Glenelg Hopkins CMA boundary or the Moyne municipal district
Minimum strategic biodiversity value	0.312

Aspect	Offset requirement
Large trees to be offset	6 large trees
Over dimensional route (Glenelg Shire)	
General offset amount	0.013
Vicinity	Glenelg Hopkins CMA boundary or the Moyne/Glenelg municipal districts
Minimum strategic biodiversity value	0.683

The project is predicted to directly impact 0.48 hectares of mapped Seasonal Herbaceous Wetland of the Temperate Lowland Plain, an ecological community listed under the EPBC Act. This represents 2.6% of the mapped ecological community within the investigation area. A suitable offset for the clearance Seasonal Herbaceous Wetland of the Temperate Lowland Plain has been located in accordance with the EPBC Act offset policy.

In addition to direct physical disturbance, alteration of existing hydrological drainage patterns or natural seasonal filling regime have the potential to indirectly impact Seasonal Herbaceous Wetland of the Temperate Lowland Plain ecological community. As discussed in Section 7.3.1, the construction of roads and wind turbine foundations has the potential to alter existing drainage patterns if not accounted for during design. Hydrological effects have the potential to occur over a larger area, due to the nature of the shallow topographical relief of floodplain systems. During the project design, hydrological flood modelling was used to inform the placement of turbine locations. Similarly, modelling of flood and flow velocity would be considered for the sizing of culverts to ensure flow pathways are not affected by the project.

With the implementation of these measures, the creation of buffers around wetlands and the implementation of an approved offsets package, the impact to Seasonal Herbaceous Wetland of the Temperate Lowland Plain ecological community within the site was assessed to be of low.

A total of 0.8 hectares of Grassy Eucalypt Woodland of the Victorian Volcanic Plain has been mapped within the investigation area and these areas have been avoided during project design. A further 2.2 hectares of Heavier-soils Plains Grassland EVC has the potential to support this community. These areas have been avoided during the design of the project and therefore no impacts on this ecological community were predicted.

Consistency with planning provisions

The provisions of the Moyne Planning Scheme have been considered in the design of the project to assist in the protection and conservation of Victoria's biodiversity, consistent with the provisions of Clause 12.01-1S.

The approach to the removal of native vegetation has been to avoid and minimise its removal, consistent with the provisions of the Clause 52.17 and the Native Vegetation Framework, as well as Clause 12.01-2S that contains an objective *"to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation."*

The project has had regard to the objectives of Clause 21.06 Environment as it seeks to protect and enhance the region's indigenous genetic biodiversity, and Clause 22.02 Environment as it seeks to maintain, protect and enhance the flora and fauna communities and habitat, particularly the critical habitat, of Victorian Rare and Threatened Flora and Fauna species.

Flora and fauna

Method

A combination of desktop information and field-based survey techniques were used to characterise the flora and fauna within the project site and surrounding areas.

Flora

Fifteen vegetation and flora surveys have been carried out at the project site. The initial surveys were done by Ecology Partners Pty Ltd from 2009 to 2017, and then by Nature Advisory Pty Ltd from 2018 onwards. A detailed description of each of these surveys is provided in Appendix P.

Fauna

Numerous fauna surveys have been undertaken at the project site. The initial surveys were undertaken by Ecology Partners Pty Ltd from 2009 to 2011, and then by Nature Advisory from 2018 onwards. In accordance with a risk-based approach, fauna surveys have focussed on bats, birds, reptiles and amphibians and aquatic fauna. A detailed description of each of these surveys is provided in Appendix P.

The flora and fauna investigation area for the database searches of existing flora and fauna species records and potential occurrence of EPBC Act matters was defined as the project site plus a buffer area of at least 10 kilometres from the project site boundary.

Bat surveys over five main recording periods (2009, 2010, 2011, 2018, 2019/20) were carried out using ultrasonic bat detectors deployed remotely and recording the calls of bats that passed by them. Surveys involved the deployment of bat detectors for several weeks at a time at 100 unique survey sites in a broad range of habitats and areas of the site during focussing on between spring and early autumn. Recordings were also conducted at ground level and at heights of 45 metres on wind monitoring masts to detect species flying at height, and thus provide data on which species may be at greater risk of collision with operating wind turbines. Call identification was based on a key developed by comparing the characteristics of bat calls with reference calls.

To characterise the bird community present within the project site a number of methods were used. Fixed-point bird surveys were completed in 2009, 2018 and 2019. These surveys involve an observer stationed at a survey point for 15 minutes. During this period, all birds (species and abundance) were recorded, and the height of birds were documented. Incidental observations of threatened bird species and raptors were also recorded while moving across the site. Seasonal wetlands and farm dams were also visited on five separate surveys during spring and summer and assessed for the suitability to provide foraging habitat for migratory shorebirds. Searches were carried out using binoculars and telescope. All listed migratory birds encountered were identified and the number of individuals was counted. These surveys were completed in accordance with EPBC Act migratory shorebird survey guidelines.

A broad range of other fauna surveys were also completed for threatened fauna (see Appendix P) including:

- Striped Legless Lizard – habitat surveys and targeted tile surveys.
- Swamp Skink – trapping, active searching, and habitat surveys.
- Growling Grass Frog – targeted frog surveys and habitat surveys.
- Little Galaxias and Yarra Pygmy Perch – targeted fish surveys using bait traps, dip nets and Fyke nets

A range of further surveys and assessments were also completed to assess Brolga and potential Brolga breeding habitats, which are presented in Appendix Q – *Brolga*.

Existing conditions

As described above, the majority of the site has been cleared of native vegetation for agricultural purposes. Exotic pasture and crops cover most of the site area. This area is largely grazed by livestock and provides little habitat or shelter for indigenous fauna. Within these areas there are areas (often linear) of planted vegetation, usually as wind breaks, and farm dams.

Other habitats for flora and fauna identified include:

- Modified native grasslands – these largely restricted to roadsides with areas mapped as the Plains Grassy Woodland (EVC 55_63). This habitat was assessed to be of moderate habitat quality.
- Modified woodland and scattered trees – occur primarily along roadsides and some patches in agricultural land, and scattered remnant trees and Basalt Shrubby Woodland (EVC 642). This habitat was assessed to be of low to moderate habitat quality.

- Rocky rise/stony knoll – occurs in much of the southern section of the site in grazing land and includes patches of Stony Knoll Shrubland (EVC 649). This habitat was assessed to be of low to moderate habitat quality.
- Swamps and marsh – These habitats are predominantly inundated during Winter and Spring before drying during Sumer. Much of the original wetland habitat has been modified or drained. The largest of these habitats is Cockatoo Swamp in the northern areas of the site and includes patches of Plains Grassy Wetland (EVC 125). This habitat was assessed to be of moderate habitat quality.

Figure 7-13
Plains Grassy Wetland
(EVC 125)

Figure 7-14
Basalt Shrubby Woodland
(EVC 642) (Nature Advisory)

Figure 7-15
Stony Knoll Shrubland
(EVC 649) (Nature Advisory)

Flora

During the field assessments, 208 plant species were recorded. Of these, 123 (59%) were indigenous and 85 (41%) were introduced or non-indigenous native in origin. The desktop review indicated a total of 43 indigenous species have the potential to occur in the investigation area based on database records. This included 18 species listed under the EPBC Act, and 35 species listed under the FFG Act.

Targeted surveys for the potentially presented listed flora species focussed on suitable habitats within proposed areas of development. Based on these targeted surveys two flora species of conservation significance were recorded in the investigation area. These were:

- Swamp Everlasting (*Xerochrysum palustr*) listed as vulnerable under the EPBC Act, listed as threatened under the FFG Act. A total of 24 plants were recorded within a single patch of Plains Grassy Wetland (EVC 125) on private land.
- Trailing Hop-bush (*Dodonaea procumbens*) listed as vulnerable under the EPBC Act and DELWP Advisory List. Three plants were recorded in two patches of Basalt Shrubby Woodland (EVC 642) along Old Dunmore Road

Figure 7-16
Swamp Everlasting recorded in the investigation area

Figure 7-17
Flowers of trailing hop bush

(Source: Brown, A. J. © 2021 Royal Botanic Gardens Board, CC BY-NC-SA 4.0)

No listed flora species were assessed to have the potential to occur within roadside areas of the over dimensional road route.

Five declared noxious weed species, listed under the *Catchment and Land Protection Act 1994*, were recorded, including Blackberry (*Rubus fruticosus*), Gorse (*Ulex europaeus*), Perennial Thistle (*Cirsium arvense*), St John's Wort (*Hypericum perforatum*) and Sweet Briar (*Rosa rubiginosa*).

Birds

A total of 96 bird species were recorded within the investigation area and surrounding areas between 2009 and 2020. This represents about half of bird species reported locally in the Victorian Biodiversity Atlas.

During 2018 and 2019 bird utilisation fixed point surveys were completed. The most common species recorded were Little Raven, Australian Magpie, Eurasian Skylark, Common Starling, Magpie-lark and Long-billed Corella. Overall, the five most common species represented more than two thirds of all birds recorded. Most bird sightings (95%) were recorded below 40 metres in height, with the remaining 5% being

recorded between 40 and 250 metres in height. The only listed species observed during the bird utilisation surveys was the Fork-tailed Swift, which is listed as a migratory species under the EPBC Act.

Six raptor species were recorded, with Brown Falcon and Nankeen Kestrel being the most frequently recorded species. Raptors represented a small proportion of the total bird community recorded in the site. Wedge-tailed Eagles were rare, being recorded on only three occasions. While not recorded during surveys the Black Falcon and Little Eagle were assessed to have the potential to pass through the site.

A total of seven species of waterbirds were recorded. The Pacific Black Duck, White-faced Heron, and Australian Shelduck were the most common waterbirds with most recorded flying close to the ground. Less abundant waterbirds observed were the Australian White and Straw-necked Ibises, White-necked Heron and Grey Teal. The highest concentrations of water birds were at Wild Dog Swamp, to the east of the project site along the Moyne River floodplain. The Eastern Great Egret, Eastern Cattle Egret, Plumed Egret and Glossy Ibis were also assessed to potential occur locally in small numbers when seasonal conditions created ephemeral wetland areas.

Due to the presence of potentially suitable habitat at a range of wetlands and watercourses within the investigation area, surveys for migratory shorebirds and potential habitat were undertaken. From these surveys, Nature Advisory considered there was potential for five migratory wader species to occur within the site. Of these, the Sharp-tailed Sandpiper, Common Greenshank and Latham's Snipe were recorded, and the Curlew Sandpiper and Red-necked Stint were assessed to occasionally visit. These species were recorded in low numbers and were well below the criteria of a population of national importance of 0.1% of flyway population.

Nature Advisory determined there is little suitable habitat within the site for most migratory shorebirds, largely due to the highly ephemeral nature of most waterbodies, and limited extent of open water or exposed muddy shorelines. The lack of extensive habitat, and the small numbers of these species observed indicate the wetland areas within the site are unlikely to support important habitat of any of these species. Unlike the other migratory shorebirds that may use the project site, Latham's Snipe hides in dense vegetation near water by day and mostly forages in more open wetlands with soft, muddy substrates at night. Suitable habitat for Latham's Snipe occurs along Back Creek and nearby drains in the eastern part of site, as well as along the Shaw River and some deeper, more heavily vegetated wetlands.

The White-throated Needletail is an aerial species that forages while flying and is known to occur over forested areas. No White-throated Needletail were observed during field surveys and the site lacks areas of forested vegetation their preferred foraging habitat, indicating that site is unlikely to provide important habitat for the species.

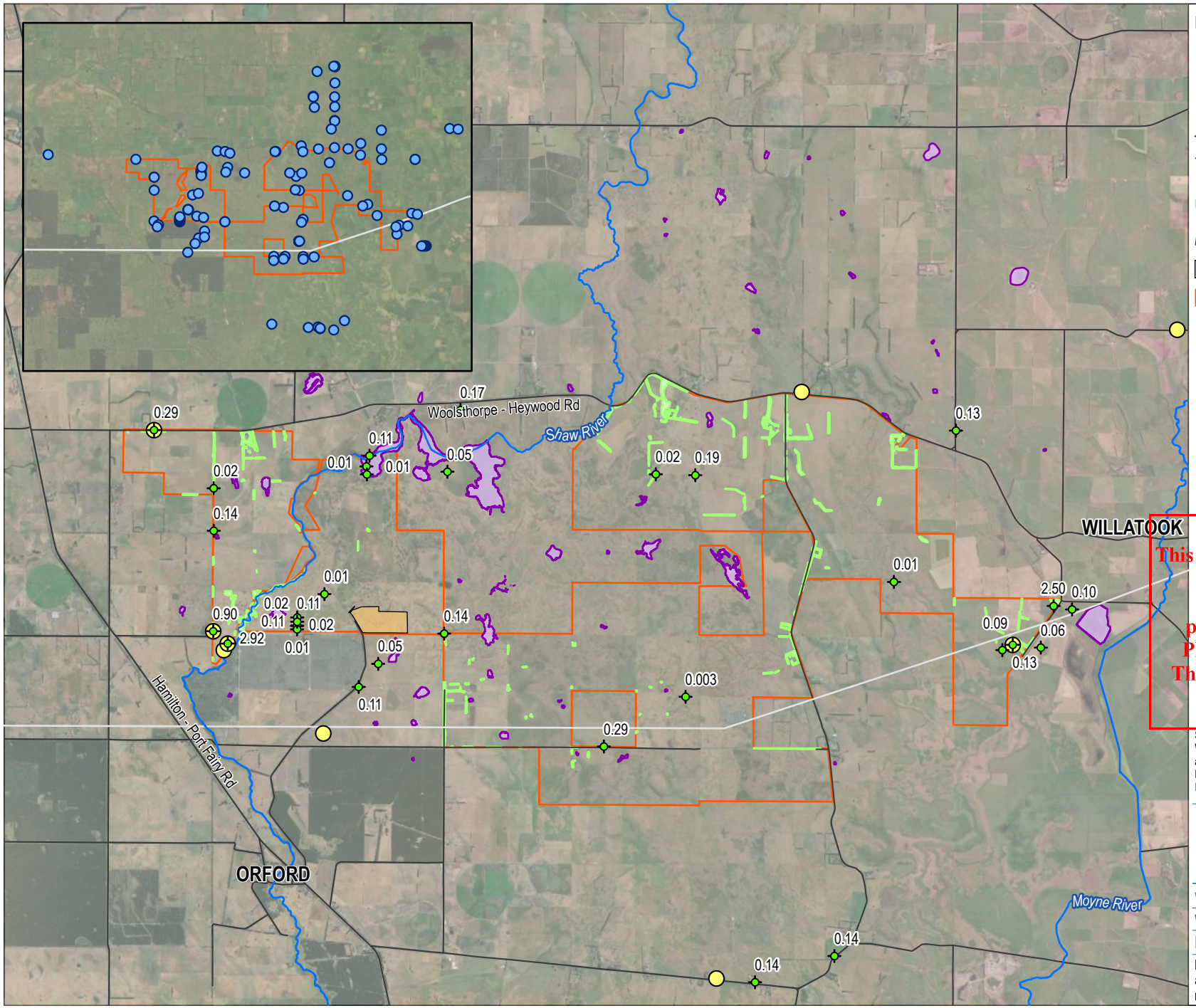
Bats

Ten species of bats were recorded during bat surveys between 2009 and 2020. Eight of the species recorded are considered secure in their conservation status (i.e., not listed as threatened) and are widely distributed. Most calls in the site were from the ground-based detector indicating bats in these areas typically fly around ground level. Species recorded at a height of 45 metres were Gould's Wattled Bat, Chocolate Wattled Bat, Large Forest Bat, Little Forest Bat and White-striped Freetail Bat, but at a much lower frequency.

Two species recorded were listed threatened bats; the Southern Bent-wing Bat (EPBC Act Critically Endangered, FFG Act Critically Endangered) and Yellow-bellied Sheathtail Bat (FFG Act Vulnerable). A further four multi-species complexes were recorded, including the Long-eared bats (*Nyctophilus* spp.), Forest Bats (*Vespadelus* spp.), and Freetail Bat (*Ozimops* spp.) complexes. Species belonging to these species' complexes are not threatened.

The absolute abundance of bats cannot be measured from the number of bat calls recorded during any given time; however, calls can be used as an indication of relative abundance or activity.

Out of tens of thousands of recorded bat calls from all surveys, 150 were attributed to the Southern Bent-wing Bat and 16 to Yellow-bellied Sheathtail Bat (Figure 7-18).



LEGEND

- Bat recording sites
- Southern Bent-wing Bat
- Yellow-bellied Sheathtail Bat
- Road
- Watercourse
- Potential Southern Bent-wing bat habitat
- Modelled wetland areas
- Quarry area
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, quarry, wetlands and bat survey data from Wind Prospect.
Roads, transmission line and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 1 2 km

SCALE 1:85,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.18

Records of Southern Bent-wind Bat and Yellow-bellied Sheatail Bat with mapped habitats

DATE: 18.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F031_GIS DOC REFERENCE: 287657_02_FIGS_C.APRX_V04

Based on review of database records, the Grey-headed Flying-fox (*Pteropus poliocephalus*) was assessed as having the potential to occasional pass through the site, but due to limit suitable foraging habitat it was assessed to be unlikely to occur regularly.

Frogs

Due to the presence of a range of suitable habitat in a range of waterbodies and tributaries within the site, targeted frog surveys were conducted in November 2009 and habitat assessments were conducted in 2018 and 2019. Five frog species were recorded including the Southern Bullfrog (*Limnodynastes dumerilii*), Striped Marsh Frog (*Limnodynastes peronii*), Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Growling Grass Frog (*Litoria raniformis*) (EPBC Vulnerable, FFG vulnerable), Common Froglet (*Crinia signifera*), and Southern Brown Tree Frog (*Litoria ewingii*).

In the 2009 survey, a Growling Grass Frog was heard calling to the south of the project. In 2018 and 2019, the aquatic habitats on and near the site were assessed for their suitability for the Growling Grass Frog. These surveys concluded that most wetlands lacked sufficient fringing, floating or emergent vegetation of the type favoured by the species. A smaller number of wetlands and creek lines met the requirements for potential Growling Grass Frog habitat. Back Creek (and potentially the Shaw River) was assessed to be potential movement corridors providing connectivity to other habitats up- and downstream.

Reptiles

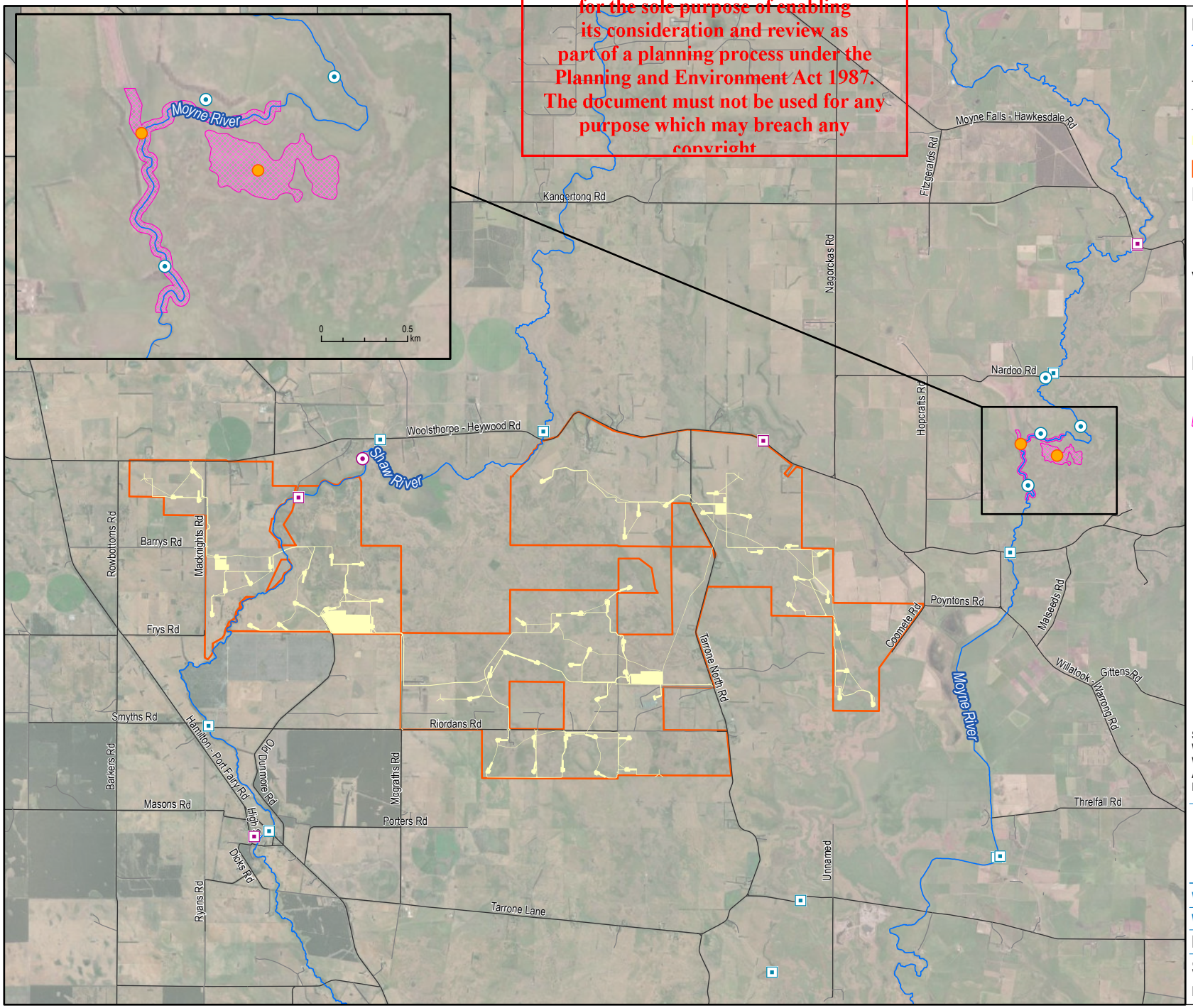
Ten reptiles have been recorded across the site and neighbouring areas. This includes six lizards and four snakes. Two threatened species were recorded; the Swamp Skink and Glossy Grass Skink, both listed as endangered under the FFG Act. Due to the presence of potentially suitable habitat in areas of remnant native grassland, the Striped Legless Lizard (*Delma impar*) (EPBC Vulnerable, FFG endangered) was also assessed as having the potential to occur.

Aquatic fauna

Six fish species were collected within the investigation area. This included threatened fish species, the Yarra Pygmy Perch (*Nannoperca obscura*) and Dwarf Galaxias (*Galaxiella pusilla*) collected within an upstream tributary of the Shaw River. Since the time of the aquatic surveys, the western portion of the Dwarf Galaxias population has been re-classified as a new species called the Little Galaxias (*Galaxiella toourtkoourt*). The Little Galaxias is endemic to south-eastern Australia from Barwon Downs in western Victoria to near the Coorong in south-eastern South Australia. The species is listed as threatened under the FFG Act.

The Hairy Burrowing Crayfish (*Engaeus sericatus*) (listed under the FFG Act) is a short-ranged endemic species found in Western Victoria and has been recorded in a Moyne River tributary six kilometres east of Willatook. Burrow chimneys from crayfish were observed in one section along the Moyne River and adjacent wetland during field surveys for the project and attributed to the Hairy Burrowing Crayfish.

The location of threatened aquatic fauna species is shown in Figure 7-19.



LEGEND

- Watercourse
- Road
- Track
- Construction footprint
- Willatook Wind Farm boundary

EHP records (2018)

- Little Galaxias
- Yarra Pygmy Perch

VBA records (2022)

- Little Galaxias
- Yarra Pygmy Perch

NA records

- Hairy Burrowing Crayfish
- Hairy Burrowing Crayfish habitat

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Watercourses from Vicmap.
Aquatic fauna locations from Nature Advisory.
Imagery from ArcGIS Online (various capture dates).

0 2 km

SCALE 1:100,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.19

Significant aquatic fauna records

DATE: 09.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F#65_GIS DOC REFERENCE: 287657_02_F#GS_G.APRX_V01

Management and mitigation

The project has applied the mitigation hierarchy whereby the approach has been to firstly avoid potential impacts if possible and practical, then to minimise the severity of the impact, followed by the application of targeted mitigation and management measures.

Adoption of the mitigation hierarchy has included:

- Avoid: measures taken to avoid impacts from the outset using spatial placement of infrastructure away from ecological values (including native vegetation), or scheduling works to avoid impacts. Avoidance measures have focussed on those on areas that are important to terrestrial and aquatic biodiversity, particularly those areas that support rare or threatened species.
- Minimise: measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided, as far as is practically possible. For example, limiting the number of watercourse crossings for access tracks to the minimal number needed to connect sectors of the project.
- Offset: measures taken to compensate for any residual, adverse impacts that cannot be avoided, minimised and/or rehabilitated or restored, in order to achieve no net loss or preferably a net gain of biodiversity. The project would offset any clearance of native vegetation.

From the earliest point in the project design, ecological considerations have been built into the project geographic information system (GIS) as constraints. These constraints have been progressively refined as ecological field studies have been conducted and an improved understanding of the site has been achieved. The purpose of incorporating these constraints and buffers into the planning process was to ensure that potential impacts could be either avoided or minimised at the outset.

Other specific design measures that have been developed in response to key environmental features of the site relating to native vegetation, ephemeral wetlands, watercourses, and habitat features of threatened fauna. These included:

- a 100-metre buffer placed around all wetlands mapped in the Victorian Wetland Inventory to exclude all project infrastructure
- a 100-metre buffer around watercourses including the Shaw River, Back Creek and smaller drainages, were buffered by 100 metres, with the exception of required access track and cable crossing
- locating all wind farm infrastructure more than 100 metres of outer edge of mapped Growling Grass Frog Habitat, with the exception of watercourse crossings
- 215 metre buffer from remnant and planted treed vegetation was applied to wind turbines based on the results of bat recording for the project and consideration of findings from other investigations (Appendix P)
- adopting a minimum tip height of 40 metres. This limit was selected to minimise potential collision risk with birds and bats, and was informed by flight behaviour data gathered by Nature Advisory during 15 years of bird and bat surveys in south-west Victoria. This data shows decreasing bird and bat strikes with increasing turbine blade height.

A summary of committed management measures is outlined in the following sections. Further environmental management measures are outlined in Section 7.7 of this report and Appendix H – *Environmental Management Framework*. This includes the preparation of the CEMP and Environmental Management Plan.

Bird and bat collisions with wind turbines

To manage the risk bird and bat collisions with wind turbines, a Bird and Bat Adaptive Management Plan will be developed to be approved by DELWP Environment and the responsible authority. The Bat and Avifauna Management Plan would include:

- a quarterly mortality monitoring program of at least three years' duration that begins when the first turbine is commissioned
- trigger responses in the event that a listed species is impacted by the wind farm
- responsibilities and reporting requirements.

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. 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 (as shown in Appendix P).

Direct impacts to Growling Grass Frog

To limit potential impacts of proposed watercourse crossings a range of measures are proposed that would form a Growling Grass Frog Management Plan. These include completing 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 (2017) to ensure habitat connectivity is maintained, and promptly restoring and enhancing affected areas.

Where essential wind farm infrastructure (e.g., access roads, underground cabling trenches) intersects an area identified as potential habitat for Growling Grass Frog, specific action would be undertaken as outlined in the CEMP. The CEMP would describe appropriate disturbance mitigation measures in relation to sensitive habitat areas such as watercourse banks, channels and nearby vegetation.

Direct impacts to Striped Legless Lizard

To limit potential impacts to the Striped Legless Lizard a range of measures are proposed. These include inducting all workers on the site during construction to recognise this species and alert the site manager when found, and if found implementing a salvage and translocation protocol.

Impacts to aquatic habitats

Where practicable, trenched watercourse crossings will be constructed during no or low flow conditions.

Bridges and culverts would be designed to allow flow beneath the roads along their natural flow paths. The watercourse crossings construction method would be dependent on the site conditions of the crossing location. All watercourse crossings and culvert and bridge designs would conform to relevant local Council, Glenelg Hopkins Catchment Management Authority and DELWP guidelines.

Appropriate sediment control structure would also be used to capture suspended solids and stream banks would also be promptly rehabilitated.

It is proposed that fish friendly culverts would be used for the proposed crossings of Shaw River and Back Creek.

Impact assessment

Flora

Impacts on flora populations as a direct result of habitat loss are most influenced by the spatial extent and severity of the habitat loss and the nature of the population. As such the impact assessment focussed on those species that are of conservation significance, often having a restricted distribution or specific habitat requirements.

Two species of conservation significance were recorded in the investigation area these were the Swamp Everlasting and the Trailing Hop-bush. All recorded populations of the Swamp Everlasting and the Trailing Hop-bush were avoided during the project design. With measures to avoid other areas that have the potential to provide habitat for these species, a very low residual impact on these species was predicted.

While not recorded during targeted flora surveys, seventeen species of conservation significance were assessed as having the potential to occur within the project site. These species were assessed to have the potential to occur within existing patches of native vegetation; however, extensive targeted surveys for these species within the project site failed to record any populations. During the design process, more than 95% of potential habitat for these species within the site would be retained. Based on the failure to record these species during targeted surveys and considering the quality of native vegetation/potential habitat that would be impacted, a very low impact as a result of the project is predicted.

Birds

During construction there is the potential for direct habitat loss from vegetation clearance and physical disturbance associated with construction earthworks, as well as habitat degradation from indirect effects such as hydrological changes. At this time, there would also be increased noise, vibration and lighting that has the potential to disrupting the behaviour of birds. Once operating, impacts to birds include bird death or injury from collisions with wind turbines, and indirect impacts from habitat disruption and displacement due to the presence of wind turbines.

The clearance of native vegetation was assessed as unlikely to have a material effect on local bird populations, with the scale of disturbance in any one location likely result in behaviour shifts or minor displacement of several individuals. Likewise, the construction disturbance is likely to have a temporary effect on a small number of individuals at any one point in time. The impact of project construction on the overall bird community within the site was assessed to be very low.

Post-construction monitoring of bird deaths from turbine collisions is now a typical condition of operating wind farms. This enables predictions about the likely impact to birds from the project by comparing operating wind farms in similar contexts.

During operation of the project there would be expected to be some bird deaths from collisions with wind turbines. Considering the bird community present within the site is represented by common and well represented species, the impact to the overall bird population (excluding threatened and species at risk) was assessed to be negligible.

A summary of the impact assessment for birds is provided in Table 7-8.

Table 7-8 Impact assessment summary – birds

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
Construction			
Bird community	Direct habitat loss and disturbance from project construction	The scale of disturbance in any one location likely to be limited to temporary altered behaviour of resident birds or minor displacement of several individuals. Likewise, the construction disturbance, is likely to have a temporary effect on a small number of individuals at any one point in time.	Construction works were assessed to be unlikely to have a material effect on local bird populations and therefore a very low impact was predicted.
Operation			
Bird community	Collision or interaction with wind turbines	Predicted to be approximately 3 to 7 bird deaths per turbine per year. This is predicted to reduce the abundance of local populations of the Eurasian Skylark, Sulphur-crested Cockatoo, Little Raven, Magpie, Nankeen Kestrel and Brown Falcon	Considering the bird community present within the site is represented by common and well represented species, the impact to the overall bird population was assessed to be very low.
Migratory species - Fork-tailed Swift and White-throated Needletail	Collision or interaction with wind turbines	The Fork-tailed Swift often flies above 40 metres but has rarely recorded colliding with wind turbines	In the unlikely event there are collisions with wind turbines the impact to the population was assessed to be very low.
		Collisions of White-throated Needletails in small numbers have been recorded at other operating wind farms, therefore there is a risk that any individuals occurring in the site could collide. The collision of a small number of individuals is not expected to lead	No White-throated Needletails were observed during field surveys and the site lacks areas of forested vegetation their preferred foraging habitat. If there were any collisions of White-throated Needletail with project wind turbines the impact

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
		to a long-term decrease in the size of the local population.	to the population was assessed to be low.
Migratory shorebirds - Sharp-tailed Sandpiper, Common Greenshank, Curlew Sandpiper, Red-necked Stint Latham's Snipe	Collision or interaction with wind turbines	Collision or interaction with wind turbines is not predicted to be likely, but due to the potential presence of a small number of these species the hazard exists.	In the unlikely event there is mortality of the individual Sharp-tailed Sandpipers, Common Greenshanks, Curlew Sandpipers and Red-necked Stints from collisions with wind turbines the impact to these populations is likely to be very low.
Black Falcon and Little Eagle	Collision or interaction with wind turbines	Collision or interaction with wind turbines is not predicted to be likely but could occur should they occasionally pass through the site.	In the unlikely event there were to be a collision(s) of individuals of these species while moving through the landscape, it was not predicted to have a material impact on the population and a such a low impact was predicted.
Raptors	Collision or interaction with wind turbines	Raptors were recorded at very low rates during surveys representing 2 to 4% of all observations and even lower rates of those individuals being recorded in the rotor swept area. It is likely there would be instances of collision of these species within project wind turbine.	In terms of overall impacts to the local populations of these species, each of these species is distributed widely across Australia and is not considered to be secure (i.e., not threatened). They also have larger ranges and dispersal abilities. The overall effect of this mortality was assessed to be low.
Water birds	Collision or interaction with wind turbines	Collision or interaction with wind turbines is not predicted to be likely, but due to the potential presence of a small number of these species the hazard exists.	In the unlikely event there is mortality of the individual(s) from collisions with wind turbines the impact to these populations is likely to be very low.

Bats

Based on the on-site bat recording and comparing the results of post construction monitoring of bat deaths, it is likely there would be bat turbine collisions. Species most likely to be affected would be White-striped Freetail Bat, Gould's Wattled Bat, Chocolate Wattled Bat, Large Forest Bat and Little Forest Bat. Each of these species are common species that are widely distributed and considered to be secure (i.e., not threatened). Considering the bat activity in the site is lower compared to other areas, avoidance of treed and forested areas, and that the minimum blade tip is higher than most operating wind farms, the overall impact to bats (excluding threatened species) was assessed to be low.

There have been eight reported deaths of the Southern Bent-wing Bat from collisions with wind turbines. As such, there is a risk that individuals may collide with operating turbines. The Recovery Plan for the Southern Bent-wing Bat (DELWP, 2020) states the impacts from wind farms on the population is unclear at this stage, though the risk increases the closer the wind farm is to a maternity site or migratory route. Risks mentioned in the plan include cave destruction during construction, mortalities due to collisions, and altered access to foraging areas. The plan notes a range of threats have been suggested as potential factors in this decline, including loss and modification of roosting and foraging habitat, human disturbance, pesticides, disease, drought and climate change affecting food availability. However, it also notes there is little empirical evidence to clearly identify the main cause/s of the current decline.

The project is not close to a significant roosting site for the Southern Bent-wing Bat. The site is also not a key foraging area for the species, based on the low level of recorded activity across the site over a long

period. Compared to ten other studies of bats, some of the lowest levels of Southern Bent-wing Bat activity was recorded at the project site despite the highest survey effort being conducted. Peer review by Biosis also concluded the site supports relatively low level of Southern Bent-wing Bat activity and that habitat characteristics of the site are likely to be no more or less attractive to the species than the broad range of similar agricultural land across much of the species' range.

Based on the presence and activity of the Southern Bent-wing Bat, the behaviour of the species, and design measures to minimise the risk of collision, the likelihood of collisions with project wind turbines was assessed as to be low. Notwithstanding, as the species is critically endangered any mortality is considered significant. The Biosis peer review concluded that in light of the low level of detected Southern Bent-wing Bat mortalities at wind energy facilities within the species range to-date, they consider that the report's assessment conclusions related to significance of impact on the species are appropriate.

As part of a bat and avifauna adaptive management plan, a monitoring program to record bat collisions would be implemented. If mortality of the species is recorded, an appropriate response would be initiated, and reporting requirements outlined in the decision-making framework within Appendix D1 – *Biodiversity* . With these measures in place the impact to the Southern Bent-wing Bat was assessed to be low.

A summary of the impact assessment for bats is provided in Table 7-9.

Table 7-9 Impact assessment summary – bats

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
Operation			
Bat community	Collision or interaction with wind turbines	It is likely there would be bat turbine collisions of the White-striped Freetail Bat, Gould's Wattled Bat, Chocolate Wattled Bat, Large Forest Bat and Little Forest Bat with operating turbine blades. These may reduce the local population of each of these species, which are widely distributed and considered to be secure (i.e., not threatened).	Considering the bat activity in the site is lower compared to other areas, avoidance of treed and forested areas and the minimum blade tip is higher than most operating wind farms, the overall impact to bats (excluding threatened species) was assessed to be low.
Southern Bent-wing Bat	Collision or interaction with wind turbines	Based on the presence and activity of the Southern Bent-wing Bat, the behaviour of the species, and design measures to minimise the risk of collision, the likelihood of collisions with project wind turbines was assessed as to be very low.	As the species is critically endangered, any mortality is considered significant. With the design and adaptive management plan in place the impact to the Southern Bent-wing Bat was assessed to be low.
Yellow-bellied Sheathtail Bat	Collision or interaction with wind turbines	There is the possibility that the species could collide with project wind turbines if they fly across the site, but any such movements are predicted to be infrequent. Given the very small number of calls recorded, despite considerable survey effort, and the fact that most calls were from habitat outside the proposed wind farm layout, it is considered unlikely the project would result in many (if any) collisions.	In the unlikely event there is mortality of the individual(s) from collisions with wind turbines the impact to the population was assessed to be very low.
Grey-headed Flying Fox	Collision or interaction with wind turbines	While not recorded during surveys for the project, the Grey-headed Flying-fox has the potential to occasionally fly over the project site. In the unlikely event there is mortality of the individual(s) from collisions with wind turbines such an instance was assessed to be unlikely to lead to a long-term decrease in the size of an important population of a species.	It is unlikely the species would visit the project site regularly if at all due to the lack of food resources that would attract the flying-fox to the area. In the unlikely event there is mortality of the individual(s) from collisions with wind turbines the impact to the

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
			population was assessed to be very low.

Frogs and reptiles

With the implementation of appropriate management measures, impacts to the overall frog and reptile assemblages (excluding threatened species) were assessed to be low.

While the project design generally avoids potential Growling Grass Frog habitat (and has removed six crossings of mapped habitat from the concept design) there are two proposed crossings of potential movement corridors of Back Creek and the Shaw River. This is predicted to remove approximately 0.14 hectares of Growling Grass Frog habitat at the Back Creek crossing and 0.12 hectares of sub-optimal habitat at the Shaw River crossing.

To limit the impact of proposed watercourse crossings a range of measures are proposed that would form a Growling Grass Frog Management Plan. These include completing 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, (2017) 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 CEMP to minimise impacts to these watercourses, which are also relevant to minimising impacts to the Growling Grass Frog.

With the implementation of design and control measures, impacts to the Growling Grass Frog via physical disturbance of watercourse crossings were assessed to be localised (at crossing points), for a short duration. With rehabilitation re-instating habitat and maintaining connectivity, the impact on the population of the Growling Grass Frog was assessed to be low**.**

A summary of the impact assessment for frogs and reptiles is provided in Table 7-10.

Table 7-10 Impact assessment summary – frogs and reptiles

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
Construction			
Overall frog and reptile assemblages	Direct habitat loss and disturbance from project construction.	Localised areas of vegetation clearance and physical disturbance has the potential to impact local populations of frogs and reptiles.	With the implementation of appropriate management measures, impacts to the overall frog and reptile assemblages (excluding threatened species) were assessed to be low.
Growling Grass Frog	Physical disturbance of habitat and associated reduced water quality at watercourse crossings. Constructing crossings through habitat can create barriers that pose a risk to connectivity with nearby populations.	Two creek crossings for cables and access tracks that would impact around 0.2 hectares of potential habitat. Impacts to the local Growling Grass Frog population via physical disturbance of watercourse crossings were assessed to be localised (mainly at crossing points) for a short duration with rehabilitation re-instating habitat and maintaining connectivity. Watercourse crossing were assessed to be unlikely to result in a long-term decrease in the size of the local population of the species or to fragment an existing population of Growling Grass Frog.	With the implementation of design and control measures, impacts to the Growling Grass Frog via physical disturbance of watercourse crossings were assessed to be localised (mainly at crossing points), for a short duration with rehabilitation re-instating habitat, the impact on the population of the Growling Grass Frog was assessed to be low.

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
Striped Legless Lizard	Physical disturbance of habitat.	Despite conducting targeted surveys in 2009 or 2018, no Striped Legless Lizards have been recorded. Nature Advisory concluded that based on the long history of agricultural land use of the site, habitats are unlikely to support a significant population of the species (if any at all). Therefore, there is a low likelihood that the site supports an important population of the species.	With management controls in place, impacts on the Striped Legless Lizard were assessed to be very low.
Glossy Skink	Physical disturbance of habitat.	As total of 4.5 hectares of native vegetation in patches of relatively poor condition (average condition score of 24) is proposed to be removed by the project. This represents about 0.5% of native vegetation mapped within the project site.	With measures in place to avoid additional impacts on remanent vegetation, the overall impact to the Glossy Skink was assessed by Nature Advisory to be negligible.

Aquatic fauna

Project construction disturbance at watercourse crossings would be localised (at crossing points), for a short duration with rehabilitation re-instating or improving these habitats and connectivity being maintained. The impact on the aquatic fauna populations (excluding threatened fish) was assessed to be low with any reductions on habitat quality predicted to be localised and temporary.

A summary of the impact assessment for aquatic fauna is provided in Table 7-11.

Table 7-11 Impact assessment summary – aquatic fauna

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
Construction			
Aquatic fauna (general)	Physical disturbance to watercourses and associated aquatic habitats at crossing points and/or reduced water quality in the immediate vicinity of construction activities.	Physical disturbance to watercourses and associated aquatic habitats at crossing points with associated temporary increase in sedimentation. Likely impacts to aquatic fauna (excluding threatened fish species) are predicted to be localised and temporary.	Project construction disturbance at watercourse crossings would be localised (at crossing points), for a short duration with rehabilitation re-instating or improving these habitats and connectivity being maintained. The impact on the aquatic fauna populations (excluding threatened fish) was assessed to be low.
Little Galaxias	Physical disturbance to watercourses and associated aquatic habitats at crossing points of Back Creek and to a lesser extent Shaw River for accessways and cables	The main impact was predicted to be physical disturbance to aquatic habitats at watercourse crossing points, primarily for the Back Creek and to a lesser extent Shaw River. These crossings would be expected temporary increase in sedimentation from construction at the watercourse crossing locations.	Based on the predicted level of impact, Nature Advisory concluded that it was unlikely that the project would lead to a long-term decrease in the size of a population and therefore a low impact was predicted.
	Altered hydrology resulting in degradation	With design and management controls in place the project would be unlikely to	Impacts to Little Galaxias as a result of altered

Biodiversity value	Impact pathway	Likely impact (considering magnitude, extent and duration)	Impact rating and justification
	of potential habitat or reduced habitat connectivity	alter the hydrology of the Back Creek and Shaw River catchments. Any changes to run-off likely to be localised around wind turbines and other infrastructure components and unlikely to alter the overall dynamics of the catchment.	hydrology were assessed to be of **very low**.
Yarra Pygmy Perch	Physical disturbance to watercourses and associated aquatic habitats at crossing points of Back Creek and to a lesser extent Shaw River for accessways and cables	The Yarra Pygmy Perch are assumed to be present in the Shaw River (and upstream tributary of the Kangaroo Creek), Back Creek and the Moyne River. The main impact was predicted to be physical disturbance to aquatic habitats at watercourse crossing points, primarily for the Back Creek and to a lesser extent Shaw River. These crossings would be expected temporary increase in sedimentation from construction at the watercourse crossing locations.	Based on the predicted level of impact, Nature Advisory concluded that it was unlikely that the project would lead to a long-term decrease in the size of a population and therefore a low impact was predicted.
	Altered hydrology resulting in degradation of potential habitat or reduced habitat connectivity	With design and management controls in place the project would be unlikely to alter the hydrology of the Back Creek and Shaw River catchments. Any changes to run-off likely to be localised around wind turbines and other infrastructure component and unlikely to alter the overall dynamics of the catchment.	Impacts to Yarra Pygmy Perch as a result of altered hydrology were assessed to be of **very low**.

Consistency with planning provisions

The provisions of the Moyne Planning Scheme have been considered in the design of the project to assist in the protection and conservation of Victoria's biodiversity consistent with the provisions of Clause 12.01-1S. This has included due consideration of flora and fauna values, including avoiding and minimising impacts on native vegetation to preserve habitat, and minimising environmental impact in accordance with Clause 12.01-2S Native vegetation and Clause 52.17 Native vegetation. Due consideration has also been given to river corridors, waterways, lakes and wetlands in accordance with Clause 12.03-1S.

The project has had regard to the objectives of 21.06 Environment as it seeks to protect and enhance the region's indigenous genetic biodiversity and Clause 22.02 Environment, as it seeks to maintain, protect and enhance the flora and fauna communities and habitat, particularly the critical habitat, of Victorian Rare and Threatened Flora and Fauna species. Within the context of the balance of policy objectives under the planning scheme, the impact of the project on flora and fauna is acceptable.

7.3.4 Brolga

Purpose

The potential impact of wind farms on Victoria's Brolga population is seen as a key environmental issue for the wind industry in south-west Victoria. This is because a large proportion of the Victorian Brolga population's range occurs in areas proposed for wind farm development.

This section describes the assessment of potential impacts from the construction, operation and decommissioning of the project on Brolga, and measures taken to avoid and minimise these impacts in accordance with the Interim Brolga Guidelines.

The Victorian Brolga Assessment and Mitigation Standards are currently in draft as of April 2022. These have been exhibited for comment but have not been finalised. Due to uncertainty as to their final form, and the extensive work that was conducted for the project in accordance with the Interim Brolga Guidelines, the draft Brolga Assessment and Mitigation Standard has not been adopted by the project.

A full assessment of the impact of the project on the Brolga is included in Appendix Q.

Assessment

Existing conditions

The Brolga is an iconic wetland bird that is listed as endangered in Victoria. The southern portion of the population has experienced significant decline since European settlement attributed to habitat loss from agriculture and wetland drainage, predation from foxes, and collisions with fences and powerlines.

Over the last decade significant efforts have been made to assess Brolga activity and suitable habitat at the project site and surrounding area. Assessment has included a review of existing Victorian Government database records, consultation with project and surrounding landowners, aerial surveys, many field surveys of wetlands recording Brolga activity and the suitability of wetlands as Brolga habitat, and hydrological modelling to identify potential habitat. A summary of the methods used to investigation Brolga and potential breeding habitat is shown in Figure 7-20.

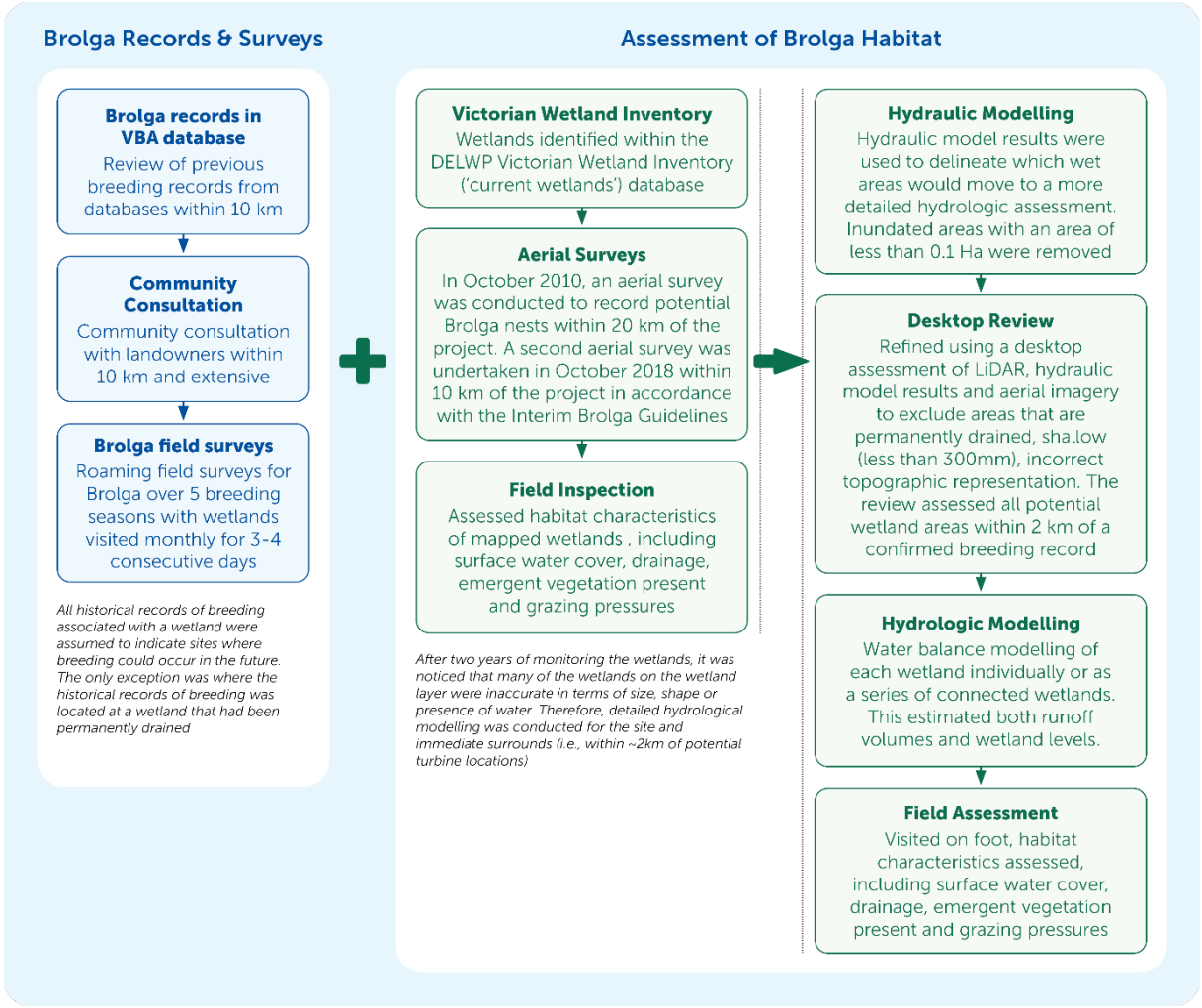


Figure 7-20 Brolga assessment method

A review of existing databases for records of Brolga breeding, flocking and sighting records were analysed by Nature Advisory. Information provided by local landowners and land managers (not recorded in databases) was also considered and incorporated into the assessment. A total of 28 records of Brolga breeding were identified within approximately 10 kilometres of the project site and of these 23 could be attributed to a wetland and defined as a possible Brolga breeding site (Figure 7-21). Six of these sites are within 3 kilometres of the project (Figure 7-21).

Roaming field surveys were conducted for the project between 2010 and 2021. These observed five pairs of Brolga breeding within 10 kilometres of the project site. One pair of Brolga were repeatedly recorded nesting at one wetland within the Cockatoo Swamp complex (wetland 4; DELWP wetland 25721) (Figure 7-23). Brolga nesting was also observed at Macarthur Wind Farm (wetland 25650), a felled plantation area (wetland 25867) and at St Helens (wetland 25894). Pairs of Brolga were also observed in the areas of Pallisters Reserve.

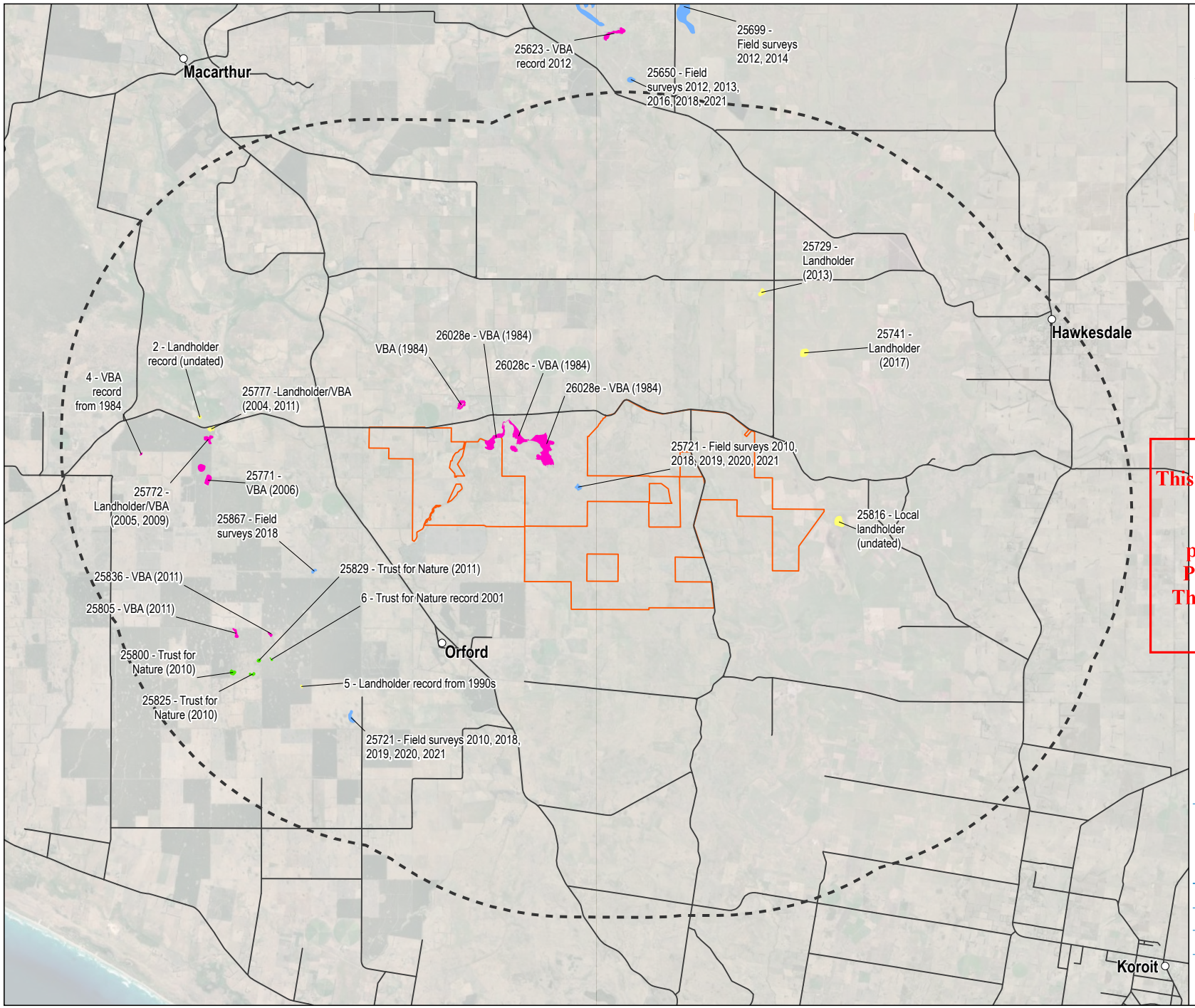
The Victorian Brolga population occupies different habitats during the non-breeding season (January to June) and breeding season (July to December). In the non-breeding season habitat comprises deep freshwater marshes, vegetated areas in permanent open water, and feeding areas in pasture, seed and stubble crops. No flocking sites were assessed to occur within 10 kilometres of the project.

Brolga require shallow wetlands to breed in water about 0.3 metres deep. The Brolga breeding cycle involves a 30-day incubation period followed by a 95-day chick raising period. Therefore, an individual wetland either needs to remain suitable for Brolga for at least 4 months to support a successful breeding attempt. This is the minimum duration required for Brolga to build a nest, lay eggs, incubate the eggs, and for chicks to grow to an age where they can walk to nearby wetlands and to avoid predation, particularly from foxes. Brolga are also unlikely to breed successfully in wetlands that are less than 0.6 hectares. Nature Advisory reviewed sizes of published and unpublished Brolga breeding sites and concluded that the smallest size wetland used by Brolga was 0.6 hectares used for night roosting, or 1.3 hectares for confirmed breeding (Appendix Q).

Initially the DELWP Victorian Wetland Inventory wetlands ('current wetlands') was used to assess potential Brolga breeding habitat. A total of 335 wetlands identified within the DELWP Victorian Wetland Inventory wetlands ('current wetlands') that are within 10 kilometres of the project site were assessed by Nature Advisory. Each of these wetlands was assessed for their suitability to support Brolga reproduction, focussing on vegetation presence, physical attributes (e.g., size, depth and steepness of banks) and their condition. Most (67.5%) of these wetlands were found to be unsuitable for breeding due to changes in hydrological regimes (i.e., they were drained and converted for agricultural use) or due to inaccurate wetland mapping by DELWP.

To predict potential Brolga breeding habitat more accurately from a hydrological perspective, investigations were undertaken to develop a surface water model that accurately determines which wetlands can hold water for a 120–days or more, which is what the Brolga requires to successfully breed. Hydraulic modelling simulated runoff generated from local rainfall and site topography. Modelling used high-resolution topographic mapping and rainfall data from the past decade. This produced data on how wetlands and other depressions are filled, their maximum size and interconnectivity. The results were then used to remove potential wetlands that did not meet other Brolga breeding habitat requirements (e.g., wetlands had been permanently drained or were too small). The remaining wetland areas then underwent a more detailed hydrological assessment, which involved water balance modelling of each wetland individually or as a series of connected wetlands. This estimated both runoff volumes and wetland water levels.

Water levels for each wetland were modelled using a representative rainfall dataset from 2009 to 2019 to identify wetlands that met the inundation criteria for Brolga breeding and night roosting suitability. Further ecological field surveys of these wetlands and farm dams were completed to assess other features that are known to be of importance to Brolga, including wetland size and the presence of aquatic or semi aquatic vegetation. These assessments predict that 11 seasonal wetlands and 3 farm dams in proximity to the project are capable of providing habitat suitable for foraging, breeding and night roosting including the six sites already identified as Brolga breeding wetlands.



LEGEND

- Locality
- Major road
- Field surveys
- Landholder
- Trust for Nature
- Victorian Biodiversity Atlas (VBA)
- WillatookWindfarmBoundary
- Willatook Wind Farm 10km buffer

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary, 10km buffer and Brolga wetlands from Wind Prospect.
Imagery from ArcGIS Online (various capture dates).

0 2 4 km

SCALE 1:175,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.21

Brolga breeding records

DATE: 21.03.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F019_GIS DOC REFERENCE: 287657_02_FIGS_B.APRX_V03

Figure 7-22
Wetland 4 with nesting Brolgas and Black Swans with the Tarrone Terminal Station in background

Figure 7-23
Nesting Brolga

Management and mitigation

Turbine free buffers

The main mitigation implemented during the project design to avoid or minimise impacts to the Victorian Brolga population has been the development of turbine free buffers around Brolga wetland habitat.

The turbine free buffer areas were designed to limit impacts to Brolga during construction (i.e., habitat destruction and/or disturbance) and operation (i.e., collision with wind turbines). Project-specific Brolga buffers were developed based on:

- extensive field surveys of the project site and surrounding areas
- consultation with landowners, land managers and special interest groups
- understanding of Brolga movements around breeding sites from observational studies by Nature Advisory over the last 15 years
- observations of the movements of Brolga breeding at the Macarthur Wind Farm since 2012
- the recent Brolga research undertaken by Veltheim et al. (2019).

Turbine free buffers developed for the project consider three key habitats:

- seasonal wetlands used for the breeding (nesting and egg incubation), night roosting and foraging
- non-wetland areas around functional wetlands used for foraging and breeding
- movement corridors between breeding site wetlands and other functional wetlands.

The Interim Brolga guidelines acknowledge that home ranges are likely to vary with local habitat quality and extent and seasonal conditions (Department of Sustainability and Environment, 2012). The home ranges defined by the project (Appendix Q) have the following features:

- a minimum of four wetlands (average 4.2 wetlands) in each of the home ranges from the five Brolga possible breeding wetlands in the Cockatoo Swamp wetland complex. Veltheim et al. (2019) found that brolgas need three wetlands within the breeding distribution
- home ranges that are each significantly larger than any of the home ranges recorded in the Veltheim et al. (2019) or other studies.

A disturbance buffer of 300 metres was then applied around perimeter of the home range boundary consistent with the recommendation of the Interim Brolga Guidelines. No project infrastructure (including tracks or cables) was placed within this buffer area. An additional 95 metres was added to the home range boundary to account for the maximum length turbine blades. The outer edge of these additional zones around the home range represents the turbine free buffer for Brolga breeding sites (Figure 7.24).

The establishment of this buffer resulted in significant design changes, with 23 proposed wind turbines either removed or related from the layout. The turbine free buffer zone is similar or larger than those used for other approved or operating wind farms in the Victorian range of the Brolga, such as Dundonnell, Golden Plains and Stockyard Hill wind farms.

The resulting turbine free buffer around Cockatoo Swamp complex is 2,658 hectares in size, encompassing five wetlands (W12e, W12c, W12w, 1 and 4) (Appendix Q). It includes a minimum 795-metre turbine free buffer around the perimeter of known Brolga breeding wetlands, and functional wetlands within 2,000 metres of those breeding wetlands. This would provide infrastructure free area almost ten times the mean home range size recorded by Veltheim et al., (2019). Records indicate this buffer protects the future breeding opportunities for the one pair of Brolga found using it.

Minimum tip height

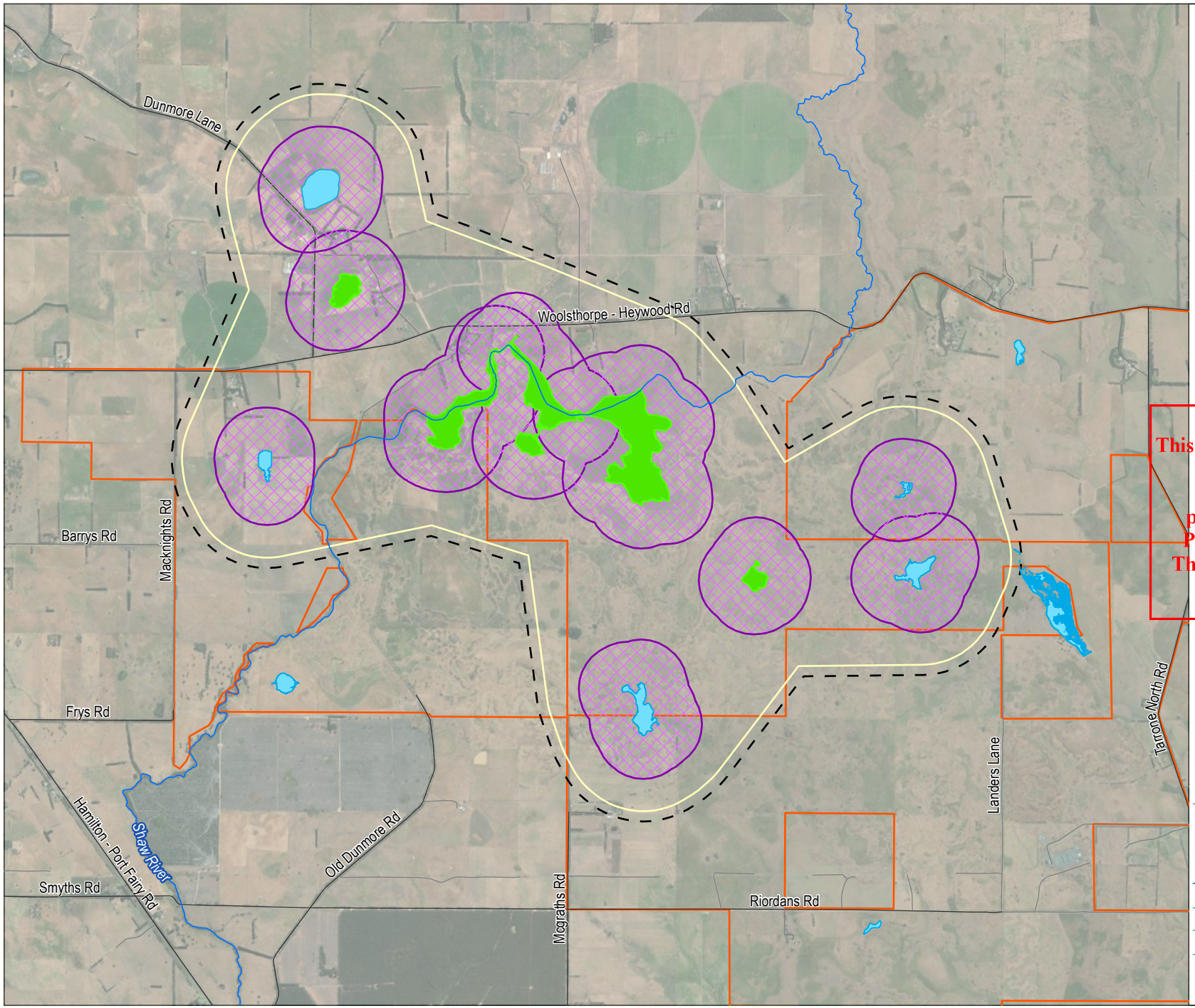
A minimum tip height of 40 metres for wind turbines has been adopted for the project (i.e., all wind turbine blades will be at least 40 metres from ground level). This limit was selected to minimise potential collision risk with Brolga (and other birds and bats). This was informed from flight behaviour data gathered by Nature Advisory over 15 years in southwest Victoria. These monitoring observations of 31 breeding Brolga pairs showed that there were approximately 8.6% of flights estimated to be at or above the minimum tip height of 40 metres

Hydrology

The construction of roads and hardstand areas has the potential to alter existing drainage patterns if not accounted for during design. Hydrological effects have the potential to occur over a larger area due to the nature of the shallow topographical relief of floodplain systems. The exclusion of wind turbines and other infrastructure from the entire Cockatoo Swamp ephemeral floodplain complex area will largely mitigate this potential impact. Furthermore, hydrological flood modelling was used to inform the placement of turbine locations outside of water flow paths. In areas where inundation is predicted, hardstands will be designed to ensure drainage flows away from wind turbine location. Permanent surface structures, including the substation and the battery energy storage system, would be designed to maintain existing overland flow paths and not result in increased flood levels upstream of the sites.

.

.



LEGEND

- Road
- Track
- Watercourse
- Brolga breeding wetlands
- Functional wetland
- Blade buffer
- Disturbance buffer
- Brolga home range buffer
- Willatook WInd Farm boundary

SOURCE:
Willatook Wind Farm boundary and Brolga habitat boundaries from Wind Prospect (2021).
Roads and watercourses from Vicmap (2021).
Imagery from ArcGIS Online (various capture dates).

0 1 km

SCALE 1:50,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.24

Final turbine free buffer around Cockatoo Swamp complex

DATE: 12.05.22 PROJECT: 754-MELEN287657 FILE: 287657_01_F059_GIS DOC REFERENCE: 287657_02_FIGS_F APRX_V03

Minimisation of overhead transmission lines

Brolgas are known to collide with powerlines, so new powerlines associated with wind farms within Brolga habitats will pose a new collision risk.

The addition of more land to the to the central part of the project in 2019 site enabled the proposed on-site substation to be relocated adjacent to the Tarrone Terminal Station area. This reduced the length of overhead transmission line between the on-site substation and the grid connection point at the Tarrone Terminal Station to be reduced from five kilometres to less than 300 metres. Biosis (Appendix P2) note that the reduction of the proposed overhead transmission line is a significant measure that can be expected to reduce the probability of Brolgas colliding with the transmission line.

The on-site substation and overhead powerline have been located away from Brolga breeding wetlands and well outside the Brolga home range and buffer zones created for the project. All remaining electrical cabling required for the project will be placed underground and located outside the Brolga buffer zones

Bird and Bat Adaptive Management Plan

Before development starts, a bird and bat adaptative management plan is to be approved by DELWP and the responsible authority. The plan will include a Brolga monitoring program of potential Brolga breeding sites during construction between June and December for all wetlands within two kilometres of infrastructure locations. As part of the bird and bat adaptive management plan, a mortality monitoring program would be conducted either using searches on foot along pre-determined transects by an adequately trained ecologist or via searches by a trained scent dog. The plan will include an operational monitoring program of at least three years' duration will be developed and implemented.

Further detail of the proposed monitoring program, and the adaptive management framework is provided in Appendix P.

Brolga Compensation Plan

A Brolga Compensation Plan will be developed and implemented create a suitable offset through the restoration of breeding habitat so that additional breeding pairs can produce increased numbers of young that survive to become breeding adults. This will ensure that the expected minimum population size remains the same. A framework for this plan is outlined in along with an assessment of its feasibility in Appendix Q.

Impact assessment

Brolga collisions with powerlines have been reported in Victoria, however, no collisions with wind turbines have been reported to date. Brolgas spend significant portions of their time on the ground. They obtain their food on the ground and walking occupies a large part of their activity cycle. Flights are relatively infrequent and are undertaken primarily when moving between a breeding nest site and preferred foraging areas.

While the likelihood of collision with turbines was assessed to be low, based on their flight behaviour and the height of turbines, there remains a risk of collision with wind turbines. The Interim Brolga Guidelines state the objective of collision risk modelling is "to estimate the residual number of Brolga movements which have the potential to interact with wind turbines on the proposed site and from this estimate the annual collision risk"

A Brolga turbine collision risk model was developed in accordance with the Interim Brolga Guidelines. It was assumed that a Brolga pair would nest each year in the central buffer zone around Cockatoo Swamp and one additional pair was assumed to use one of the isolated wetlands to the east of the wind farm three out of ten years. The model assumes that a proportion of these Brolga's flights would be at a height and distance where turbine interaction is possible. Wind turbine avoidance rates were calculated using observations of Brolga and international studies of crane species. The model predicts that under the most conservative turbine avoidance scenario where Brolga avoid wind turbines 90% of the time, there would be 0.07 flights at risk of collision per year on average, or 1.7 flights at risk of collision over the 25-year life of the project. Statistically, there is a 95% chance of between zero and five collisions over 25 years.

To assess the impact Victorian Brolga population under various collision risk modelling scenarios, a Population Viability Assessment was completed by Professor Michael McCarthy from the University of Melbourne (included in Appendix Q). This predicted that the population size would be reduced by between 0.3 and 0.8 birds compared with baseline conditions. Using the worst-case scenario collision impact rate,

this represents a reduction of about 0.1% in the population. The peer review by Biosis (Appendix P-2) notes that this is likely to be an overestimate of collision risk to Brolgas.

The Interim Brolga Guidelines require that the impacts on the Victorian Brolga population are 'fully offset' through the implementation of a Brolga compensation plan. The aim of the plan will be to replace the worst-case estimate of the number of Brolga affected by the project (5 individuals over 25 years) through the restoration of lost breeding habitat so that additional breeding pairs can produce increased numbers of young that survive to become breeding adults.

Consistency with planning provisions

The design of the project has had due consideration of the Interim Brolga Guidelines, the Policy and Planning Guidelines and the key sections of the planning scheme including in relation to protection of biodiversity at Clause 12.01-1S. As outlined in the Brolga Impact Assessment, impacts are predicted to be confined to up to four Brolga over the life of the project, which is considered feasible to replace through compensation in enhanced Brolga breeding wetlands. The impact of the project on rare or threatened species including Brolga is considered acceptable under the relevant policy of the planning scheme and the Interim Brolga Guidelines.

7.4 Heritage

7.4.1 Aboriginal cultural heritage

Purpose

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that proponents of a wind farm project must address the potential impact of the wind farm on cultural heritage values.

A draft CHMP has been prepared by EHP. The draft CHMP will not be exhibited with the EES or Planning Application as requested by DELWP and First Peoples – State Relations Group. Instead, an Aboriginal Cultural Heritage Impact assessment has been prepared by EHP and is included in Appendix C.

Assessment

A CHMP (no. 11090) has been prepared for the project in accordance with Part 4 of the AH Act and will be evaluated by the Secretary of Department of Premier and Cabinet (First Peoples – State Relations Group, formerly Aboriginal Victoria) as there was no RAP in place for the project site at the time the notice of intent to prepare a CHMP was lodged.

Representatives of the RAPs have been involved in heritage surveys for the project. Discussions have also occurred regarding the project and the intangible Aboriginal cultural heritage that may exist within and surrounding the project site.

The CHMP included all three levels of assessment:

- a background review (desktop assessment)
- field survey (standard assessment)
- subsurface excavation (complex assessment).

The standard and complex assessment surveys were undertaken between December 2009 and June 2021 and were attended by representatives from the relevant Aboriginal Traditional Owner groups: the Eastern Maar Aboriginal Corporation, Framlingham Aboriginal Trust and Gunditj Mirring Traditional Owners Aboriginal Corporation.

A total of 69 registered Aboriginal places have previously been recorded within five kilometres of the project, consisting of 77 site components, comprising four site component types, being:

- 28 artefact scatters
- 1 scarred tree
- 8 object collections
- 40 earth features.

Of these places, one place (VAHR Registered 1) is located within the project site and consists of an earth feature (mound) measuring approximately 3.2 metres by 2.2 metres. The complex assessment failed to locate this site and is considered to have since been unintentionally destroyed. Three additional Aboriginal heritage places were identified (i.e., VAHR Registered 2, 3 and 4) comprising a total of 16 subsurface artefacts. The total of subsurface artefacts recorded gives an artefact density of less than two artefacts per square kilometre across the project site.

With further refinements to the project site boundary, one of these places is within the project site (VAHR Registered 2). This place is an artefact scatter comprised of one artefact made of hornfels assessed to be of low archaeological and scientific significance. While the earth mound (VAHR Registered 1) may have been of moderate-high archaeological and scientific significance at the time of its registration, it has most likely since been destroyed and is now considered to have low archaeological significance. Nonetheless a buffer around this location was incorporated into the design.

The test excavations undertaken at the quarry site did not identify any Aboriginal cultural heritage.

No scarred trees were identified within the project site. Additionally, no caves, cave entrances or rock shelters were identified.

The project intersects with four areas of mapped Aboriginal cultural heritage potential, which were the focus for complex assessments.

Through the implementation of design mitigations, project infrastructure and works avoid areas of known Aboriginal cultural heritage places and areas likely to contain Aboriginal cultural heritage. The likelihood of impacts to these places during project construction, operation and decommissioning is considered low.

The project CHMP will be finalised in consultation with the RAP and submitted to First Peoples – state Relations Group for evaluation once the Minister for Planning has made an assessment on this EES. The approved CHMP would contain conditions for the management of known Aboriginal heritage places and contingency plans for the unexpected discovery of Aboriginal cultural heritage and human remains. These conditions would ensure that any potential impacts are avoided or minimised.

Management and mitigation

Avoidance by design has been the primary measure to limit impacts to Aboriginal cultural heritage places.

Based on the results of the complex assessment, areas likely to contain Aboriginal cultural heritage were determined to be concentrated to land:

- within 200 metres of the Shaw River in the west of the project site
- within 200 metres of Moyne River east of the project site
- within 200 metres of two watercourses (Back Creek and an unnamed tributary) in the north-east of the project site.

Impacts to these areas and identified Aboriginal places have been limited through design modifications including micro-siting of turbines, cabling, tracks and other associated infrastructure. The proposed access track crossing over the Shaw River was the focus of complex assessment, which failed to record any Aboriginal places.

All recorded Aboriginal heritage places that were identified were included within the project constraints mapping and actively avoided through implementation of appropriate buffers.

The approved CHMP will contain conditions for the management of known Aboriginal heritage places, and contingency plans for the unexpected discovery of Aboriginal cultural heritage and human remains. These conditions would ensure that any potential impacts are avoided or minimised.

Consistency with planning provisions

The CHMP and associated work has considered the provisions of Clause 15.03, 21.05 and 22.01-1 which have objectives to protect and conserve places of Aboriginal cultural heritage significance. Protection of environmental and cultural heritage values would be supported in accordance with these clauses.

7.4.2 Historical cultural heritage

Purpose

Clause 52.33 triggers a planning permit for removal or alterations to dry stone walls. Clauses 15.03 and 21.05 seek to ensure the conservation of places of heritage significance. A Historical Heritage Impact Assessment and Historic Heritage Assessment were completed by EHP and is included at Appendix D and Appendix D-2 respectively. The Historic Heritage Assessment included a desktop assessment and field survey. In addition, a report "Dry Stone Wall Assessment and Management Plan" has been prepared by EHP (October 2021) and is included in Appendix D.

Assessment

Existing conditions

The desktop assessment indicated four historical heritage places recorded on the Victorian Heritage Inventory within a five kilometre radius of the site:

- H7321-0022 (Moyne River Stone Foundation)
- D7321-0040 (Landers Lane Dry Stone Wall)
- D7321-0025 (Officer DSW1)
- D7321-0039 (Harton Hills Dry Stone Wall Complex).

One additional historic place, Turkish Bath House, is listed on the Register of the National Estate and Register of the National Trust. The field assessment identified two new historic heritage places within the project site and included in the Victorian Heritage Inventory for their potential to contain archaeological deposits (H7321-0104 Woolsthorpe-Heywood Road Hut 1 and H7321-0105 Woolsthorpe-Heywood Road Ruin).

Management and mitigation

As the project became aware of the locations of known and newly discovered locations containing historical heritage values, the design was reviewed to ensure the project did not impact these sites. The locations were marked in design layers to ensure avoidance as the project design developed.

The exception to this was the design of accessways and cable routes crossing Landers Lane impacting some sections of the dry stone wall. The design of the accessways sought to minimise the number of crossings of Landers Lane, however these impacts had to be considered alongside other environmental factors and safety considerations of the local road network. With consideration of the historical heritage values of the Landers Lane Dry Stone Walls, the design has minimised the number of crossings of Landers Lane and the width of the gates required.

The access routes to the project site have been designed to avoid construction traffic using Landers Lane except for crossing the road. Additionally, the design of the electrical cabling routes has sought to collocate the accessways and cable routes to minimise the impacts to environmental and heritage constraints wherever feasible.

In addition to these design measures, proposed management measures to address residual impacts on historical heritage values in the construction and operation phases of the project include:

- Prior to commencement of works at individual construction locations, construction sites would be surveyed for archaeological places or relics. Should any items of historical heritage value be identified during construction that have not been previously identified, a heritage advisor would be required to assess the site.
- An Unexpected Finds Protocol would be developed prior to the commencement of works and incorporated into the Construction Management Plan.
- Where dry stone walls are impacted by the project, planned or accidental, and that impact is not permanently required (i.e., for access), the dry stone walls would be rebuilt to its existing condition by an experienced stone mason.

Consistency with planning provisions

The design of the facility has considered the provisions of Clauses 15.03 Heritage and 21.05 Settlement and Housing, which have the objective to protect and conserve places of heritage significance. The purpose of Clause 52.33 to conserve dry stone walls has been considered and the project is found to be acceptable.

Places of heritage significance would be conserved in accordance with the objectives of Clauses 15.03 and 21.05. Impacts to the identified heritage places are limited to the Landers Lane Dry Stone Wall. The heritage fabric that is likely to be impacted by the proposal would be replaced like for like through the construction process, resulting in minimal and acceptable impacts. Impacts on the dry stone wall would not affect the significance of the heritage place based on the findings of the heritage assessment and the minimal to negligible impact on the heritage fabric. Environmental and historic heritage values would be supported in accordance with Clause 52.33 Post Boxes and Dry Stone Walls.

7.5 Community and safety

7.5.1 Aircraft safety

Purpose

Both Clause 52.32 and the Policy and Planning Guidelines stipulate that proponents of wind farms must address the potential impact of the project on aviation. Policy at Clause 18.02-7S (Airports and Airfields) also supports the appropriate management of development to avoid undue impacts on aviation facilities to strengthen their role within the state's economic and transport infrastructure, facilitate their siting and expansion and protect their ongoing operation.

An aviation impact assessment has been prepared by Chiron Aviation Consultants and is included in Appendix O.

Assessment

Existing conditions

The aviation impact assessment investigation area included the project site and a buffer of 30 nautical miles (or 55.6 kilometres) of the project site to encompass all registered and certified aerodromes within this area as per the Airservices Australia requirements for an Aviation Impact Statement.

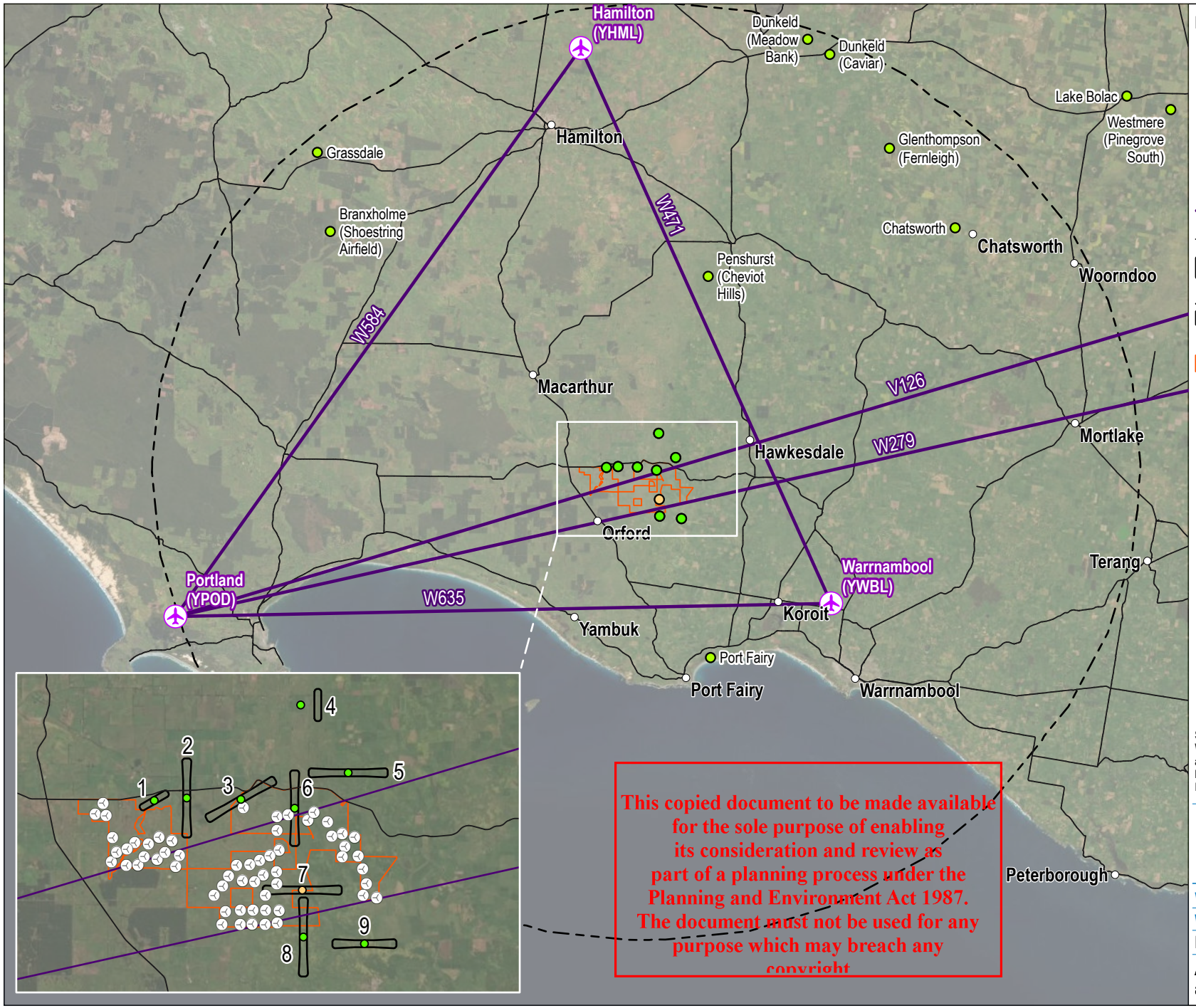
There are three regulated aerodromes located within 30 nautical miles of the project site (Figure 7-25):

- Portland, located approximately 31 nautical miles (or approximately 57 kilometres) west-south-west of the project site
- Hamilton, located approximately 28 nautical miles (or approximately 52 kilometres) north-west of the project site
- Warrnambool, located approximately 12 nautical miles (or approximately 23 kilometres) south-east of the project site.

There is also an unregulated aircraft landing area at Port Fairy, approximately 11 nautical miles (or 21 kilometres) from the project site.

There are nine uncertified private airstrips on properties within and close to the project. Four of these airstrips decommissioned or unused, while the others are used infrequently for aerial agricultural applications operations. Of these airstrips, the project would affect local aircraft operations of one local private airstrip (a landowner who would host wind turbines) due to its proximity to wind turbines, although being situated outside the aviation safety buffer. The use of this airstrip could continue with caution.

The project is located within Class G airspace, which is located beneath Class E airspace. Class G airspace refers to airspace that is uncontrolled (i.e., does not require air traffic control clearance), while Class E airspace is a mid-level en-route controlled airspace with a lower limit of 18,000 feet.



LEGEND

- Local airports
- Turbine location
- Locality
- Unregulated aircraft landing areas
- Decommissioned unregistered aircraft landing area
- Published flight routes
- Major road
- Aviation safety buffer
- Aviation impact assessment investigation area (30nm / 55.56km)
- Willatook Wind Farm boundary

SOURCE:
Willatook Wind Farm boundary, turbine locations and aviation data Wind Prospect.
Roads from Vicmap.
Imagery from ArcGIS Online (various capture dates).

0 5 10 15 20 km

SCALE 1:700,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.25

Aviation investigation area and features

DATE: 26.05.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F014_GIS DOC REFERENCE: 287657_02_FIGS_B.APRX_V03

Four air routes pass over or nearby the project site. These air routes and their lowest safe altitudes are:

- one-way overhead Portland Aerodrome/east of the township of Darlington, (V279), with published lowest safe altitude of 2,500 feet
- one-way south-west of the township of Enfield/overhead Portland Aerodrome (V126), with published lowest safe altitude of 2,500 feet
- Hamilton/Warrnambool (W741), with published lowest safe altitude of 2,900 feet
- overhead Portland Aerodrome/overhead Warrnambool Aerodrome (W635), with published lowest safe altitude of 2,200 feet.

There are four known aerial applications operators, used for spraying and spreading in less accessible areas, that work in the general area of south-western Victoria. Consultation with pilots that apply fertilisers and weed and pest control via aerial application identified that wind farms would impose some limitations on aerial applications, however, their knowledge of operating near wind farms has improved and they are aware of how to operate safely in their vicinity. Other aviation activities in the project investigation area include recreational aviation and aerial emergency services.

Impact assessment

The project would not impact the Obstacle Limitation Surface for the Portland, Hamilton or Warrnambool Aerodromes. Similarly, the project would not impact the Procedures for Air Navigation Services – Aircraft Operations surfaces prescribed airspace of the Instrument Approach Procedures for the Portland or Hamilton Aerodromes.

Whilst the proposed turbines are beyond the 10 nautical mile Minimum Safe Altitude of the Warrnambool Aerodrome, there are several turbines within the 5 nautical mile buffer zone used to calculate this Minimum Safe Altitude. To enable the proposed maximum wind turbine tip height to be accommodated, the 10 nautical mile Minimum Safe Altitude would need to be raised by 100 feet (or 30.5 metres) from 2,100 feet to 2,200 feet to satisfy the requirements of International Civil Aviation Organization Procedures for Air Navigation Services – Aircraft Operations document 9905 (*Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual*) to ensure minimum factors of safety are maintained. The same modification is also required for the Procedures for Air Navigation Services – Aircraft Operations surface for the Warrnambool aerodrome (YWBL RNAV-Z RWY 13) non-precision approach.

This change would only affect Instrument Flight Rules aircraft, with the change predicted to have a minimal impact to their pilots. Agreement with the Warrnambool Aerodrome and the Instrument Approach Procedure designer (Airservices Australia) is required to have the recommended amendments made. If agreement to these changes cannot be reached, the blade tip heights of five wind turbines would need to be reduced by between 1.5 and 14 metres to avoid modifying the Procedures for Air Navigation Services – Aircraft Operations.

The project would result in some limitations on aerial agricultural within and immediately surrounding wind turbines and meteorological monitoring masts, however, these limitations would largely be experienced by stakeholder landowners.

Overall, the impact assessment identified the potential to impact aviation operations in the project region is low and does not pose a hazard to aircraft safety. As such, the obstacle lighting review concluded that wind turbines would not need obstacle lighting. However, the project wind turbines and meteorological monitoring masts are considered to be tall structures and therefore must be reported to the Vertical Obstacle Database, managed by Airservices Australia.

Management and mitigation

Avoidance by design has been the primary measure to limit aviation impacts. This has included establishing buffers around local airstrips in the concept design, incorporating the recommendations of the CFA Guidelines in the project design and management measures, and committing to marking the meteorological monitoring masts in accordance with the *National Airports Safeguarding Framework Guideline D: Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers* to improve visibility for pilots of low-flying aircraft.

Agreement with the Warrnambool Aerodrome and the Instrument Approach Procedure designer (Airservices Australia) is required to have the recommended amendments made to the instrument

Approach Procedure. If agreement to these changes cannot be reached, the blade tip heights of five wind turbines would need to be reduced by between 1.5 and 14 metres to avoid modifying the Procedures for Air Navigation Services – Aircraft Operations.

The project does not require obstacle lighting as it is not considered to be a hazard to aircraft safety.

The project turbines would be appropriately painted, and meteorological masts marked, as per the design controls, to ensure they are visible by day.

Consistency with planning provisions

The project meets the provisions of Clause 52.32 and the Policy and Planning Guidelines as it considers the potential impact of the wind farm on aviation and concludes that there are no impacts. The purpose of Clause 18.02-7S Airports and Airfields is met with any relevant aviation facilities being protected. The minor impact on aerial agricultural activities mostly affects host landowners, and ultimately would not undermine the agricultural productivity of the area so is consistent with the objectives of the Farming Zone and policies relating to agricultural protection.

7.5.2 Traffic and road impacts

Purpose

Managing the road system to achieve integration and ensure effective planning for future essential infrastructure (Clause 18.02-3S.) Clause 52.32 requires that proponents of wind farms consider the proximity of the project to sufficient road infrastructure and to provide a concept plan of access road options.

A permit is triggered for changes to a road in the Transport Zone 2 pursuant to Clause 52.39.

The traffic impacts are detailed in the traffic and transport assessment prepared by Ratio Consultants at Appendix F.

Assessment

Existing conditions

The project site is bordered to the north by Woolsthorpe-Heywood Road (Transport Zone 2), an arterial C class road, which extends east from the Henty Highway, Heywood to Warrnambool-Caramut Road, Woolsthorpe.

The cross-section and construction standard of the road varies along its length, with older sections typically constructed as a central single 4 metre seal with gravelled shoulders and with newer, reconstructed sections provided within a 7 metre, two-lane sealed carriageway.

The existing annual average daily traffic for the Woolsthorpe-Heywood Road is 270 vehicles per day (both directions), including an estimated 40 heavy vehicles. This compares to 890 vehicles per day on the Hamilton-Port Fairy Road between Woolsthorpe-Heywood Road and Spencer Road, including 130 heavy vehicles (two-way annual average daily traffic) and 2,100 vehicles per day on the Penshurst-Warrnambool Road between Woolsthorpe-Heywood Road and Cruites Road (two way annual average daily traffic) including 280 heavy vehicles.

Tarrone North Road is a sealed sub-arterial road running north–south on the eastern side of the project site. It is a sealed two-lane road between Woolsthorpe-Heywood Road and the Tarrone Terminal Station access road as it was upgraded to provide access for the construction vehicles used to develop the Tarrone Terminal Station. South of the Tarrone Terminal Station access road the Tarrone North Road becomes a single 4 metre sealed lane road with gravelled shoulders.

Old Dunmore Road is as an unsealed local access road that extends north from Hamilton-Port Fairy Road as an unsealed local access road, crossing Riordans Road and continuing a short distance further to the north. The road provides local property access only and does not cater for regional through traffic. Reflecting the road function, the pavement width and condition of the Old Dunmore Road varies, but generally provides for two-way traffic to pass with care in most locations.

Riordans Road extends east from Hamilton-Port Fairy Road as unsealed road to Tarrone North Road that provides access to several dwellings and farms along the road. From Hamilton-Port Fairy Road to approximately 800 metres west of Landers Lane, Riordans Road has a formed carriageway of between 6–7 metres suitable of accommodating agricultural and logging vehicles that use the road for propertyaccess and access to timber plantations located towards Hamilton-Port Fairy Road. East from this location, the width and alignment of the Riordans Road carriageway responds to topography and local features and is generally suitable for light vehicles only. Approximately 470 metres east of the intersection of McGraths Road there is crossing point for dairy cows, which is used twice daily for milking.

McGraths Road is an unsealed minor road that extends east from Tarrone Lane in the south and terminates in private property approximately 1,500 metres north of the intersection with Riordans Road. McGraths Road provides access to several dwellings and farms and has a formed carriageway of between 5–7 metres suitable for accommodating agricultural vehicles that use the road for property access.

The traffic and transport assessment (Appendix C) also characterises other roads in proximity to the project site such as Kangertong Road, Dunmore Lane, Macknights Road and Nargorckas Road. These are not proposed to provide access to the project and would not be used by construction-related traffic.

Landers Lane, Barrys Road, Frys Road, Poyntons Road and Hopcrafts Road are all lower order roads that border or extend through/within the project site and provide for local property access.

Local roads around the project site are shown in Figure 7-26.

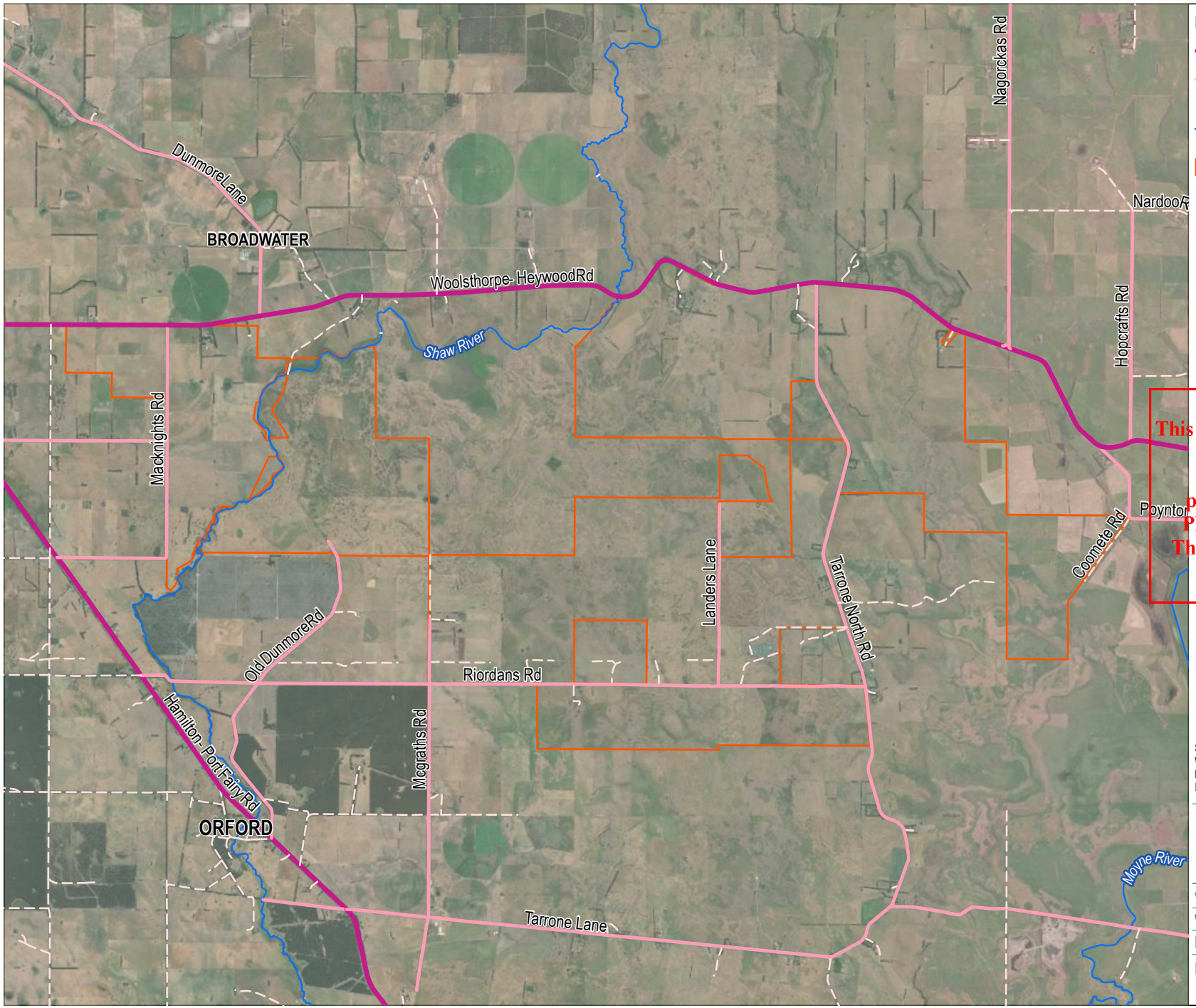
The project site would be accessed via a network of internal access tracks extending from Woolsthorpe-Heywood Road, Tarrone North Road and Riordans Road.

Internal access tracks (approximately 6 to 8 metres wide) would provide access for construction and for ongoing maintenance throughout the life of the project. The project would also rely on some sections of public roads as links between various areas of the site including:

- Tarrone North Road between Woolsthorpe-Heywood Road between and Point B near the Tarrone Terminal Station
- Riordans Road, from McGraths Road to Point C (gate 16)
- McGarths Road, north of Riordans Road to gate 33.

Access point turnouts at gate locations to external roads would be constructed in accordance with VicRoads Type B – '*Truck access to rural property*'.

A number of school bus routes use roads that intersect the project and operate on the road network that would be used by project vehicles including both Tarrone North Road and Woolsthorpe-Heywood Road. Engagement with local and regional schools will be required prior to construction vehicles mobilising to the project site to understand the operations of school busses at the time.



LEGEND

- Arterial Road
- Local road
- Track
- Watercourse
- Willatook Wind Farm boundary

ADVERTISED PLAN

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Roads and watercourses from Vicmap.
Imagery from ArcGIS Online (various capture dates).

N

0 2 km

SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT

WILLATOOK WIND FARM

FIGURE 7.26

Local road network

DATE: 25.01.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F044_GIS DOC REFERENCE: 287657_02_FIGS_E_APRX_V01

Where new access is proposed from a road in the Transport Zone 2, a permit is triggered for the works. Site and access tracks are shown in Figure 3-8.

Construction and delivery of the project would occur across a 24-month period and would include the following key work phases and indicative tasks:

- Site establishment – including the establishment of the temporary concrete batching plants, delivery of key plant and construction vehicles and the construction of initial access tracks required for the delivery of materials and goods for further construction. This period would also include the establishment of on-site quarrying and water sourcing (if pursued).
- Public interface works – including road and intersection upgrades, and vegetation management.
- Civil construction works – including the construction of the balance of internal access tracks, hardstand areas, wind turbine generator turbine footings, construction of on-site substation and battery energy storage system, and internal power infrastructure.
- Wind turbine delivery – including wind turbine blade delivery, tower section delivery and other associated wind turbine generator components.
- Wind turbine generator installation – including the use of mobile cranes and associated infrastructure.

The project is seeking to minimise, and as much as is possible, avoid transport impacts caused by the transport of crushed rock through using an on-site quarry.

A large proportion of daily project traffic across all work stages would be associated with staff movements to and from the project site. This traffic would be concentrated to the mornings and afternoon periods when construction staff are arriving at and departing from the project site, with limited activity at other times. The traffic from heavy vehicles would be more broadly spread with daily volumes translating to an average of four heavy vehicles per hour where road/hardstand materials are sourced on-site and eight heavy vehicles per hour if the material is all sourced externally.

Figure 7-27 summarises the estimated daily vehicle movements assuming that 80% of the quarried material can be sourced from an on-site quarry, which is the preferred option. If on-site quarrying is pursued, the project would rely on Riordans Road and McGraths Road from Hamilton-Port Fairy Road for the transport of heavy plant and equipment to site. This transport would involve a limited number of movements over a relatively short time period, with the level of traffic not anticipated to be problematic in regard to road capacity.

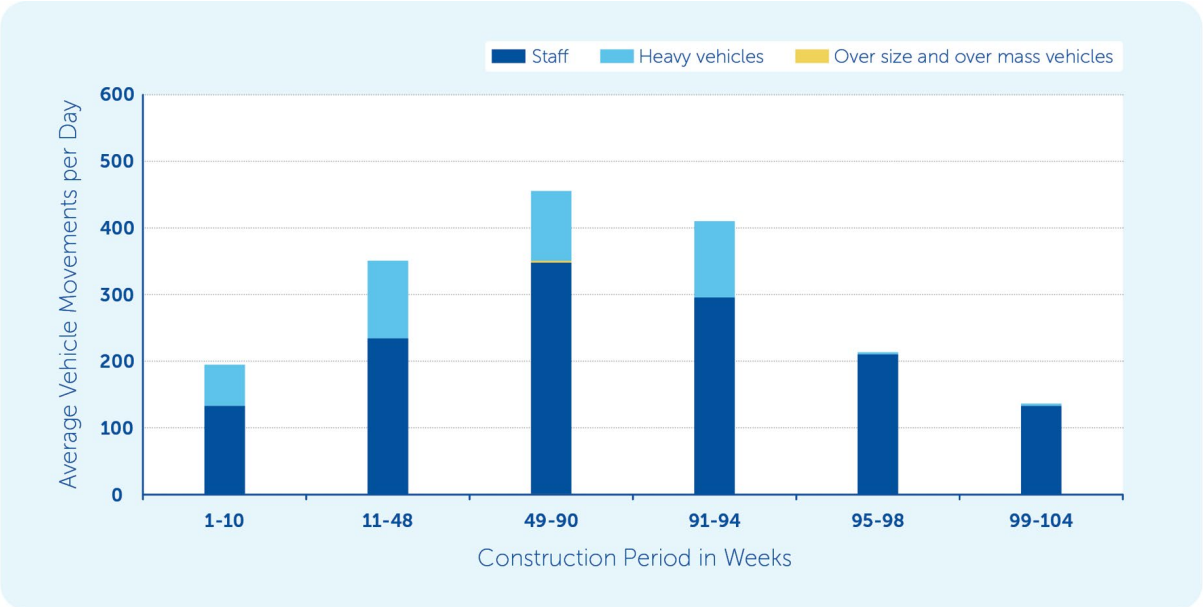


Figure 7-27 External daily vehicle movements assuming on-site materials sourcing

Should sourcing of materials from the proposed on-site quarry not be possible, an estimated 60 additional heavy vehicles (120 vehicle movements) per day would be required to transport quarried materials to the site during peak construction. Project construction traffic at this level would increase the likely incidence of passing traffic along the 2.4-kilometre single lane sealed length of Woolsthorpe-Heywood Road between Poyntons Road and 2169 Woolsthorpe-Heywood Road. As such widening of this section of road to a two-lane two-way road is proposed (see Appendix F). The proponent would also maintain shoulders along those sections of Woolsthorpe-Heywood Road used by over size and over mass vehicles and where shoulders are relied on by passing vehicles for the duration of this haulage activity.

Figure 7-28 provides a comparison of predicted daily heavy vehicle movements with on-site versus off-site materials sourcing.

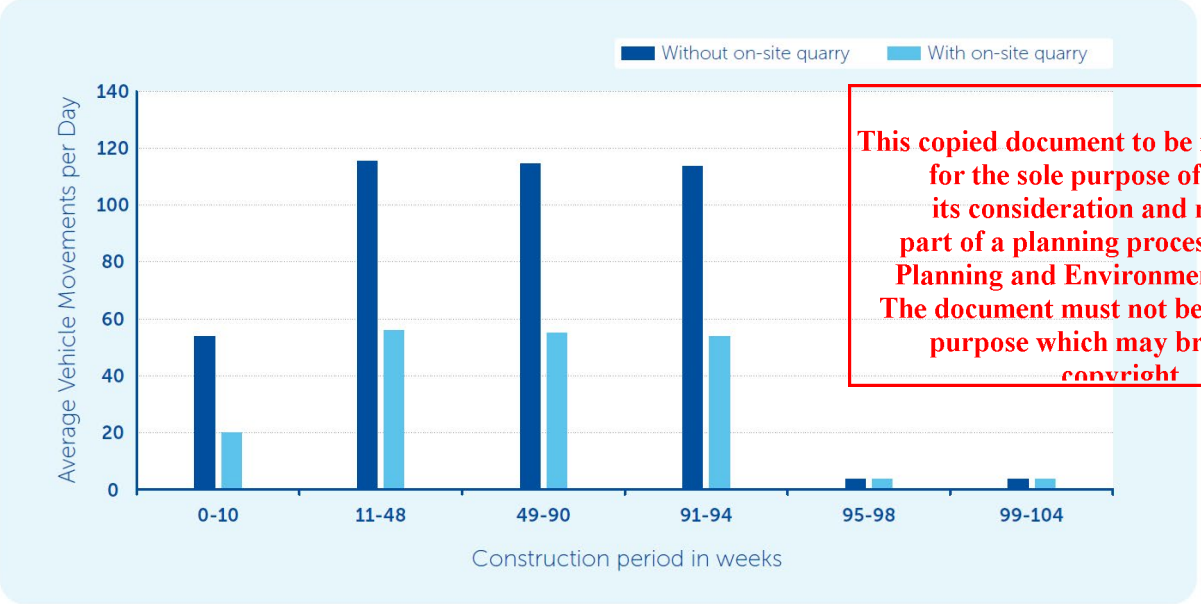


Figure 7-28 Comparison of heavy vehicle movements between on-site materials sourcing and off-site materials sourcing

Where practical, construction materials not sourced on-site would be sourced from within the local region. Four quarries have been identified as potential sources: Tarrone Quarry to the south, Mount Napier to the north, Mount Shadwell to the north-east near Mortlake, and Gillear sand and limestone quarry at Allansford to the south-east. Cement and other key construction materials would likely be sourced from Warrnambool.

Externally sourced materials required for construction would primarily access the site via Woolsthorpe-Heywood Road from Penhurst-Warrnambool Road and/or Hamilton-Port Fairy Road.

Based on advice from the Department of Transport and Moyne Shire Council during stakeholder engagement, the following principles were applied to identify the preferred routes between quarry sites that may be used for external material sourcing:

- Routes rely on arterial roads wherever possible. Use of local roads is limited to quarry access roads from the arterial road network only.
- Routes seek to adopt the shortest travel distance/most direct via the arterial road network between the quarry site and project area.
- Where alternate routes of approximately equivalent length are available, avoidance of townships and sensitive areas has been considered (i.e., Kororoit from Gillear Quarry).

All roads relied on are approved for B-double and Higher Mass Limit vehicles. Use of local roads is limited to quarry access roads under Council management and the section of Tarrone North Road included within the project road network. All route options presented were subject to visual inspection to confirm suitability by project materials haulage heavy vehicles.

The Port of Portland has been identified as the preferred port of entry for wind turbine generators and other major imported componentry. On this basis, an over-dimensional vehicle haulage route has been identified

between the Port of Portland and the site based on the maximum expected wind turbine component being a 93 metre turbine blade.

A swept path analysis (or evaluation and calculation of the space required to enable a specified vehicle to make turning movements) was undertaken of the over size and over mass haulage route identifying the intersections that would require some median and/or roadside infill works, and potential roadside furniture removal to cater for the vehicles transporting the turbine blades. While other wind farm projects have previously used the Port of Portland for large wind turbine components, the turbine blade length (maximum 93-metre long) used for the assessment are longer than those used on other wind farm projects in the Moyne Shire.

The intersections requiring upgrades are:

- Henty Highway/New Street, Portland
- Princes Highway/Henty Highway, Portland
- Princes Highway/Tyrendarra-Ettrick Road, Tyrendarra
- Tyrendarra-Ettrick Road/Woolsthorpe-Heywood Road, Homerton
- Woolsthorpe-Heywood Road/Hamilton-Port Fairy Road, Broadwater.

Three of the intersections are located within the Glenelg Shire and a separate planning permit is being sought for those works and the associated removal of native vegetation.

Two intersections are within the Moyne Shire. A small amount of native vegetation removal is required associated with the works. This is also addressed in 7.3.3 Biodiversity.

Impact assessment

Development of the project has the potential to impact the existing road network and road users through the following pathways:

- increased traffic volumes, particularly during construction of the project
- altered traffic composition increasing the proportion of heavy vehicles and over size and over mass vehicle traffic.

As a result of these changes caused by the project, the project has the potential to impact transport infrastructure and road users, including:

- additional traffic during project construction may exceed the capacity of the road network and result in increased congestion and compromise road safety
- external road infrastructure relied on by the project may not be of suitable standard to cater for the expected vehicle types, compromising road function and safety
- works on public roads within the project area required by the project (such as creating access or upgrading road segments) may disrupt and/or delay through traffic
- slow moving wind turbine componentry and over size and over mass vehicle traffic may delay may disrupt and/or delay through traffic on the arterial road network
- temporary works on public roads external to the project area to support wind turbine componentry and over size and over mass vehicle may disrupt and/or delay through traffic and may create a road safety hazard
- construction works may disrupt access to land within the project site through the closure and diversion of existing local roads.

During operation of the wind farm, transport and access to the project site would consist of daily access from a small workforce of between two to five people. There would also be weekly or fortnightly minor maintenance that would involve a team of no more than fifteen people attending the site, with up to four vehicles. Occasional maintenance would occur when components of the development need to be replaced, such as replacing a gearbox. This is expected to only occur very occasionally and would be subject to approval processes with the relevant authorities. There would also be expected to be visitors to the site such as office-based staff and courier deliveries.

As experienced with other wind farms, there may be ongoing public interest in the wind farm and so a designated viewing area, in a safe location, is also proposed.

Management and mitigation

Several wind farms have been developed within the Moyne Shire and the project has sought to learn from the experiences of those projects, repeating what worked well, and improving upon what did not. Noting that there have been issues in the past with transport impacts of wind farms, the community and Moyne Shire Council have been consulted, and where possible, inputs from the developers of other wind farms in Moyne have been sought. This consultation has identified key traffic and transport issues experienced by the community and enabled the project design development to accommodate some of those issues.

The project has designed an internal access track network to limit project vehicles having to use public roads once they have arrived at the project site. This has been undertaken in response to feedback from project stakeholders, including Moyne Shire Council and local landowners, to minimise the use of the public road network for the project, thereby reducing potential impacts on local roads and road users.

The project is seeking to minimise, and as much as is possible, avoid transport impacts caused by the transport of crushed rock through the use of on-site quarry. It is estimated that an on-site quarry would cater for around 80% of road/hardstand construction material and most non-potable water needs. As such, an on-site quarry would remove up to 60 heavy vehicle movements per day from public roads, limiting potential impacts on traffic, road condition, and the safety of road users. Woolsthorpe-Heywood Road would be used to transfer material between the various areas of the project site, as required.

Traffic management to address the safety risk of changed traffic conditions during the transportation of over size and over mass vehicles would bring with it an impact of closing roads and delaying traffic. The community would be given advance notice of the planned road closures to allow community members to account for closures and possible delays. This process would be outlined in the Traffic Management Plan.

An internal access bridge over the Shaw River has been incorporated into the design to reduce the number of heavy vehicle trips on the public roads surrounding the project. Without the construction of a crossing over the Shaw River, construction vehicles including heavy vehicles delivering crushed rock from the proposed on-site quarry would be required to use public roads to access the western section of the project site. While the addition of the crossing has required the assessment of potential impacts to water quality, aquatic fauna, and Aboriginal cultural heritage sensitivity of the riverbanks and the river itself, the bridge would limit potentially significant impacts on local road users.

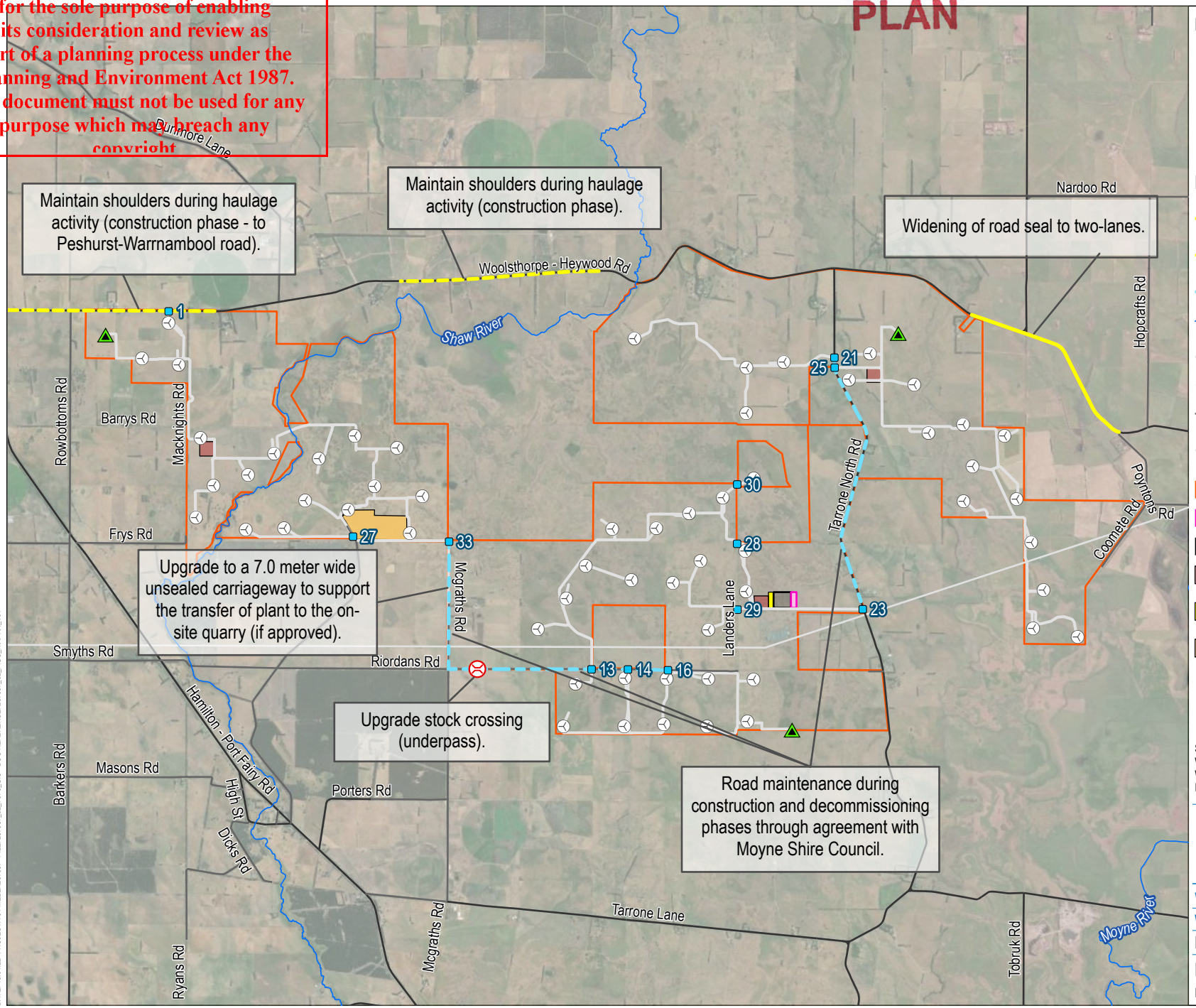
Road and intersection upgrades would be completed to ensure that the roads that project vehicles would use are of a sufficient standard to accommodate the increased volumes of traffic and maintain the safety and level of service requested for the community. The access gate design is shown in Appendix A.

Where possible, engineering design measures have been included to avoid potential impacts to roads and road users. To further minimise potential impacts to traffic and the road infrastructure, a range of management controls are proposed to be implemented. These measures include higher order traffic management measures for the route are suitable for the large project vehicles to facilitate the movements and ensure public safety, and some minor road upgrades (e.g., infill of median strips). Proposed road mitigation measures are shown in Figure 7-29.

School bus routes would be reviewed at the beginning of each school term in consultation with the local and regional schools and Moyne Shire Council and, if required, updated windows of inactivity (curfew times) would be arranged.

A detailed Traffic Management Plan would be prepared prior to the commencement of the construction of the project. This would include the use of Green Travel Plans, and road maintenance agreements to manage local roads and key arterial road sections used by the project. It is recognised that further engagement with Moyne Shire Council and Regional Roads Victoria is required to develop appropriate traffic management measures and to communicate any road network changes required.

Based on the existing traffic volumes and usage, and upgrades that are committed to support project construction, traffic generated by the project on public roads can reasonably be accommodated. Local traffic impacts within the project site during all project phases can be suitability and safely managed.



LEGEND

- Turbine location
- Access gate
- Met mast location
- Upgrade stock crossing (underpass)

Road upgrades / maintainance

- Maintain shoulders during haulage activity
- Widen to two-lane seal
- Public roads used for movement between WTG areas
- Watercourse
- Access track
- Road
- Local Road
- 500kV Moorabool-Heywood transmission line
- Willatook Wind Farm boundary
- Substation
- Battery energy storage system
- Construction compound
- Operations and maintenance facility
- Quarry area

SOURCE:
Willatook Wind Farm boundary from Wind Prospect.
Watercourses and roads from Vicmap.
Imagery from ESRI (various capture dates).

0 1 2 km

SCALE 1:75,000
PAGE SIZE: **A4**
PROJECTION: **GDA 1994 MGA Zone 54**

WIND PROSPECT
WILLATOOK WIND FARM

FIGURE 7.29

Proposed road mitigation works

DATE: 13.04.22 PROJECT: 754-MELEN287657 FILE: 287657_02_F075_GIS DOC REFERENCE: 287657_02_FIGS_HAPRX_V01

Consistency with planning provisions

The proposed new access on to Woolsthorpe-Heywood Road (Transport Zone 2) would be designed to not impact the traffic flow and road users. The proposed management measures are designed to minimise the disruption during the construction period, ensure road safety and plan for required maintenance to roads as required.

In accordance with the above assessment and the traffic impact assessment at Appendix F, the project will not have an unreasonable impact on traffic and the road network through construction, operation and decommissioning. The majority of impacts will be through construction via number of vehicles and oversize loads for construction of the main project facilities. Potential impacts range from negligible to moderate yet may be managed through appropriate traffic management measures and also through implementation of a relevant traffic management plan ensuring no unreasonable adverse impact on Council assets.

The purposes of Clause 36.04 (Transport Zone 2) and Clause 18.02-5S (Roads) will be met by the project with impacts being manageable and acceptable.

7.5.3 Blade drop

Blade drop is the very rare occurrence of a structural failure to a wind turbine generator during operation resulting in the blade or part of it to fall to the ground. In recent times there have been several incidences of blade drop, but there have been no injuries.

There are no planning provisions that require the consideration of blade drop, however this section outlines the consideration of the siting of the turbines and the risk of blade drop to roads and neighbouring properties. In the rare event of a blade dropping, the area that the blade will drop will be below the turbine. Roads that have been considered are made and all-weather roads and not for example, paper roads which do not carry any traffic. Neighbouring properties of non-stakeholder landowners have been considered.

Blade failures are generally not well reported, however catastrophic blade failures are generally reported. Five catastrophic blade failures have been identified in Australia:

- Windy Hill WF (QLD) July 2005 – blade shear off
- Wonthaggi (VIC) WF March 2012 – blade cracked
- Lal Lal WF (Vic) September 2019 – blade broke
- Bald Hills (Vic) June 2020 – No reliable details
- Dundonnell WF (Vic) October 2020 – blade fell.

There were no injuries because of these events.

In relation to the project, the proposed wind turbine blades have been conservatively assessed as 93 metres. All wind turbines have a minimum setback of 100 metres from any made or all-weather roads and neighbouring property boundaries. The neighbouring properties are absent of structures and generally vacant cropping or grazing land. The neighbouring land holdings are mostly large in size and used for farming purposes. There are no structures located near the project boundary. There are some farm dams on adjoining properties located proximate to the shared boundary with the site. There are no sensitive farming uses, such as horse studs, located on adjoining properties.

Given the size of the properties and the nature of the farming uses, there will be very few occasions where the landowner or another person will be near the boundary where there are turbines. In the event that a neighbour is near the boundary in a location where a turbine is within 200 metres, the actual risk of blade drop is very low.

In the recent panel hearing for the Delburn wind farm in late 2021, expert evidence from Dr Naomi Brammer was presented on the likelihood of blade throw and its effects on nearby roads and residences. The panel report dated 7 February 2022 outlines that this evidence is the most comprehensive of its type undertaken in Victoria. The conclusions were not seriously challenged by parties to the proceeding, and the Department of Transport accepted the conclusions of the assessment.

Dr Brammer's conclusions were summarised by the panel as:

- *blade throw incidents are relatively rare for modern turbines*

- *structural blade failures do not typically result in the detachment of blades or blade fragments due to compliance with international standards, high quality maintenance and continual improvements in component design and controls systems*
- *calculated risk for a person who remains at a fixed location in the vicinity of a wind turbine at a distance of half the rotor diameter for the equivalent of 8 hours per year, the risk of being hit and killed by a blade or blade fragment is in the order of 10^{-8} per year (1- in-100 million).*

The Delburn project proposed turbines with blade rotation within 10 metres of the edge of the road reserve, with nearby residential properties much further afield (more than 1km). The panel concluded that there is no demonstrated need to increase turbine setbacks for driver or nearby resident safety.

Based on the expert evidence presented at the Delburn panel hearing and the subsequent conclusions of the panel, it is demonstrated that blade drop/throw does not require further consideration.

7.5.4 Fire prevention and safety

Purpose

There are no specific permit triggers under the planning scheme that apply to the project site relating to bushfire risk, however Clause 52.32 requires proponents of wind farms to address bushfire risks. The CFA Guidelines are relevant to the project, and along with Clause 13.02-1S and Clause 44.06 (BMO) have been considered in this assessment. It is noted the site is within a designated Bushfire Prone Area under the *Building Act 1993* and that a small area of the project site and proposed infrastructure is affected by the BMO.

This section addresses how the project layout has been designed in respect of the CFA Guidelines, the Policy and Planning Guidelines, and address the relevant bushfire objectives of the planning scheme with particular reference to Clause 13.02-1S.

Assessment

The specifications for the infrastructure for this project are provided with the application material.

The proposed battery is located with suitable fire breaks, and static water supplies will be installed in strategic locations through the project area. Access tracks and project infrastructure are sited so emergency vehicles can easily enter and manoeuvre around the site. Further detailed plans will be prepared in collaboration with the CFA before construction and commissioning of the project and will be influenced by the outcomes of a detailed risk assessment that aligns with the CFA Guidelines.

As noted within the Aeronautical Impact Assessment, ground based fire fighting is generally used to suppress or extinguish a bushfire while firefighting aircraft are used for support, which are only effective when followed up with intense firefighting activities by ground firefighting crews.

Access for fire trucks and personnel, and consequently their ability to fight the fire within a wind farm, is greatly enhanced by the access roads built for the construction and maintenance of the turbines. These roads also act as fire breaks, which can slow fire spread or contain the fire. The area around the base of each tower is kept clear of vegetation and as such offers a refuge for fire fighters and their vehicles along with also serving as a fire break. There are other water storages associated with the wind farm that are available for firefighting purposes including on site dams.

Aviation activities in the project investigation area include aerial emergency services. Recreational Aviation Australia registered recreational and sport aircraft are limited to daytime flight in accordance with the Visual Flight Rules. Police Air Wing, Helicopter Emergency Medical Service, and fixed-wing air ambulance are capable of Instrument Flight Rules flight, with the Police Air Wing and Helicopter Emergency Medical Service also able to fly in low level (reduced light) night operations as they are equipped with Night Vision Imaging Systems. Aerial firefighting is conducted at low level using specialist aircraft flown in accordance with the Visual Flight Rules.

Aerial firefighting flying is conducted at low level using specialist aircraft flown in accordance with the Visual Flight Rules. As such, aerial firefighting can only operate during daylight hours and aircraft must remain clear of smoke to maintain visibility of the ground and obstacles. The use of aerial firefighting can also be restricted by turbulence, smoke, strong wind, fire induced thunderstorm cloud (pyrocumulonimbus) or erratic

fire behaviour. Through engagement with the Country Fire Authority, no concerns were raised about potential impacts of the project on firefighting operations. Wind turbines are a manageable hazard which form part of standard risk assessment procedures for firefighting pilots.

Wind turbines are not expected to pose unacceptable risks to aerial firefighting.

The CFA Guidelines provide standard design and management protocols for wind farms that can manage fire risk to an acceptable level. These are outlined below.

Management and mitigation measures

The CFA Guidelines outline fire safety, risk and emergency management measures and processes to be considered in the design, construction and operation of renewable energy facilities. These guidelines contain specific conditions to be complied with for the siting, and operation and maintenance of wind energy facilities. In conformity with the CFA Guidelines:

- the proposed wind farm is situated on open grassed paddocks which is considered a low risk landscape by the CFA Guideline.
- the spacing between wind turbines and masts is greater than 300 metres to allow for access by firefighting aircraft
- wind turbines would be provided with automatic shut-down, and the ability to be completely disconnected from the power supply in the event of fire.
- wind farm access tracks will amply accommodate firefighting vehicles in the case of an emergency; and
- static water supply will be located on site to assist with firefighting.

A suitable fire break width would be provided between any landscape buffer/screening vegetation and the battery energy storage system (and related infrastructure). The battery energy storage system is located reasonably adjacent to a site vehicle entrance where emergency vehicles can be accommodated.

The development of a risk management plan, Fire Management Plan and emergency management plan via a standard permit condition, in consultation with the CFA, would suitably manage any residual fire risks posed by the project. This plan would be prepared prior to the commencement of construction in consultation with the CFA to ensure best practice operational procedures during construction, commissioning and the operations phases.

A Risk Management Plan would be developed to identify and assess controls for the management of onsite and offsite risks at the facility including but not limited to:

- battery chemistry and technology risks including thermal runaway, off-gassing, toxic smoke.
- electrical equipment faults
- fire spread between battery containers
- grassfire/bushfire to and from the battery containers
- ember attack to the battery containers
- radiant heat and flame contact to the battery containers
- physical/mechanical damage to battery containers
- radiant heat from battery containers fully involved in fire as an ignition source (to other battery containers, site infrastructure, on-site buildings, site boundary and vegetation)
- related dangerous goods storage and handling including transformer oil/diesel spills/leaks, refrigerant gas releases
- evidence-based determination of the effectiveness of the risk controls against the identified hazards.

The Plan would identify battery safety and protective systems including battery management systems, monitoring systems, overcharge detection, off-gas detection, pressure relief systems, thermal detection, smoke detection, gaseous or extinguishing agent systems, refrigeration/cooling systems, visual and audible warning systems. The omission of any safety and protective system would be supported by an evidence-based justification within the risk assessment. A fire water protection system suitable for the risks and hazards at the facility would be installed.

Before the development starts, a Fire Management Plan, informed by the Risk Management plan, would be prepared in conjunction with the CFA. An Emergency Management Plan will also be prepared.

Consistency with planning provisions

The project layout is consistent with the CFA Guidelines so as to allow for firefighting aircraft and vehicles in case of an emergency. There would be a static water supply provided on the site for firefighting purposes. It is anticipated that there would be conditions on any permit that may be issued that will require a risk management plan, Fire Management Plan and emergency management plan. The degree of fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard has been considered as part of the design of the project, consistent with Clause 65. The project has appropriately considered fire risk in accordance with Clause 52.32 and Clause 13.02-1 Bushfire Planning. Additional consideration of Clause 13.02 will be addressed in the Risk Management Plan. Designing and managing impacts in consideration of the CFA Guidelines and in consultation with the CFA is considered an appropriate response to the level of bushfire risk posed by the site and proposed project. Risk to settlements, communities and human life would be managed to an acceptably low level.

7.6 Economic and social aspects

Economic and social benefits and impacts associated with the construction, operation and decommissioning of the project were assessed in the Social and Economic Impact Assessment undertaken by Ethos Urban (Appendix E).

The social impact assessment considered a broad range of potential impacts arising from the construction, operation and decommissioning of the project, with these impacts identified principally through the stakeholder consultation process.

An economic impact assessment was completed to identify potential local and regional economic benefits and impacts associated with the project. This assessment was based on an analysis of the local and regional population, labour markets, and occupational and business structure, and the capacity of the townships in the study area to participate and service the project.

Assessment

Social

Social impacts vary in their nature and can be positive or negative, tangible or intangible, physically observable, or psychological (fears and aspirations). They may be quantifiable, partly quantifiable or qualitative. Social impacts can also be experienced or perceived differently by different people and groups within a community, or over time.

Construction

During construction, temporary negative impacts to the current way of life, community, culture, health and wellbeing, environment and amenity are anticipated, associated with the generation of dust, noise and vibration, and changes to the visual character of the landscape, increased traffic on local roads, and the presence of a construction workforce that affects the community's sense of place.

Construction impacts assessed as having a 'high' social significance include impacts to land, water and air and associated changes in amenity may be experienced by the community. The magnitude of construction impacts to the local community because of changes to the environment and amenity is predicted to be a noticeable change.

Operation

Potential impacts to environment and amenity, culture and way of life are also predicted during the operation of the project, particularly the cumulative noise and visual impacts resulting from the nearby existing and approved wind farms (noting that noise levels are predicted to comply with the relevant standard).

Operation impacts assessed as having a 'medium' social significance include:

- There is potential for negative impacts to be experienced by some stakeholders to way of life, including peaceful enjoyment, farming activities, communication and recreation.
- As more wind farms become operational in the region there may be changes to character and sense of place.

- Some members of the local community may experience impacts to their cultural connections to the land due to the presence of new wind turbines within a largely agricultural setting.
- The existing landscape would be altered with the introduction of large wind turbines and a network of access tracks across the site. For some landowners and community members, the presence of the project turbines and other nearby wind farms may result in cumulative impacts to environment and amenity.
- Operation of the project would possibly impact personal and property rights (associated with economic effects).
- Continued concerns or fears relating to the project operation are possible.

No operational impacts were assessed to have a 'high' social significance with the implementation of management measures discussed below.

Economics

Construction

During construction the composition of the community would be affected by the presence of a large workforce. The average size of the workforce over the construction period was predicted to be 180 people, with peaks potentially up to 270 people. Of this workforce, approximately 60% (or 110 people on average) are predicted to live in the region, with the remainder coming from other regions of Victoria (and interstate).

Ethos Urban estimated that the region currently has around 1,760 commercial rooms and cabins (mainly in Hamilton, Port Fairy and Warrnambool). The estimated required accommodation equates to approximately 6% of total accommodation stock.

The increase in employment would be expected to have a positive effect on local and regional businesses, with increased expenditure on services such as accommodation, hospitality, retail, medical and other services from local wage spending. This is estimated to equate to $6.1 million in wages earned by project workers coming in from outside the region (in 2020 dollars) on the basis that each worker is employed for 12 months on an average construction wage of approximately $88,000. An estimated $3.5 million (2020 dollars) of those wages would be spent on local and regional businesses and service providers during construction.

Based on construction cost data from several built and operating wind farm projects located in regional areas, approximately 15% in total investment is retained in the region for projects of this type. This indicates that during construction approximately $120 million would be spent on wages, contracts, and other services, flowing into the region's economy.

This level of personal spending would indirectly support approximately 23 full time equivalent jobs in the services sector, including jobs in the Moyne Council and surrounding local government areas. These jobs would be associated with retail, accommodation, trade supplies, fuel suppliers, cafes and restaurants. In total, the project is estimated to indirectly generate 470 new full time equivalent jobs over the construction period.

Operation

Ongoing economic stimulus associated with the operation of the project through the financial returns to host landowners, local wage spending, community fund payments and Council financial returns is estimated at approximately $158.4 million over 25 years (adjusted for the Consumer Price Index at 2.5%).

The impact of the project on agricultural activity is likely to be minimal as only a small proportion of agricultural land, estimated at approximately 2.4% of the project site area. As turbine infrastructure does not significantly disrupt other farming practices (such as sheep and cattle grazing and dairy farming), activities are anticipated to only be marginally impacted. New and improved access tracks between turbines may facilitate more efficient movement around the farms.

Turbines and infrastructure would be spread across 16 host landowners, providing income returns to these farming families. Potential exists for landowners to continue to host wind turbines after the initial 25-year period, assuming the wind farm is not decommissioned, and relevant approvals are obtained for wind turbine refurbishment or replacement, as required. This would provide income for future generations or new landowners.

It is estimated Moyne Shire Council would receive annual revenue from wind farm operations at the site of about $550,000 in the first year, excluding the existing rates revenue collected from the site. This would be an important source of additional income for Council. The uplift in rates revenues generated from the operation of the wind farm on the project site would represent a net return to Council. Annual revenue generated for Moyne Shire Council from the project has significant potential to contribute to facilities, services, and programs for the area, which may positively impact health and wellbeing of the overall community.

Management and mitigation measures

A range of environmental and social factors have been incorporated into the project's GIS as constraints that influenced the siting of infrastructure (including wind turbines). Several of these constraints involved creating a setback from specific features, such as dwellings, townships, wetlands, and roads. The purpose of incorporating these setbacks was to make sure that potential impacts could either be avoided or minimised.

A substantial Neighbour Benefit Sharing Program has been developed in consultation with the local community and draws upon recommendations from the Australian Energy Infrastructure Commissioner's annual reports, the Clean Energy Council's (2019) *A guide to benefit sharing options for renewable energy projects,* and DELWP's (2021d) *Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria – A guide for renewable energy developers*.

The Neighbour Benefit Sharing Program has been shared with the local community through door knocks, information sessions, the Koroit shopfront for the project and mail outs. As part of this community engagement, feedback was gathered and used to shape the proposal outlined in the flyer included as Appendix R – *Neighbour Benefit Sharing Program*.

The Neighbour Benefit Sharing Program would offer the following benefits to eligible neighbouring landowners and/or residents with a dwelling within 6 kilometres of a constructed wind turbine (excluding those hosting infrastructure):

- one off construction payment of $1,000
- neighbour benefit payment of between $1,000 and $30,000 annually (subject to eligibility criteria, including proximity of dwellings to constructed wind turbines)
- energy cost offset plan payment of up to $2,000 annually.

The benefits, where relevant, would be administered over the life of the project.

The project would also include a Community Benefit Fund (as part of the Neighbour Benefit Sharing Program), administered by a community-led independent fund committee, comprising $1,000 per operational wind turbine per year indexed annually to the Consumer Price Index from the commencement of the fund.

To further minimise potential impacts, management controls would be implemented during the design, construction, operation and decommissioning of the project. These measures include:

- implementation of an overarching Communications and Engagement Strategy to facilitate ongoing consultation between the proponent and the broader community
- further engagement and consultation and consultation would be carried out with the affected communities to understand their preferences for mitigation and management measures (e.g., holding regular meetings with neighbouring residents to discuss any issues or concerns)
- implementation of the Neighbourhood Benefit Sharing Program and compensation scheme to promote community understanding and make a positive contribution to the potentially affected communities
- a business register has been established for the project, which is expected to grow as awareness of the project increases through EES exhibition. Companies can register their interest in providing a range of goods or services through the website
- develop partnerships with businesses, local employment agencies, training and education providers to maximise local employment and contract opportunities

- ongoing engagement with the local community and Aboriginal organisations to explore ways in which connections to local cultural heritage can be preserved and enhanced
- Construction Workforce Accommodation Strategy would be developed prior to the construction phase of the project commencing. The Construction Workforce Accommodation Strategy would aim to minimise impacts on the community especially for those reliant on low-cost housing as well as ensuring sufficient accommodation is available to service the tourism sector. The Construction Workforce Accommodation Strategy would be prepared in conjunction with local councils, commercial accommodation providers, private accommodation providers, real estate sector and other relevant stakeholders.

7.7 Environmental management

The expert reports make recommendations for the preparation of plans to address management measures during the construction, operation and decommissioning of the wind farm. Section 4.3.4 of the Planning and Policy Guidelines requires the preparation of an Environmental Management Plan to accompany the planning application. This section provides an outline of the various sub-plans and indicative content as recommended in the expert reports. It is expected that any permit that may issue will include conditions that will require further Management Plans. Further detail regarding the Environmental Management Framework for the project is included in Appendix H. The Framework is shown in Figure 7-30.

7.7.1 Detailed design plans

Development plans are typically required as a condition of the planning permit. The project design will be subject to detailed design during the pre-construction phase, incorporating the results of geotechnical investigations and the detailed design work undertaken by the selected wind turbine manufacturer and civil and electrical contractors. All waterway crossings and culvert and bridge designs would conform to relevant local guidelines and approved by Moyne Shire prior to commencement of construction. Any road works will be designed in accordance with relevant guidelines and approved by the relevant road authority.

7.7.2 Environmental Management Plan

An Environmental Management Plan would be prepared before construction starts. The Environmental Management Plan consolidates all environmental management measures that relate to the project and provides details of how they should be performed. The plan would include the measures set out in this EES (see Appendix H Environmental Management Framework), and relevant planning permit conditions (should the project be approved). It would also include measures derived from recommendations set out in the EES Inquiry and Planning Permit Application Panel Report and the EES Minister's Assessment. The Environmental Management Plan would be key document when preparing detailed designs, and is the main document used when undertaking planning and environmental compliance audits.

The Environmental Management Plan would remain a live document throughout the project pre-construction and construction phases. Some provisions may also apply during the operational phase. The Environmental Management Plan would be updated after the detailed design and pre-construction ecological surveys, and to reflect any changes in legislation, where relevant. All appropriate mitigation and management strategies would be consolidated in the Environmental Management Plan, which would clearly outline what should be done and who has the responsibility for doing it.

The Environmental Management Plan would also apply to the decommissioning phase, acknowledging that decommissioning would occur at least 25 years later and may need significant amendments by that time due to changes in legislation and existing social and environmental conditions.

The Environmental Management Plan for the continued operation of the wind farm would be reviewed and amended (if necessary) in consultation with Moyne Shire Council and DELWP (where relevant) to reflect operations and any changes to environmental management standards/techniques.

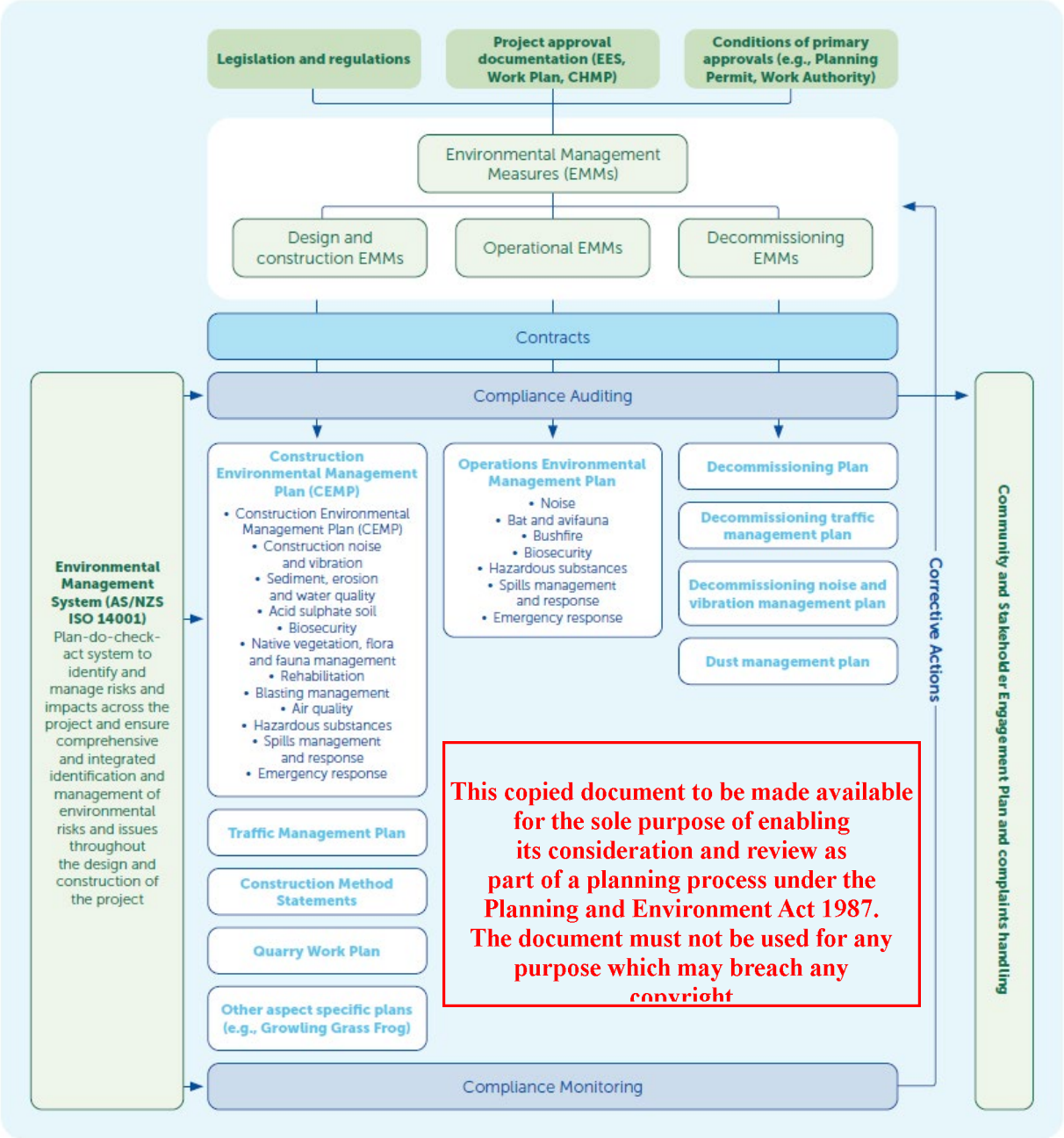


Figure 7-30 Environmental Management Framework

7.7.3 Construction Environmental Management Plan

The development of a CEMP via a standard permit condition will suitably manage the potential impacts to environmental, cultural and amenity values during the construction process. This plan will be prepared prior to the commencement of construction in consultation with the Glenelg Hopkins CMA, DJPR, DoT, Moyne Shire Council, CFA and DELWP as appropriate to ensure best practice procedures are adopted in the CEMP.

The development of a CEMP via a standard permit condition will suitably manage the potential impacts to environmental, cultural and amenity values during the construction process. This plan will be prepared prior to the commencement of construction in consultation with the Glenelg Hopkins CMA, DJPR, DoT, Pyrenees Shire Council, CFA and DELWP as appropriate to ensure best practice procedures are adopted in the CEMP.

This document would be in accordance with the requirements of the new *Environment Protection Act 2017* and best practice guidance documents including but not be limited to:

- EPA Victoria Publication 1823: Mining and quarrying – Guide to preventing harm to people and the environment
- EPA Victoria Publication 1834: Civil construction, building and demolition guide.

It is anticipated that the following management measures will be incorporated into the CEMP at a minimum:

- measures to ensure the site envelope and activity area are flagged and that no construction machinery or personnel leave the designated area
- measures to ensure all areas of native vegetation are flagged and protected by a vegetation retention zone shown on construction site plans
- measures to ensure all construction staff to undergo a site induction which includes information about the environmental, cultural and amenity values of the site and its surrounds, and the measures implemented in order to protect them
- measures to locate stockpiles and machinery at appropriate distances from the environmental values of the site
- measures to tidy up and reinstate the site at the completion of construction
- the development of a weed management plan which includes requirements relating to the cleansing of vehicles prior to entering the site, the sourcing of weed free construction materials, and the completion of pre and post construction weed surveys
- the development of a sediment and erosion management plan which includes measures to avoid offsite impacts to waterways and water bodies
- the development of a construction noise and vibration management plan which includes measures to ensure noisy construction activities are conducted during appropriate hours
- a site-specific dust management plan (sub-plan of the CEMP) will identify potential and existing dust sources and outline best practice design controls and management practices to minimise dust. These measures would include, but not be limited to:
  - watering of unsealed roads to reduce wheel generated dust
  - use of water sprays to reduce wind erosion from material stockpiles and exposed areas
  - use of water sprays as required for material transfer operations and quarry activities (e.g. drilling rock, crushing)
  - monitoring of forecast and real time local wind parameters (e.g. wind speed, wind direction) and adjustment of dust generating activities, as required, to reduce impact to sensitive receptors
  - rehabilitation and revegetation of inactive stockpiles and disturbed areas to reduce wind erosion
  - selection of equipment, e.g. concrete batching plants, which have integrated best practice dust control features
- complaints handling:
  - communication and complaints handling procedures
  - procedures for incident reporting and undertaking non-conformance investigations
  - independent verification and auditing of the CEMP
- dewatering procedures (including discharge location and quality of water, pollution control and management of sediment) in line with EPA approvals processes
- procedures for groundwater inflow monitoring in accordance with EPA Publication 669: Groundwater sampling guidelines
- construction activities and temporary works that may impact on surface permeability and groundwater would be included within the contractors CEMP
- measures to minimise groundwater recharge and flow related impacts relating to these activities and works would include, but not be limited to:
  - revegetation of disturbed areas
  - backfilling using excavated material were possible

- collected water from dewatering excavations would be tested for turbidity, salinity, pH and, if it meets the relevant ERS / ANZG water quality indicators, would either pumped into a neighbouring farm dam or discharged to adjacent land. If it exceeds acceptable limits, the water would be treated or disposed of by alternative means such as to an EPA Victoria licensed facility
- in areas of predicted elevated salinity, groundwater would be tested to determine the appropriate disposal method
- to manage potential impacts to groundwater quality, mitigation measures to be implemented (in accordance with relevant guidelines and procedures) would include, but not be limited to:
  - a site-specific risk analysis for any hazardous chemicals (batteries, explosives etc.) under relevant guidelines including EPA 1698: *Liquid storage and handling guidelines*
  - storage of fuels and chemicals within containment facilities (e.g. self-bunded, above ground in a suitable covered area), outside floodplains or watercourse areas, in accordance with relevant legislative requirements
  - spill kits for fuel, chemical and oil spills to be maintained on site
  - chemical handling training for construction personnel
  - spill response procedure, to be contained within the CEMP
  - rehabilitation of any areas where a spill has occurred.

7.7.4 Decommissioning Plan

The development of a Decommissioning Plan via a standard permit condition will suitably manage the potential impacts of the decommissioning process. This plan will be prepared following the commencement of construction in consultation with DELWP and Moyne Shire Council as appropriate to ensure best practice procedures are adopted in the Decommissioning Plan.

It is anticipated that the following management measures will be incorporated into the Decommissioning Plan at a minimum:

- deconstruction and removal of wind turbine generators from the site
- deconstruction and removal of electrical infrastructure from the site
- covering of former turbine foundations with topsoil
- removal and reinstatement of hardstand areas; and
- reseeding of all disturbed areas.

It is anticipated that access tracks would remain after decommissioning to assist the landowner with farming activities. Following decommissioning the wind turbine footings will not be removed but will be covered with topsoil and the area above them returned to pasture.

7.7.5 Other management plans

A range of other management plans would be prepared in accordance with a planning permit (should one be granted). These would include:

- noise and vibration management plan
- CHMP
- Traffic Management Plan
- water management plan
- bushfire management plan
- emergency management plan.

Chapter 8
Conclusion

This planning report has addressed the planning controls associated with the development of the project in the Moyne Shire, with reference to the relevant planning provisions and guidelines pursuant to the Moyne Planning Scheme.

The following permit triggers have been identified:

- Clause 35.07 (Farming Zone): Use and development of a wind energy facility; use and development of a utility installation.
- Clause 36.04 (Transport Zone): Use and development of a utility installation.
- Clause 37.01 (Special Use Zone Schedule 5): Use and development of wind energy facility, and use and development of a utility installation
- Clause 42.01 (Environmental Significance Overlay Schedule 4): Removal of native vegetation.
- Clause 52.05 (Signs): Development of business identification signage in Farming Zone (Category 4 – Sensitive areas).
- Clause 52.17 (Native Vegetation): Removal of native vegetation.
- Clause 52.29 (Land Adjacent to the Principal Road Network): Create or alter access to a road in the Transport Zone 2 (Woolsthorpe-Heywood Road).
- Clause 52.32 (Wind Energy Facility): Use and development of a wind energy facility.
- Clause 52.33 (Post Boxes and Dry Stone Walls): Demolish, remove or alter a dry stone wall.

This application also seeks approval for car parking spaces that would need to be designed to the satisfaction of the responsible authority in accordance with Clause 52.06-6.

The requirements specified in these triggers are addressed in the body of this planning report, with further detailed assessment included in the appendices. Potential impacts have been assessed in accordance with relevant guidelines and policies. The project layout has been the subject of an iterative design over a number of years. The iterations have occurred to minimise environmental impacts, and ensure compliance with relevant standards including noise, visual impact, and ecology. The specialist assessments also recommend mitigations measures where appropriate.

The project provides for:

- the generation of electricity through harvesting the power in the wind – that is, sustainable electricity generation, leveraging an excellent wind resource
- social benefits of the project relate to the opportunities for local job generation and training from the construction and operation phases
- overall long-term benefits include the project's contribution to the local economy and provision of new renewable energy resources to help address climate change
- low impact on existing land use, allowing continued farming on the land, and providing an additional income stream
- community and neighbour benefits.

The project represents compliance with Clause 19 of the Moyne Planning Scheme, which clearly encourages renewable energy to be developed in appropriate locations. The project demonstrates economic and environmental benefits to the broader community of renewable energy generation, while also considering the need to minimise the effects of a proposal on the local community.

The project has considered the provisions of Clause 52.32 and the Planning and Policy Guidelines and demonstrates a high level of compliance with this Clause. The project is entirely appropriate in the context of the Moyne Planning Scheme including the Planning Policy Framework, local policies, relevant zone and overlay controls and particular provisions. It is consistent with the provisions of the Planning and Policy Guidelines that relate specifically to wind farm development, and also with the CFA Guidelines. The CFA

Guidelines been considered in the design of the project, and further measures will be contained in a Fire Management Plan.

Amenity impacts such as noise and visual impacts have been considered and appropriate measures proposed to reduce any impacts. The project has considered the impacts of blade glint, electromagnetic interference and shadow flicker and complies with the relevant regulations.

Landscape and visual impacts of the project and other approved and constructed wind farms have been considered from both private and public realm viewing locations and the overall impacts considered low. Landscape screening will be implemented at residences as recommended in the landscape and visual impact assessment.

The amenity impacts to neighbouring properties are considered acceptable.

Mitigation by design has been used to limit the impact on flora and fauna, including brolga, and appropriate buffers put in place to protect environmental assets. The impact of the project on ground and surface water and the relationship with biodiversity has also been considered and concludes that the overall impacts on the environment can be managed.

The project will not result in any unreasonable impacts on aircraft safety. Traffic impacts during the two year construction period will be managed through road upgrades and traffic management measures.

Matters such as the likelihood of blade drop have been considered and all turbines are located more than 100 metres away from the non-involved landowner boundary, or a made or all-weather road.

The concrete batching plants and general construction will not result in unreasonable impacts to air quality.

Cumulative impacts of the project have been considered with viewers travelling along highways and local roads with the area likely to experience views that take in the project and other wind farms sequentially, with simultaneous views of Willatook and other wind farms possible. Cumulative noise impacts comply with regulations. Cumulative impacts to flora and fauna were considered to be greatest during operation of the project due to collisions with of birds and bats with turbine blades. The species most at risk of cumulative impacts was the Southern Bent-wing Bat, which has been recorded in the project site and other wind farm sites. Based on the very low activity levels of the species at Willatook including no records at heights of proposed wind turbines, it was concluded that the project was unlikely to result in cumulative impacts to the species.

While there is the potential for some cumulative impacts for other aspects, such as cultural heritage and electromagnetic interference, these were assessed to either be low or unlikely to occur.

A comprehensive EMP will be prepared as will other sub-plans prior to the commencement of the project. This will assist in managing the construction and ongoing operations of the project.

Avoidance and minimisation of impacts has been central to the development of the project. The approach has been to firstly avoid potential impacts, if possible, then to minimise the severity of the impact over space and time.

It is considered that the project achieves an extremely high level of compliance with the planning provisions of the Moyne Planning Scheme, relevant policies and guidelines, as well as Victorian policies relating to achieving the State's Renewable Energy Targets.

References

ABB (nd) *Rise of renewables leads to synchronous condenser revival*. Accessed 18 Aug 2021 <https://new.abb.com/motors-generators/synchronous-condensers/rise-of-renewables-leads-to-synchronous-condenser-revival>.

AEMO (2020c) *2020 Integrated System Plan*, Australian Energy Market Operator, July 2020.

Airservices Australia (2021) *Aeronautical Information Publication Australia,* September 2021.

Australian Communication and Media Authority, *Register of Radiocommunication Licences*, <https://www.acma.gov.au/radiocomms-licence-data> [accessed 18 February 2021].

Cherry Tree Wind Farm Pty Ltd v Mitchell Shire Council (2013) Permit application no. P30693/12, VCAT reference no. P2910/2012, Victorian Civil and Administrative Tribunal 521, Filing date: 4 April 2013.

Clean Energy Council (2021) *Best practice charter for Renewable Energy Developments.* Clean Energy Council, Melbourne.

Clean Energy Council (2019) *A guide to benefit sharing options for renewable energy projects*, October 2019.

Clean Energy Council (2018) *Community Engagement Guidelines for the Australian Wind Industry*. Clean Energy Council, Melbourne.

Country Fire Authority (2022) *Design Guidelines and Model Requirements for Renewable Energy Facilities*, Community Infrastructure Department, Specialist Risk and Fire Safety Unit, Country Fire Authority, March 2022.

DELWP (2021a) *Victoria's renewable energy targets*, Department of Environment, Land, Water and Planning. Accessed 18 Aug 2021 <https://www.energy.vic.gov.au/renewable-energy/victorias-renewable-energy-targets>.

DELWP (2021b) *Victoria's Climate Change Strategy*, Department of Environment, Land, Water and Planning.

DELWP (2021c) *Victorian Renewable Energy Zones Development Plan Directions Paper – February 2021*, Department of Environment, Land, Water and Planning.

DELWP (2021d) *Community Engagement and Benefit Sharing in Renewable Energy Development in Victoria: A guide for renewable energy developers (updated July 2021)*, Department of Environment, Land, Water and Planning.

DELWP (2021e) *Renewable Energy Zones*, Department of Environment, Land, Water and Planning. Accessed 11 Aug 2021 <https://www.energy.vic.gov.au/renewable-energy/renewable-energy-zones>.

DELWP (2021f) *Policy and planning guidelines for development of wind energy facilities in Victoria*. Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

DELWP (2020) *Draft Brolga Assessment and Mitigation Standards for Wind Energy Facility Permit Applications* (Draft Brolga Standards). Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

DELWP (2019) *Barwon South West Renewable Energy Roadmap*, Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

DELWP (2018) *Environment Effects Act 1978: EES Consultation Plan Advisory Note*. Published by the Victorian Government Department of Environment, Land Water and Planning, October 2018.

DELWP (2017a) *Renewable Energy Action Plan*, Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

DELWP (2017b) *Guidelines for the removal, destruction or lopping of native vegetation*. Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

DELWP (2017c), *Growling Grass Frog Crossing Design Standards*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria

DELWP (2019) *Scoping Requirements for Willatook Wind Farm Environment Effects Statement, Environment Effects Act 1978*. Department of Environment, Land, Water and Planning, Victorian Government, Melbourne <https://www.planning.vic.gov.au/environment-assessment/browse-projects/projects/willatook-wind-farm>.

Department of Sustainability and Environment (2012) *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011*, Revision 1 February 2012. Department of Sustainability and Environment, Victorian Government, Melbourne.

Environment Protection and Heritage Council (2010) *National Wind Farm Development Guidelines – Draft*. Environment Protection and Heritage Council, July 2010.

EPA Victoria (2021a) *Publication 1826.4: Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*. 20 May 2021, Environment Protection Authority Victoria, Carlton VIC.

EPA Victoria (2021c) *Publication 1823: Mining and quarrying – Guide to preventing harm to people and the environment*, July 2021.

EPA Victoria (2020d) *Publication 1834: Civil construction, building and demolition guide*, 26 November 2020, Environment Protection Authority Victoria.

EPA Victoria (2009) *Publication 655.1 Acid Sulfate Soil and Rock.* 15 July 2009, Environment Protection Authority Victoria, Carlton VIC.

Moyne Shire Council (2021) *2021-25 Council Plan*, Port Fairy, Victoria.

National Airports Safeguarding Framework (2012) *Guideline D: Managing the risk to aviation safety of wind turbine installations (wind farms)/wind monitoring towers*

Nature Advisory (2022) *Willatook Wind Farm Flora and Fauna Assessment*, prepared for Willatook Wind Farm Pty Ltd, Report no. 16087(7.4).

Office of the National Wind Farm Commissioner (2018) *Annual Report to the Parliament of Australia*, year ending 31 December 2017. National Wind Farm Commissioner, Melbourne VIC.

Standards New Zealand (2010) *New Zealand Standard 6808:2010 Acoustics – Wind Farm Noise*. Published 28 Feb 2010.

Veltheim I, Cook S, Palmer G, Hill R and McCarthy M (2019) Breeding home range movements of pre-fledged brolga chicks, *Antigone rubicunda* (Gruidae) in Victoria, Australia – Implications for wind farm planning and conservation, *Global Ecology and Conservation* (2019), doi: https://doi.org/10.1016/j.gecco.2019.e00703.