RE Future

Swansons Lane Wind Farm

Application for Planning Permit

Appendix C – Landscape and Visual Impact Assessment

May 2025

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Swansons Lane Wind Farm

Landscape and Visual Impact Assessment

Prepared for RE Future Pty Ltd 10 August 2023

GBD

Landscape Architecture

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GBD is a leading specialist in landscape planning and renewable energy landscape and visual assessment, setting a course that others follow.

Servicing the renewable energy industry for over 17 years, GBD has gathered a wealth of unrivalled project experience in a variety of landscapes from Far North Queensland to western Tasmania.

GBD has applied knowledge across multiple state planning authorities addressing planning frameworks and specific regulatory requirements for renewable energy developments.

Green Bean Design Pty Ltd
ABN 86 603 575 702

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The methodology adopted and sources of information used are outlined in this report. GBD has made no independent verification of this information beyond the agreed scope of works and GBD assumes no responsibility for any inaccuracies or omissions.

No indications were found during our investigations that information contained in this report as provided to GBD was false.

This report was completed between December 2022 and August 2023 and is based on the conditions encountered and information reviewed at the time of preparation. GBD disclaims responsibility for any changes that may have occurred after this time. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Cover image: View from Howards Road (Garvoc) toward the proposed Swansons Lane Wind Farm

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Author
Andrew Homewood
Registered Landscape Architect AILA, MEIANZ
Graduate Diploma Landscape Management,
BSc. (Dual Honours) Landscape Design and Archaeology,
National Diploma Amenity Horticulture

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Table 1 Glossary

Term	Definition
Cumulative effects	The summation of effects that result from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.
Landscape	A visible area of the earth's surface defined by natural or human induced change with discernible characteristic of landform, land use and human cultural overlays.
Landscape character	A distinct and consistent pattern of elements in the landscape that create an area of landscape visually different from other areas.
Magnitude	A combination of the scale, extent and duration of an effect.
Mitigation	Measures, including any processes, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual effects of a development project.
Photomontage (Visualisation)	Computer simulation or other technique to illustrate the appearance of a development.
Sensitivity	Susceptibility of a receiver to a specific type of change.
Viewshed	The total landscape area seen from a location or path of travel
Visibility	A relative determination at which the proposal can be clearly discerned and described.
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual effect	The change in character of an available view that results from a development or the changes in visual amenity of people living beyond the project.
Visual Assessment	A process of applied professional and methodical techniques to assess and determine the extent and nature of change to the composition of existing views that may result from a development.
View location	A place or situation from which a proposed development may be visible.
Visual receiver	Individual and/or defined groups of people who have the potential to be affected by a proposal.
Visual significance	A measure of the importance or gravity of the visual effect culminating from the degree of magnitude and receiver sensitivity.

Section 1. Executive summary

1.1 Introduction

Green Bean Design Pty Ltd (GBD) was commissioned by Swansons Lane Wind Farm Pty Ltd, (the Proponent) to undertake a Landscape and Visual Impact Assessment (LVIA) for the proposed Swansons Lane Wind Farm (the Project). The Project would comprise up to five wind turbines and associated electrical infrastructure and ancillary structures such as a switchyard/substation, access tracks and hardstands. The proposed wind turbines included in the application would be either the Vestas V162 or the V172 constructed at a 150 meter (m) or 166 m hub height. The possible wind turbine maximum tip heights would therefore be:

- 231 m (V162 on a 150 m hub height)
- 247 m (V162 on a 166 m hub height)
- 236 m (V172 on a 150 m hub height)
- 252 m (V172 on a 166 m hub height)

This LVIA has adopted the V172 on a 166 m hub height for wind turbine modelling (for ZVI and photomontages) to present a maximum tip height design envelope for assessment purposes.

1.2 Landscape characteristics

This LVIA has determined that the landscape surrounding the project site, as well as landscape in the broader viewshed, has a moderate sensitivity to change and represents a modified and productive rural/agricultural landscape which is found throughout much of the Victorian southwestern landscape region.

1.3 Visual effects

This LVIA has determined that the visual impact of the Project is likely to be low to moderate from publicly accessible locations and that the proposed Project:

- would have a Moderate and Moderate High visual effect on 4 dwellings within a 2km viewshed from the wind turbines
- would have a Low and Low Moderate visual effect on most dwellings between a 2km and 5km viewshed from the wind turbines
- would have a Low Moderate visual effect on principal rural townships and localities
- would result in a Low Moderate visual effect on views from local roads and
- would result in a Low visual effect from distant elevated views from Mount Noorat, Mount Warrnambool and regional state parks/conservation areas.

1.4 Electrical infrastructure and night lighting

The switchyard/substation would be located to the east of the wind turbines, between the Terang Warrnambool railway line and the Princes Highway. The switchyard/substation structures would be largely visually obscured by existing trees alongside the rail corridor and sections of the highway corridor. The switchyard/substation is unlikely to

be visible from uninvolved dwellings due to tree cover within the landscape and views from a short section of the Princes Highway (southbound) would be transitory and very short term in duration. This LVIA has determined that screen planting to the switchyard/substation facility would not provide any practical degree of visual mitigation. The Project is not proposed to include any permanent or temporary sources of night lighting that might impact on surrounding dwellings or road users and passenger traveling along the Princes Highway or railway corridor.

1.5 Night time obstacle lighting

The proponent engaged an aviation consultant to prepare an Aviation Impact Assessment (AIA) for the Project (Aviation Projects, March 2023). The AIA included an Obstacle Lighting Review and determined that wind monitoring towers be appropriately marked in accordance with applicable guidelines noted in the AIA. The AIA further determined that the Project is a low risk to aviation activity and therefore does not require obstacle lighting with no further mitigation required. GBD recommend that a night time lighting obstacle lighting impact assessment study is prepared subject to notification of any requirement to install obstacle lighting to wind turbine structures.

1.6 Cumulative impacts

A cumulative assessment identified 4 proposed, approved or operating wind farms within 30 kilometres (km) from the proposed Project wind turbines, including:

- Mortlake South Wind Farm at around 8km to the north
- Darlington Wind Farm around 20km to the north east
- Timboon Wind Farm around 27km to the south east and
- Mumblin Wind Farm around 12 km to the south west.

Proposed, existing and operating wind farms between 30km and 40km from the proposed Swansons Lane wind turbines include:

- Mount Fyans Wind Farm to the north north east
- Salt Creek Wind Farm to the north
- Hexham Wind Farm to the north west
- Hawkesdale Wind Farm to the west north west
- Woolsthorpe Wind Farm to the west north west

This LVIA determined that there would be a limited degree of visibility between the Swansons Lane wind turbines and other wind farm projects including the Mortlake South Wind Farm and proposed Mumblin Wind Farm; however, the potential for any significant level of direct and indirect cumulative impact would be mitigated by the distance between sensitive dwelling locations and wind turbines within each of the wind farms and the presence of tree screening and shelter belt planting across the farmland landscape.

Although some mitigation measures are considered appropriate to minimise the visual effects for several elements associated with the Project including the substation, it is acknowledged that the degree to which the wind turbines may be visually mitigated is limited by their size and position within the landscape relative to surrounding view locations.

Section 2. Introduction

2.1 Introduction

This LVIA has been prepared by GBD on behalf of the Proponent to accompany a Planning Permit Application for the Project. This LVIA informs the assessment of the Project for suitability to install wind turbines within the landscape surrounding the project site, as well as considering the potential extent and degree of visual effects on people living in, and travelling through, the surrounding landscape.

The Project is situated within the Moyne Shire Council and Corangamite Shire Council Local Government Areas (LGA) covering approximate 6.5 square kilometres in area. Swansons Lane, running north south within the Project site, forms the LGA boundary with 2 wind turbines located within the Moyne Shire Council and 3 wind turbines within the Corangamite Shire Council administrative areas (refer **Figure 2**). The substation and transmission line connection occur within the Corangamite Shire Council LGA. This LVIA has been prepared with regard to the following documents and guidelines to identify and consider potential landscape and visual impacts:

- Moyne Planning Scheme
- Corangamite Planning Scheme and
- Policy and Planning Guidelines Development of Wind Energy Facilities in Victoria, Department of Environment, Land, Water and Planning (DELWP) November 2021 (the Victorian Guidelines)

This LVIA notes that the Project site is located beyond the Coastal Spaces (April 2006) study area but does occur just within the border of the South West Victoria Landscape Assessment (June 2013) study areas. These documents have been reviewed and considered in the preparation of this LVIA.

In addition, this LVIA has also considered landscape and visual impact assessment guidance set out in:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition, Landscape Institute and Institute of Environmental Management & Assessment, 2013
- Siting and Designing Wind Farms in the Landscape, Version 3a, NatureScot (2017) and
- Visual Representation of Wind Farms, Version 2.2, Nature Scot (2017).

Section 3. Methodology and report structure

3.1 Methodology

This LVIA has been prepared by Andrew Homewood, Director and Principal Landscape Architect of GBD. Andrew has over 30 years' experience in landscape architectural consulting, and over 17 years' experience in the preparation of LVIA reports for wind farm projects, as well as other state significant projects including high voltage transmission lines, substations, and battery energy storage systems. Andrew has been commissioned to undertake LVIA studies for over 60 large scale renewable energy projects across Victoria, New South Wales, Queensland, South Australia, and Tasmania.

The methodology employed for this LVIA has been based on existing guidelines identified in the LVIA introduction. The methodology is also based on the assessment of multiple wind farm projects undertaken by GBD within Victoria, South Australia, New South Wales, Queensland and Tasmania. In its most basic form, the key principles of visual impact assessment consider a combination of:

- receiver sensitivity (landscape or people) and
- potential magnitude of visual effects.

These principles are set out in several guidelines including the Victorian Guidelines and the UK Guidelines. For wind farm projects the magnitude of visual effects is primarily determined through:

- distance between wind turbines and receiver locations
- horizontal field of view occupied by wind turbine structures and
- vertical field of view occupied by wind turbines.

The measurement of horizontal and vertical fields of view are difficult to quantify against set criteria for potential visual impact and are often considered against the parameters of normal human eyesight. Whilst human eyesight can be objectified against horizontal and vertical field of view, it does not consider the almost continual movement of receivers in the landscape and a natural inclination to scan distant horizons. Nevertheless, formulating professional judgement on the visual scale of a wind turbine within a particular vista is necessary step in the visual assessment process.

It is important to understand the difference between visual impact assessment and landscape visual assessment and why both types of assessments are appropriate to include in this LVIA. Visual impact assessments assess impacts on viewers (people) caused by developments on views from selected viewpoints, as seen by people.

A visual impact assessment will determine the change to the view itself caused by the addition of the development. It also determines how change will affect the experience of people who may be at a particular viewpoint, and how they might respond to the change. The effect of seeing a wind farm on viewer experience depends in part on what the viewers are doing when viewing a wind farm, and their response depends in part on who they are and how much they value the view.

Landscape impact assessment considers impacts on physical elements and features that make up the aesthetic, perceptual, and experiential aspects of that landscape or that make it distinctive. These impacts affect the "feel," "character," or "sense of place" of an area of landscape, rather than the composition of a view from a particular place. Landscape effects are a measure of the degree of compatibility of the character of the development, which might be, for example, "industrial," with the character of the landscape or seascape it is in or is visible from, say, "wilderness" or "tranquil." The impact receptor is the potentially affected landscape.

The final assessment of potential landscape and visual impacts combines sensitivity and magnitude of visual effects and is ultimately a process of professional judgement. Professional judgement applies knowledge, assessment skills and relevant experience within the context of existing guidelines and technical supplements. Professional judgements applied in this LVIA are based on reasonable and defined criteria and have been subject to peer review.

3.2 Professional judgement in landscape and visual impact assessment

The process of landscape and visual impact assessment incorporates both qualitative and quantitative analysis; however, determinations of impacts are ultimately based on interpretations informed by professional judgement. The application of professional judgement is outlined in the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition 2013 (the UK Guideline, which notes that professional judgement is a very important part of landscape and visual impact assessment. The UK Guideline notes that professional judgement is applied to several other environmental topics (e.g., ecology and cultural heritage) and that judgements made should be:

- Reasonable and based on clear and transparent methods
- Based on training and experience and
- Made, in general, by suitably qualified and experienced landscape professionals.

The UK Guideline notes that qualified and experienced landscape professionals may not agree on various aspects of a landscape and visual impact assessment which may arise from the application of different approaches or criteria; however, the core principals of receiver sensitivity and magnitude of impact should provide some consistency in determinations of impact.

3.3 Site inspections

Site inspections were undertaken in March 2022 and February 2023. Site inspection works included dwelling location verification, landscape character familiarisation and analysis and panorama photography and aerial drone imagery preparation.

3.4 Report structure

The LVIA report structure is set out in **Table 2**.

Table 2 Report Structure

Report Section	Description
1 Executive summary	This section provides an introductory section that describes the intent and purpose of the LVIA
2 Introduction	This section sets out the structure and methodology employed in the LVIA preparation.
3 Methodology and report structure	This section describes the regional and local position of the wind farm development relative to existing landscape features and places and describes the key visible components of the project.
4 Project location and description	This section identifies the area of land surrounding the wind farm project site subject to detailed assessment in this LVIA.

Table 2 Report Structure

5 Legislative and planning frameworks	This section sets out the legislative and planning frameworks describe policies and provisions that apply to proposed wind farm within the viewshed.
6 Viewshed	This section identifies the area of land surrounding the wind farm project site subject to detailed assessment in this LVIA.
7 Panoramic and aerial photographs	This section illustrates the LVIA with panorama and aerial photographs taken during the site inspection. The photographs are provided to illustrate the general appearance of typical landscape characteristics that surround the proposed wind turbines.
8 Landscape Character Assessment	This section describes the physical characteristics of the landscape surrounding the project site and determines the overall sensitivity of the landscape to the wind farm development.
9 Zone of Theoretical Visibility	This section identifies a theoretical area of the landscape from which the wind turbines may be visible within the viewshed and describes a range of factors which may influence the wind farm visibility within the viewshed.
10 Key views and visual effects	This section describes and determines the potential visual effect of the wind turbines on key public viewpoints within the project viewshed.
11 Cumulative assessment	This section describes the potential effect of alternate existing and/or known wind farm developments within proximity to the project.
12 Pre-construction and construction	This section describes the activities associated with pre-construction and during construction which may create visual effects.
13 Mitigation measures	This section outlines potential mitigation measures to minimise visual effects arising from the proposed wind farm development.
14 Conclusion	Conclusions are drawn on the overall visual effect of the proposed project.
Appendix A	Photomontage methodology
Appendix B	Public photomontage
Appendix C	Qualifications and experience

Section 4 Project location and description

4.1 Project location

The Project site is in Southwest Victoria within the Corangamite and Moyne Shire local government areas. The Project is approximately 6km southwest of Terang and 32km northeast of Warrnambool. The Project site location in both regional and local contexts is illustrated in **Figures 1** and **2**.

4.2 Project description

The key visual components of the proposed Project would comprise:

- up to 5 wind turbines to a maximum 252 metre tip height (maximum design envelope)
- control room and switchyard
- crane hardstand area
- 140m high meteorological mast
- Substation and associated overhead powerline (around 850m) between the substation and existing electrical infrastructure on the Princes Highway corridor
- on site access track for construction, operation and ongoing maintenance and
- signage.

Temporary works associated with the construction of the wind turbines that may be visible during construction and operational phases include:

- temporary site office, parking and materials storage areas.

The proposed wind turbine layout is illustrated in **Figure 2**.

4.3 Wind turbines

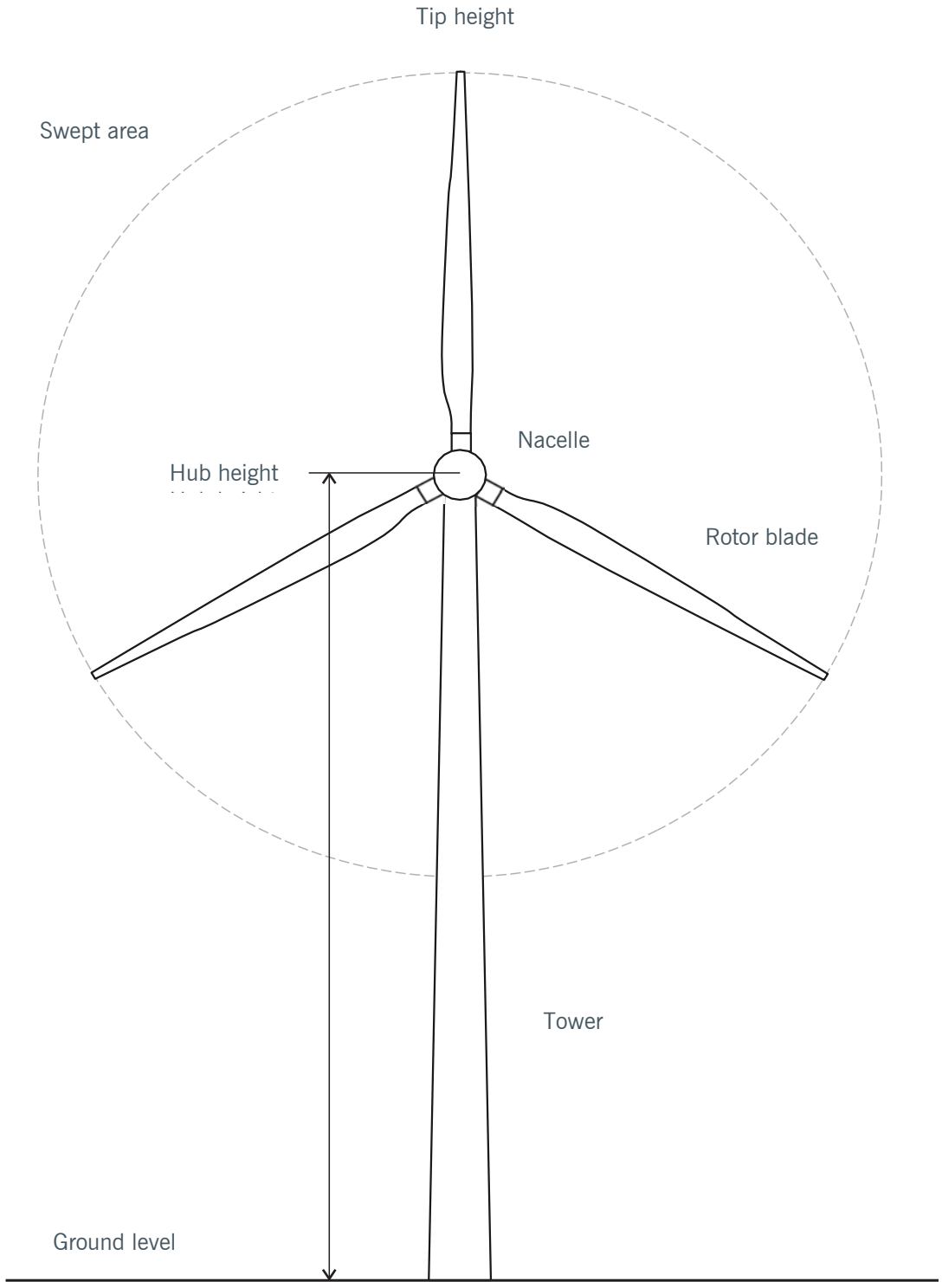
The specific elements of the wind turbines typically comprise:

- concrete foundations
- tubular tapering steel and/or concrete towers
- nacelles at the top of the tower housing the gearbox and electrical generator
- rotors comprising a hub (attached to the nacelle) with three blades and
- three composite material blades attached to each hub.

Diagram 1 illustrates a typical wind turbine structure and names the key components most relevant to this LVIA. **Diagram 1** is schematic only and is not drawn to scale or representative of the proposed Project wind turbine.

Diagram 1 – Typical wind turbine components and terminology (Image: ©GBD Pty Ltd 2022)

Not to scale



4.4 Wind monitoring mast

A wind monitoring mast would be installed on-site, extending up to 140m above ground level. The permanent wind monitoring mast is expected to be of a guyed, narrow lattice or tubular steel design similar to the existing on-site wind monitoring masts on established wind farm sites such as the Mortlake South Wind Farm site.

Plate 1 – Existing wind monitoring mast Mortlake Wind Farm (Image:©GBD 2023).

Mortlake wind turbine model Nordex 4.5MW with 72.5 m blades and maximum 186 m tip height.

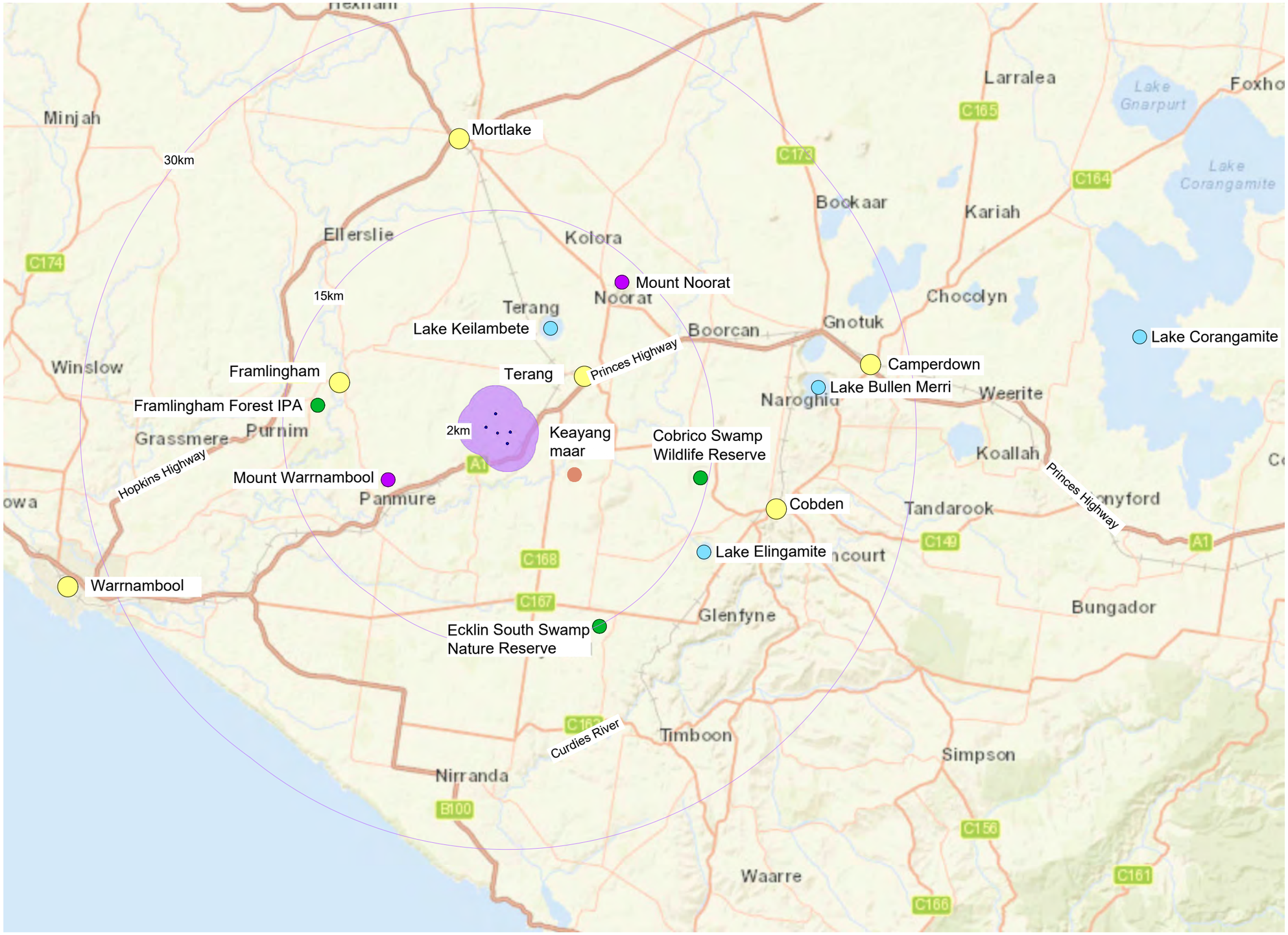
4.5 Electrical works and aviation obstacle lighting

The proposed wind turbines would be connected via a substation/switchyard to the existing distribution line located adjacent to the Princes Highway. The substation/switchyard would be connected by an above ground single circuit 66kV powerline using single poles for approximately 850m from the substation to existing powerline. Ancillary electrical infrastructure associated with the project is unlikely to form significant visual elements within the viewshed and not create significant visual effects on surrounding sensitive view locations.

The Proponent commissioned an Aviation Impact Assessment (AIA) which included a consideration with regard to obstacle lighting needs and requirements for the installation and operation of obstacle lighting. This assessment concluded that whilst obstacle lighting would not be required, a determination for the installation and operation of obstacle lighting would be subject to Civil Aviation Safety Authority (CASA) requirements. Any hazard lighting requirements would be installed in accordance with the recommendations included in the AIA.

A typical single pole powerline associated with operational wind farms proximate to Mortlake is illustrated in Plate 2.

Plate 2 – View toward existing transmission line infrastructure, Mortlake (Image:©GBD 2023)



Legend

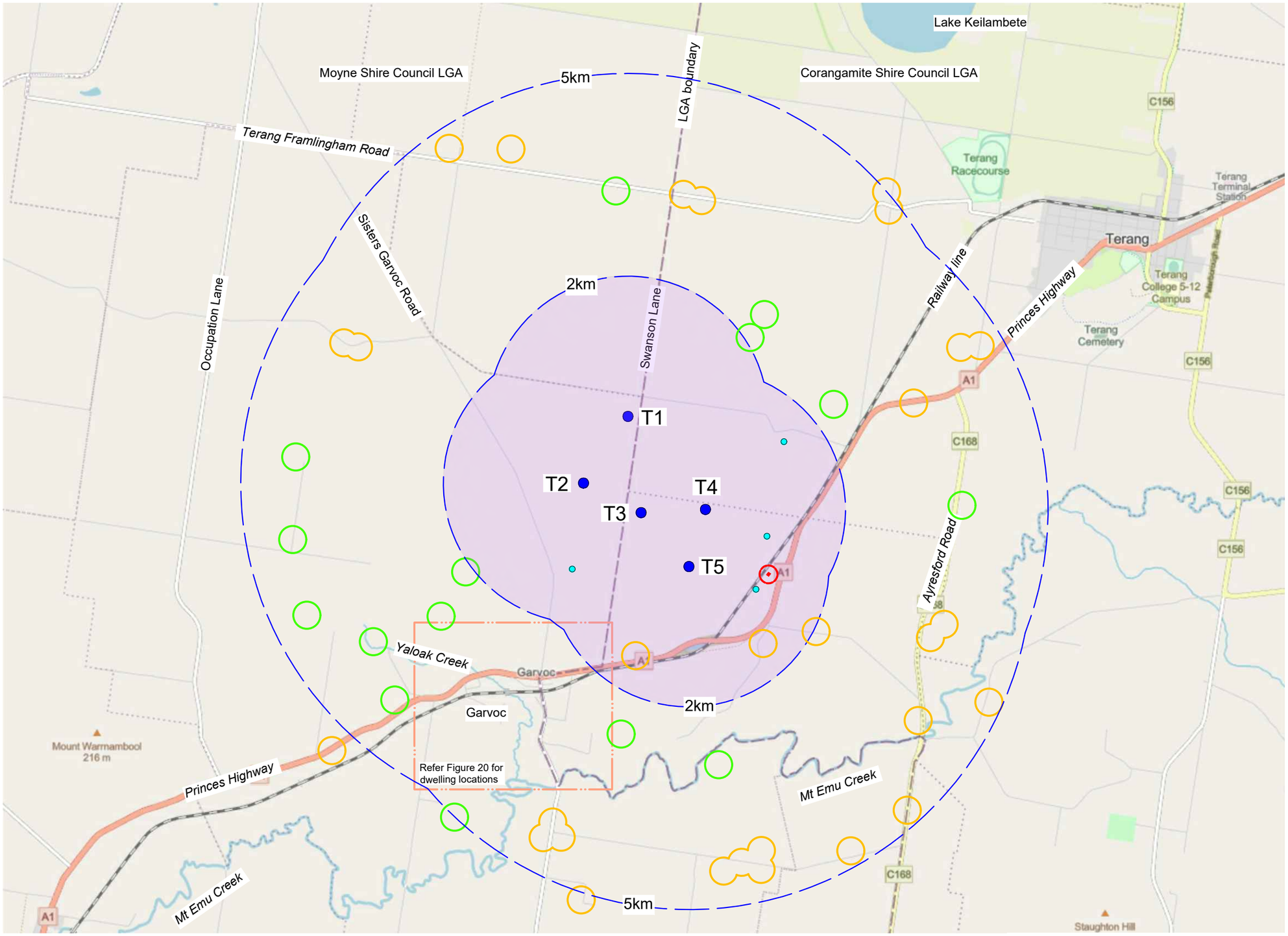
- T1 — Proposed wind turbine
- Distance from wind turbine
- 2km viewshed
- Urban locality
- Reserve
- Lake/maar
- Topographic feature and/or lookout

0m 5km

Figure 01
Regional location

GBD
Landscape architecture

Andrew Homewood
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri



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Legend

- T1 — Proposed wind turbine
- Distance from wind turbine
- 2km viewshed
- Proposed substation location
- Involved dwelling
- Non involved single rural dwelling
- Non involved grouped rural dwellings
- Princes Highway

0m 1km

Figure 02
Project locality

Swansons Lane Wind Farm : Landscape and Visual Impact Assessment

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Landscape architecture

Section 5. Legislative and planning frameworks

5.1 Introduction

This LVIA has been undertaken with reference to various State and Local planning policies within the Moyne and Corangamite Planning Schemes, as well as controls and policy guidelines all as applicable and relevant to the Project. These include:

Planning Policies

- Victorian State Planning Policy Framework – relevant Clause 19.01-2S (Renewable energy)

Planning Controls

- Particular Provisions – relevant Clauses 52.32
- Zoning and Overlays

Relevant guidelines

Victorian Guidelines (November 2021)

5.2 State Planning Policy Framework

The Victorian Government State Planning Policy Framework Clause 19.01-2S, Renewable energy, sets out objectives, strategies and policy guidelines for the provision of renewable energy including the development of wind energy facilities. The objectives and strategies are set out as follows:

Objective

To support the provision and use of renewable energy in a manner that ensures appropriate siting and design considerations are met.

Strategies

Facilitate renewable energy development in appropriate locations.

Protect renewable energy infrastructure against competing and incompatible uses.

Set aside suitable land for future renewable energy infrastructure.

Consider the economic, social 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.

Support wind energy facilities in locations with consistently strong winds over the year.

5.3 Distinctive areas and landscapes – Moyne and Corangamite Shire Planning Schemes

Clause 11.03-5S of the Planning Schemes describe the importance of distinctive areas and landscapes values of particular land systems, natural features and planning constraints. The Project would not impact on any of the identified natural features and constraints identified in the relevant policy documents listed in the Planning Scheme.

5.4 Zoning and Overlays

The proposed Project is located within the Farming Zone (FZ) as defined in Clause 35.07 of the Planning Schemes. Wind energy facilities are a permissible use subject to the wind energy project meeting the requirements of the State Planning Policy Clause 52.32 Wind Energy Facility.

Within the Farming Zone Clause 35.07-6 Decision guidelines states that the responsible authority must consider as appropriate design and siting issues including:

- The impact of the siting, design, height, bulk, colours and materials to be used, on the natural environment, major roads, vistas and water features and the measures to be undertaken to minimise any adverse impacts and
- The impact on the character and appearance of the area or features of architectural, historic or scientific significance or of natural scenic beauty or importance.

These issues have been addressed in this LVIA.

In addition to the FZ the following planning zones are located within the 5km viewshed of the wind farm:

- TRZ2, the Princes Highway and associated land adjacent to the project site is in a Transport Zone 2
- TZ, Garvoc is located within a Township Zone.

The following Overlays are located within the 5km viewshed of the wind farm:

- Environmental Significance Overlay (ESO) associated with Mount Emu Creek and a dry lake east of Ayresford Road.
- Various areas of Bushfire Management overlays (BMO).

5.5 Particular provisions

Particular Provisions Clause 52.32, Wind Energy Facility sets out a framework which includes the preparation of a design response to assess the visual impact of the proposal on the surrounding landscape. The Planning Schemes outline application requirements for wind energy facilities under Clause 52.32-4. In broad terms the application information with specific regard to landscape and visual includes:

- direction and distances to nearby dwellings, townships, urban areas, significant conservation and recreation areas, water features, tourist routes and walking tracks, major roads, airports, aerodromes and existing and proposed wind energy facilities
- views to and from the site, including views from existing dwellings and key vantage points including major roads, walking tracks, tourist routes and regional population growth corridors
- a site plan, photographs or other techniques to accurately describe the site and surrounding area
- accurate visual simulations illustrating the development in the context of the surrounding area and from key public view points
- a description of how the proposal responds to any significant landscape features for the area identified in the planning scheme, and an assessment of:
- the visual impact of the proposal on the landscape and
- the visual impact on abutting land that is subject to the National Parks Act 1975 and Ramsar wetlands and coastal areas.

5.6 Policy and Planning Guidelines: Development of Wind Energy Facilities in Victoria, November 2021

The purpose of the Victorian Guidelines is to set out:

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

The Victorian Guidelines outline the key criteria for evaluation of the planning merits of a wind energy facility. Section 5.1.3 Landscape and visual amenity identifies several considerations with regard to the degree of visual impact caused by wind farm developments.

5.7 South West Landscape Assessment Study (June 2013) (DPCD)

The South West Landscape Assessment Study (SWLAS) was commissioned by the former Department of Planning and Community Development. The SWLAS was undertaken to *'better understand and assess the visual character and significance of the wide range of landscape types, which include the volcanic plains and cones that dominate much of the area, to the Great Dividing Range in the north, and the Grampians in the central west. The study will be used to better inform planning scheme policy to assist planning decision making, and to ensure landscapes of importance are adequately protected and management into the future'.*

This LVIA notes that the Project site is located within the SWLAS 'Paddocks and Cones' landscape character type with the project site extending across approximately 6.5 square kilometres of the SWLAS area. The Project site is not recorded as a State or Regionally significant landscape and does not host any significant views. In any event, the SWLAS is not referenced in either Planning Scheme, nor is it a strategy or guideline that is required to be considered by either Planning Scheme.

5.8 Planning considerations

The key considerations drawn from the existing planning policy framework which are directly relevant to this LVIA are as follows:

The Victorian Guidelines (November 2021) present a comprehensive and clear set of considerations by which to assess the potential visual impacts of wind farm developments; however, some of the considerations require a greater degree and more detailed level of assessment than is required for this LVIA. This LVIA notes that the Draft National Guidelines (July 2010) ceased development in 2010 and have not been revisited or updated. The draft guideline lacks a degree of technical application which is more clearly set out in the Planning Scheme at Clause 52.32 as well as standard industry texts such as the Victorian and UK Guidelines.

Section 6. Viewshed

6.1 Viewshed

This LVIA defines the viewshed as a geographic area surrounding the Project site from where key project elements such as wind turbines, transmission line and substation may be visible. Viewsheds can extend for long distances beyond wind farm project sites across mixed use areas including large tracts of unoccupied agricultural or natural landscapes. Viewsheds may include a range of key view locations subject to high, moderate or low visual effects. This LVIA has adopted the following offset distances from the wind turbines to illustrate and determine potential visual effect:

- zone of Theoretical Visibility diagram up to 15km from the wind turbines (refer **Figure 16**)
- identification of named lookouts up to 15km from the wind turbines (refer **Figure 28**)
  assessment of key view locations (including dwellings) up to 5km from the wind turbines (refer **Figure 16**) and
- identification of other wind farm projects up to 40km from the Project site (refer **Figure 21**).

The extent of viewshed will vary between wind farm projects and are influenced and informed by several criteria including the height of the wind turbines together with the nature, location and height of landform or vegetation that may limit and influence the extent of wind farm visibility. The overall size of the wind farm development will also influence the extent of the viewshed. Smaller wind farm developments will limit the opportunity to view multiple wind turbines within the horizontal field of view and increase the effectiveness of existing screening surrounding and beyond key view locations.

The landform surrounding the project offers some variability in height (offering various degrees of screening) as illustrated in the ZTV diagram. The potential for significant visual effects to occur beyond 10km is considered low.

It is important to note that wind turbines can be visible from landscape areas far beyond 5km and potentially up to 50km in ideal viewing conditions (Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes, Sullivan and Richmond, Conference Paper May 2012); however, within the general parameters of normal human vision, a wind turbine at a maximum height of 247m to the tip of the rotor blade would occupy a relatively small proportion of a person's field of view from distances in excess of 5km to 10km and result in a relatively lower level of perceived visual effects.

This LVIA notes that previously approved Victorian wind farm LVIA have concluded that wind turbines (with a 230m maximum tip height) *'located toward the outer edge of a 13 to 26km range, in all but exceptionally clear lighting conditions will become increasingly imperceptible' (*Golden Plains Wind Farm LVIA, XURBAN April 2018*).* In our experience, wind turbines may be perceptible beyond 26km with less than exceptional lighting conditions; however, the more pertinent point is that wind turbines visible at long distant views will not dominate views and are more likely to be readily absorbed or screened by vegetation located between the wind turbines and visual receiver.

Section 7. Panoramic photographs and aerial images

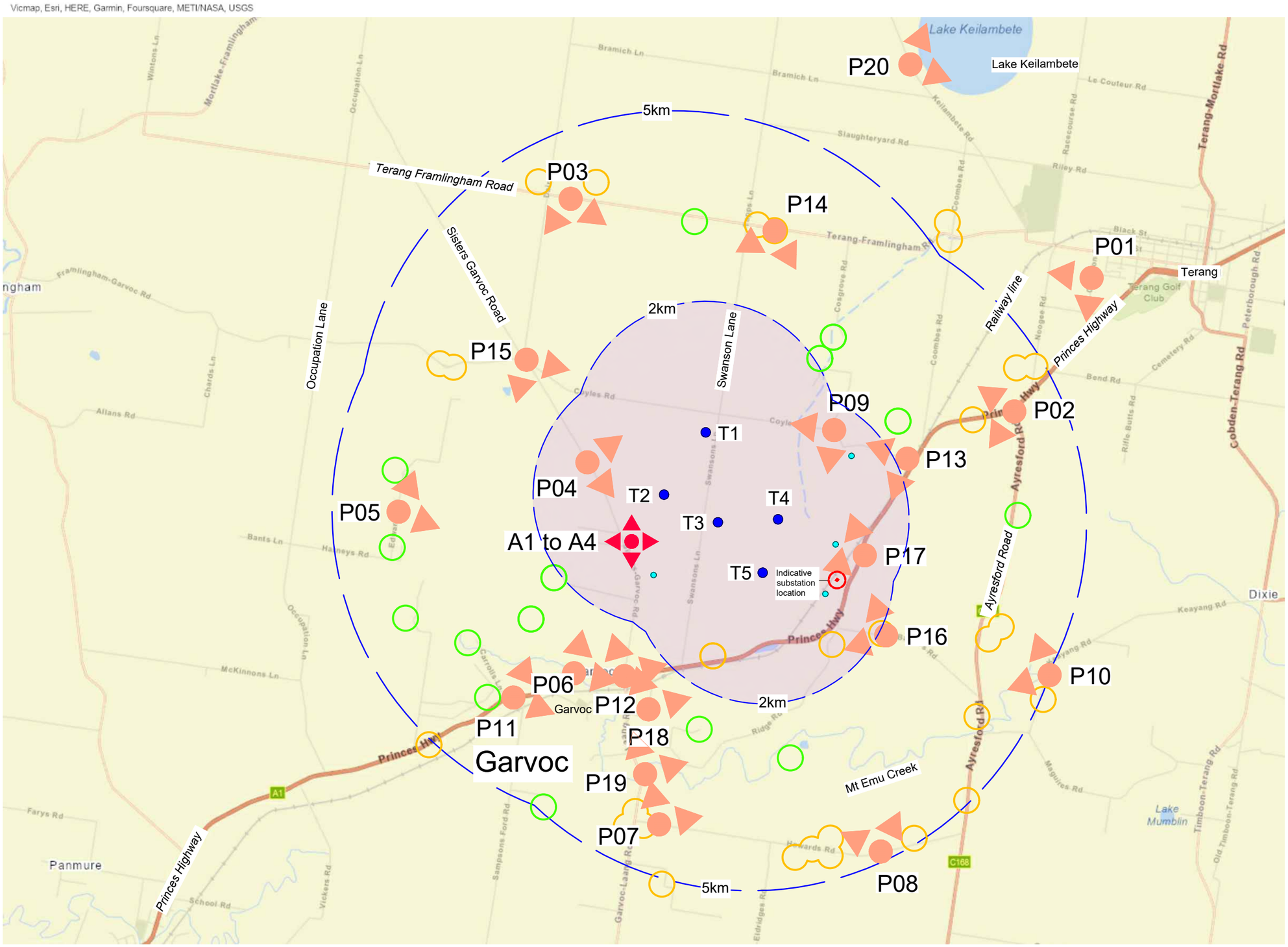
7.1 Panoramic photographs and aerial images

A series of individual and panorama digital photographs and aerial images were taken during the site inspection to illustrate existing views near the Project and to give a sense of the overall site in its broader landscape setting and characteristics. Photo locations were selected to illustrate the variety of landforms and vegetation types found within the viewshed. The panorama photographs were digitally stitched together forming a segmented panorama image to provide a visual illustration of the existing view from each photo location. Photographs presented in this section are informative only and do not illustrate the actual location or appearance of the Project wind turbines. The proposed wind turbines are illustrated in the photomontages included in Appendix B of this LVIA report.

The panorama photographs were taken with a Nikon D850 digital SLR camera with a full frame sensor and a prime 50mm focal length lens. The photographs were taken as a combination of hand held and tripod mounted images; however, all photographs for the purpose of photomontages were taken with the camera tripod mounted with additional GPS data recorded with a hand held Garmin device (as the Nikon D850 does not have an internal GPS) together with start and end bearings for each panorama.

The aerial photos were taken with a DJI Mavic Pro 2, flown to a maximum height of 120m above ground level in accordance with Civil Aviation Safety Authority requirements. The aerial photos provide extensive views and vistas that are not available from ground level due to tree cover within and surrounding the site. The aerial photos provide imagery that illustrates local and distant landscape characteristics as well as the locality of key view locations and the extent/nature of potential screening elements.

The panoramic and aerial photographs presented in this LVIA have been annotated to identify local features within and beyond the Project site. The panorama photograph and aerial image locations are illustrated in **Figure 3** and illustrated in **Figures 4** to **14**.



Legend

- T1 — Proposed wind turbine
- Distance from wind turbine
- 2km viewshed
- P6 — Panorama photo location
- A1 to A4 — Aerial photo location
- Proposed substation location
- Involved dwelling
- Uninvolved single dwelling for assessment purposes
- Uninvolved grouped dwellings for assessment purposes
- Princes Highway

0m — 2km

Figure 03
Photo locations

Swansons Lane Wind Farm : Landscape and Visual Impact Assessment

GBD
Landscape architecture

Photo Location P01- View south to south east from the Cameron Road corridor, Terang

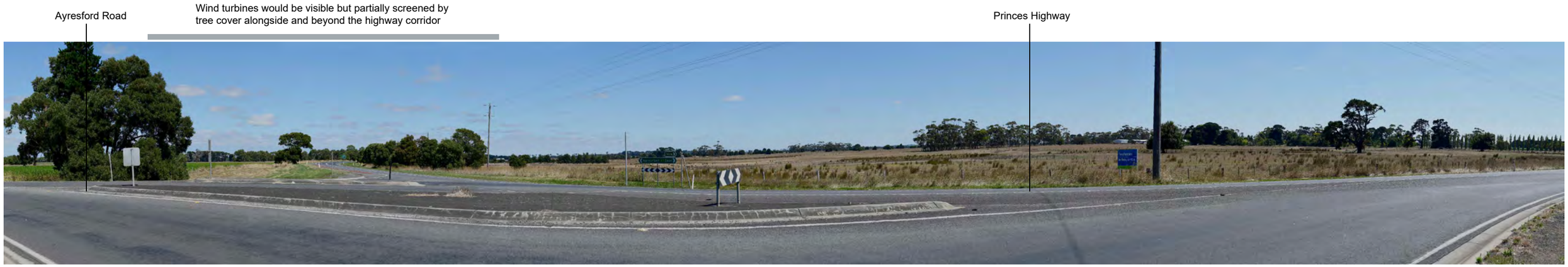


Photo Location P02- View south west to west from the Princes Highway corridor

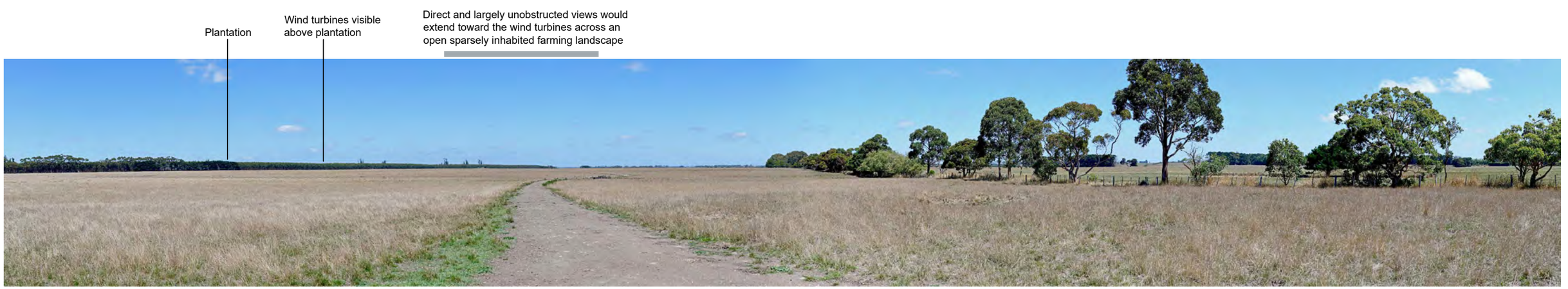


Photo Location P03- View south to south east from the Terang Framlingham Road corridor

Figure 04
Photo sheet 1

Indicative horizontal extent of wind turbine visibility

GBD
Landscape architecture

Photo Location P04- View east to south east from the Sisters Garvoc Road corridor

Photo Location P05- View north to south east from the Edwards Lane corridor

Photo Location P06- View north east from the Farrell Road corridor, Garvoc

Figure 05
Photo sheet 2

Indicative horizontal extent of wind turbine visibility

GBD
Landscape architecture

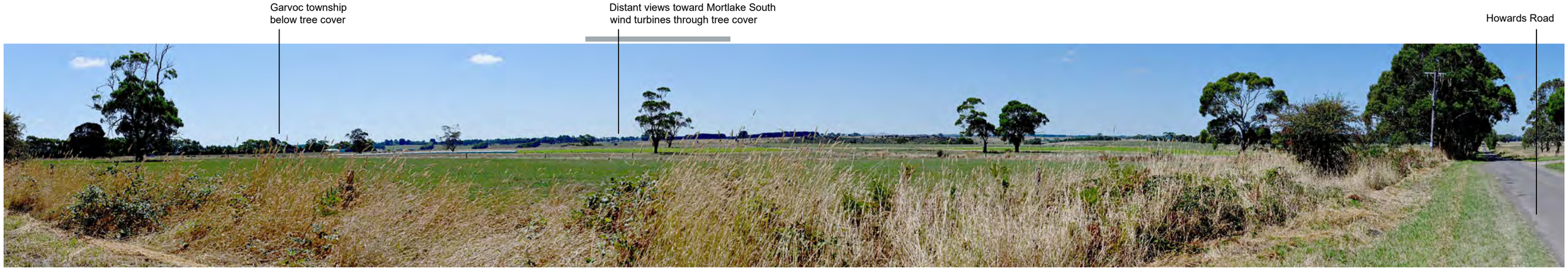


Photo Location P07- View north from the Howards Road corridor

Photo Location P08- View north to north west from the Howards Road corridor

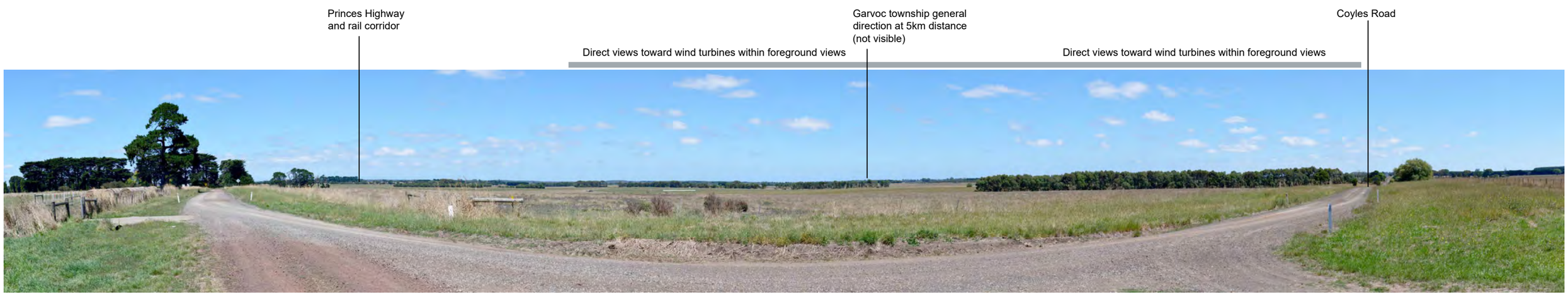


Photo Location P09- View south east to west from the Coyles Road corridor

Figure 06
Photo sheet 3

Indicative horizontal extent
of wind turbine visibility

GBD
Landscape architecture

Photo Location P10- View north west from Keayang Road corridor

Photo Location P11- View north east from the Princes Highway corridor

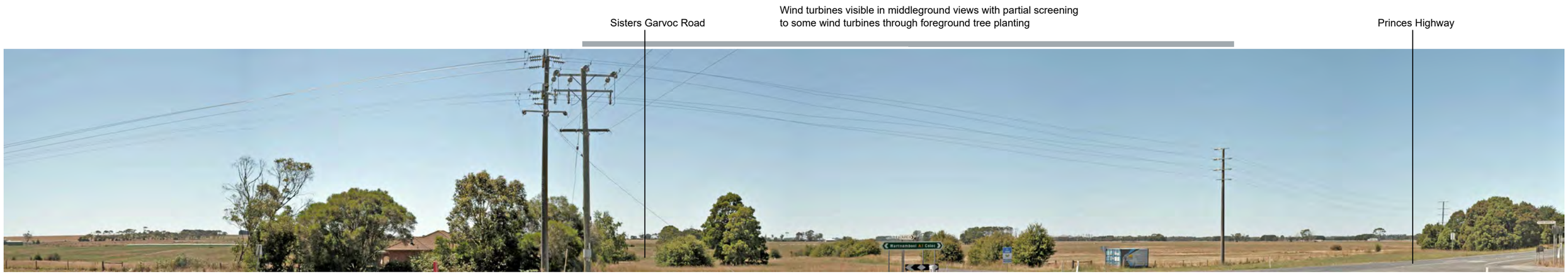


Photo Location P12- View north west from the Laang Road and Princes Highway corridor

Figure 07
Photo sheet 4

Indicative horizontal extent of wind turbine visibility

GBD
Landscape architecture

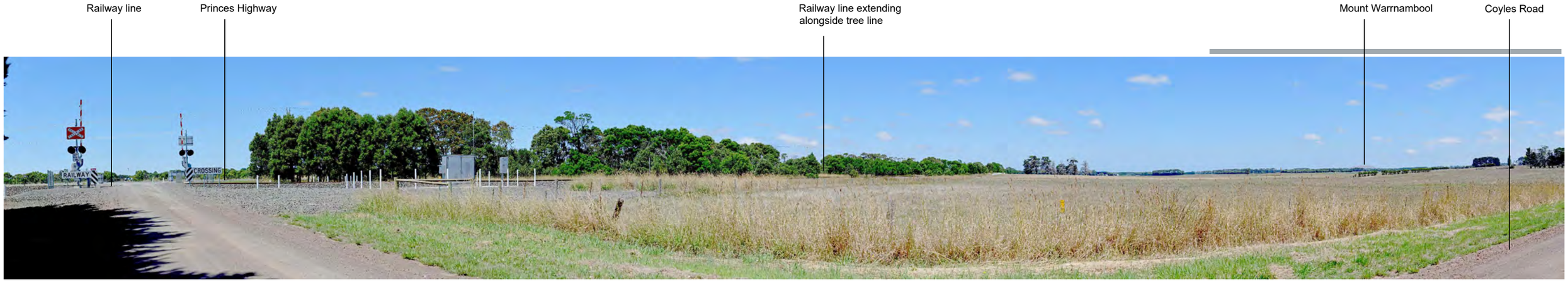


Photo Location P13- View west to south west from the Coyles Road (east) corridor

Views across generally level grazing farmland are visually contained and restricted by tree planting to field boundaries and local road corridors as well as plantation forestry extending south of the Terang Framlingham Road corridor.

Views would extend toward the 6 wind turbines above existing tree cover and plantation areas including tower, hub and rotor components.

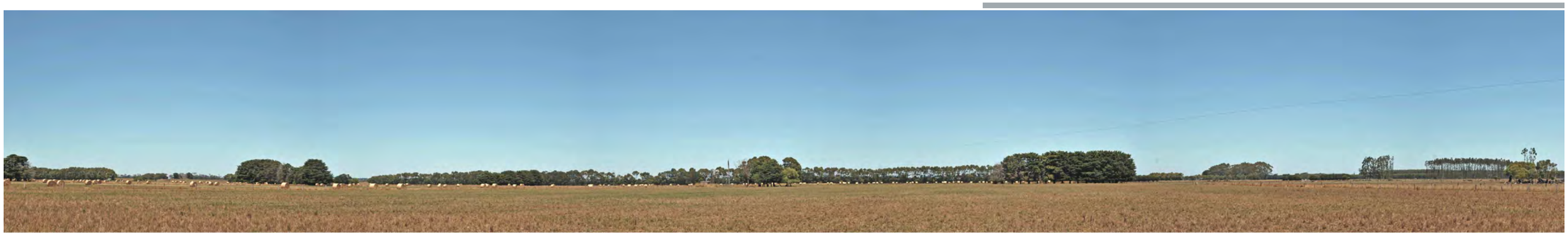


Photo Location P14- View south from the Terang Framlingham Road corridor

Photo Location P15- View south east from the Sisters Garvoc Road

Figure 08
Photo sheet 5

Indicative horizontal extent of wind turbine visibility

GBD
Landscape architecture

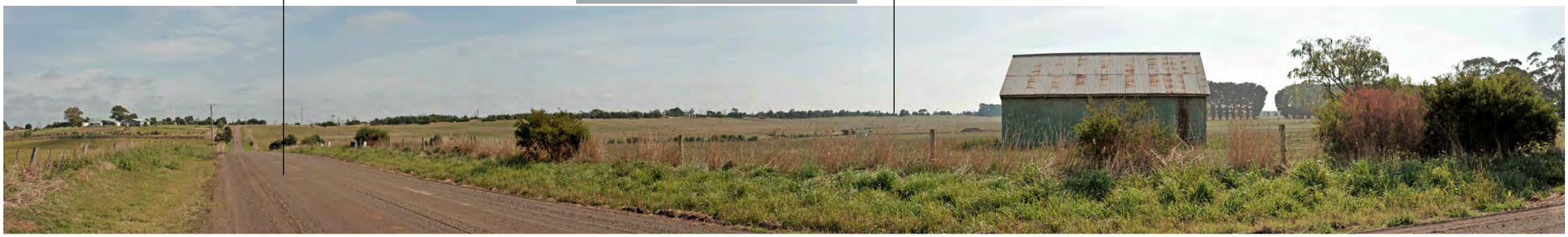


Photo Location P16- View west to north from the Baxters Road corridor

Photo Location P17- View west to south west from the Princes Highway corridor toward substation location

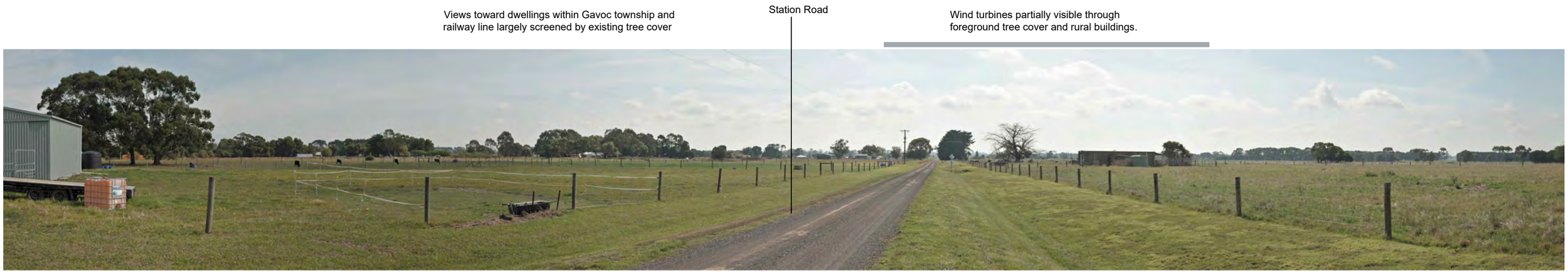


Photo Location P18- View west to north east from the Station Road corridor

Figure 9
Photo sheet 6

Indicative horizontal extent of wind turbine visibility

GBD
Landscape architecture

Photo Location P19- View north east to east along the Mount Emu Creek riparian corridor

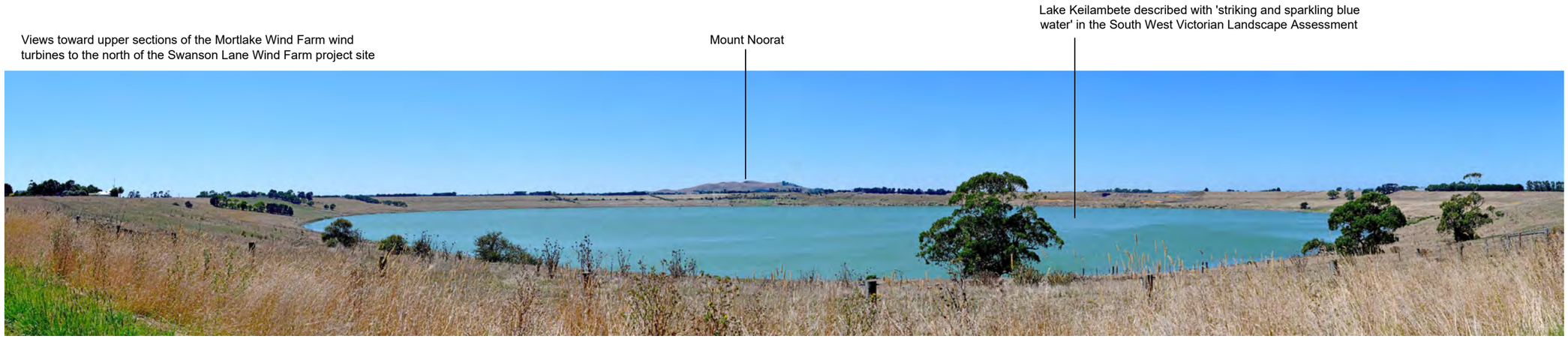
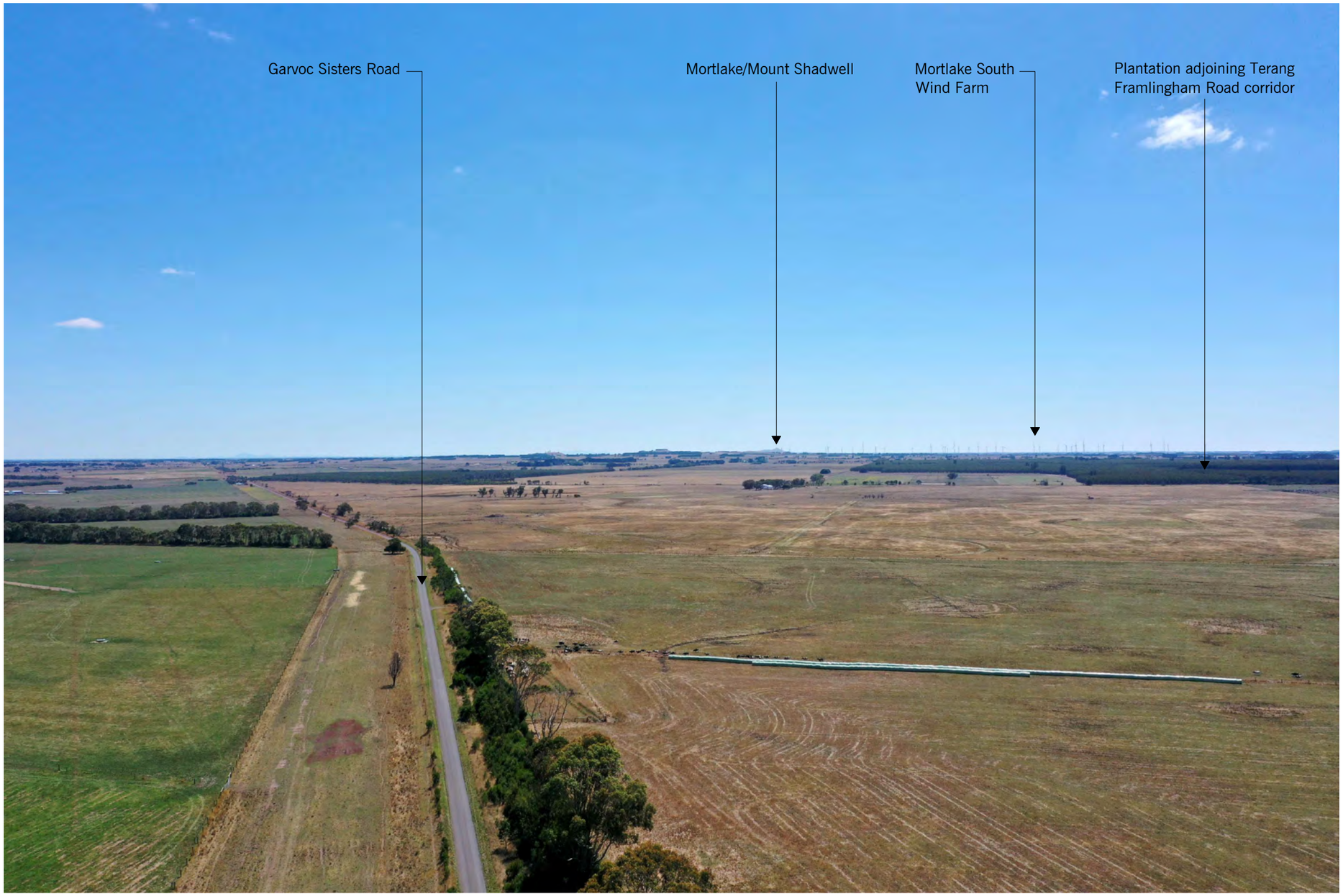
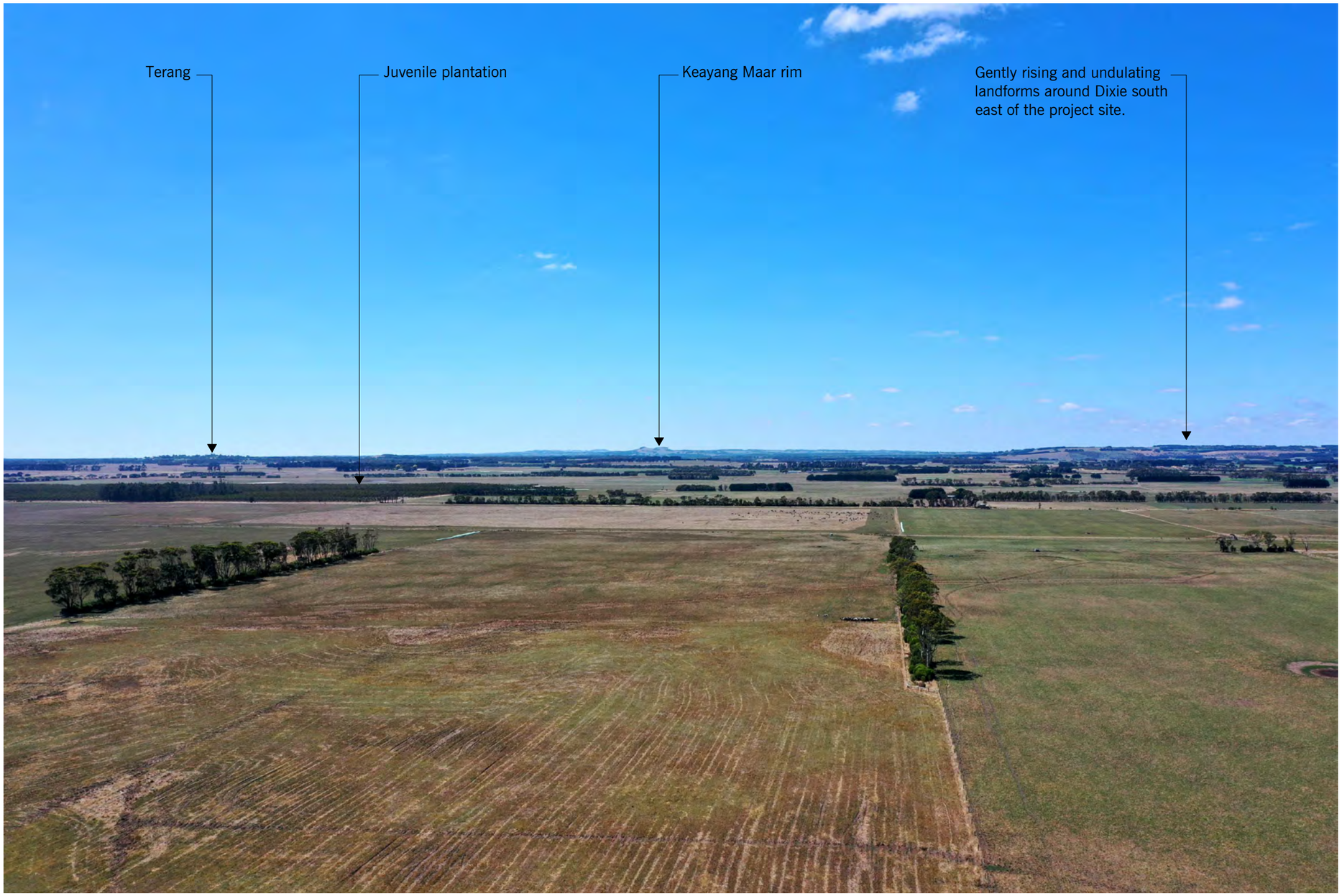


Photo Location P20- View north to east from the Keilambete Road corridor toward Lake Keilambete and Mount Noorat as viewed in the opposite direction to the Swanson Lane Wind Farm project site

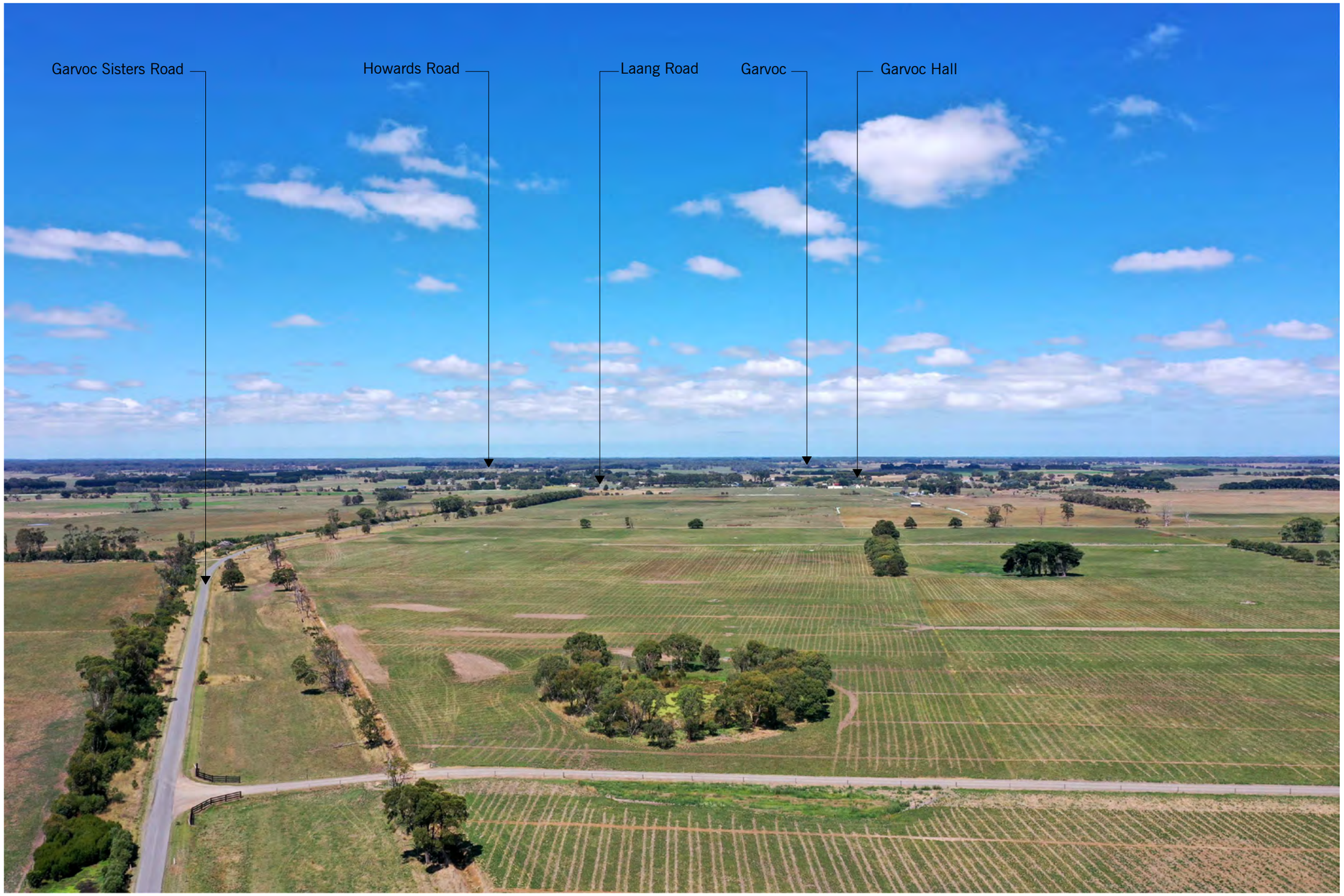


Aerial photo A1 - Existing aerial view north from above the Sisters Garvoc Road corridor adjoining and to the left of the project site (Image source GBD 2023)

Figure 11
Aerial photo 1



Aerial photo A2 - Existing aerial view east from above the Garvoc Sisters Road corridor looking across the project site (Image source GBD 2023)



Aerial photo A3 - Existing aerial view south from above the Garvoc Sisters Road corridor adjoining the project site (Image source GBD 2023)

Figure 13
Aerial photo 3

Aerial photo A4 - Existing aerial view west from above the Sisters Garvoc Road corridor adjoining the project site (Image source GBD 2023)

Figure 14
Aerial photo 4

Section 8. Landscape Character Assessment

8.1 Landscape Character Area

As part of the LVIA process it is important to understand the nature and sensitivity of different components of landscape character, and to identify them in a clear and consistent process. For this LVIA, landscape character is defined as '*the distinct and recognisable pattern of elements that occur consistently in a particular type of landscape'* (The Countryside Agency and Scottish Natural Heritage 2002). The pattern of elements includes characteristics such as landform, vegetation, land use and settlement.

For the purpose of this LVIA, the landscape character surrounding the wind farm site has been determined as a singular landscape unit which generally occurs within the 5km viewshed of the proposed Swansons Wind Farm site. The landscape unit represents an area that is relatively consistent and recognisable in terms of its key landscape elements and physical attributes, which include a relatively limited combination of topography/landform, vegetation/landcover, land use and built structures (including settlements and local road corridors). The predominant landscape unit within and surrounding the project site has been identified as generally level to gently sloping and modified agricultural land.

8.2 Landscape character assessment

An understanding of a particular landscape's key characteristics and principal visual features is important in defining a regional distinctiveness and sense of place and to determine its sensitivity to change. The criteria applied in the determination of landscape character assessment and the ability of a landscape to accommodate change are outlined in **Table 3**. These criteria are based on established industry good practice employed in the assessment of wind farm developments and have been adopted for numerous wind farm assessments across Australia. The criteria are broadly outlined in the National Wind Farm Development Guidelines (Draft v2.4), Section 6.1 Landscape Character Units, and covered in more detail within the Guidelines for Landscape and Visual Impact Assessment, Third Edition, Landscape Institute and Institute of Environmental Management & Assessment, 2013 – Chapter 5 Assessment of landscape effects.

Landscape sensitivity is a relative concept, and landscape values of the surrounding environment may be considered of a higher or lower sensitivity than other areas in the Victorian region.

Whilst landscape character assessment is largely based on a systematic description and analysis of landscape characteristics, this LVIA acknowledges that some individuals and other members of the local community may place higher values on the local landscape. These values may transcend preferences (likes and dislikes) and include personal, cultural as well as other parameters that may be explored in more depth through consultation with the local community.

Table 3 Criteria for the assessment of landscape character

Landscape Character Assessment Criteria

Characteristic	Aspects indicating lower sensitivity to the wind farm development	↔	Aspects indicating higher sensitivity to the wind farm development
Landform and scale: patterns, complexity and consistency	Large scale landform Simple Featureless Absence of strong topographical variety	↔	Small scale landform Distinctive and complex Human scale indicators Presence of strong topographical variety
Landcover: patterns, complexity and consistency	Simple Predictable Smooth, regular and uniform	↔	Complex Unpredictable Rugged and irregular
Settlement and human influence	Concentrated settlement pattern Presence of contemporary structures (e.g., utility, infrastructure or industrial elements)	↔	Dispersed settlement pattern Absence of modern development, presence of small scale, historic or vernacular settlement
Movement	Prominent movement, busy	↔	No evident movement, still
Rarity	Common or widely distributed example of landscape character area within a regional context	↔	Unique or limited example of landscape character area within a regional context
Intervisibility with adjacent landscapes	Limited views into or out of landscape Neighbouring landscapes of low sensitivity Weak connections, self-contained area and views Simple large-scale backdrops	↔	Prospects into and out from high ground or open landscape Neighbouring landscapes of high sensitivity Contributes to wider landscape Complex or distinctive backdrops

8.3 Landscape sensitivity

The scale of sensitivity for the landscape character area is described below and considered against each characteristic identified in **Table 4**.

The overall sensitivity for the landscape character area has been determined against the following ratings of Negligible through to High:

Negligible – where the characteristics of the landscape character area will not be impacted or visibly altered by the proposed Project.

Low – where the majority of the landscape character area characteristics are generally robust and will be less affected by the proposed Project. The degree to which the landscape may accommodate the Project will not significantly alter existing landscape character.

Medium – where distinguishable characteristics of the landscape character area may be altered by the proposed Project, although the landscape character area may have the capability to absorb some change. The degree to which the landscape character area may accommodate the proposed Project will potentially result in the introduction of prominent elements to the landscape character area, which may be accommodated to some degree.

High – where key characteristics of the landscape may be impacted by the Project and could result in major and visually dominant alterations to perceived characteristics of the landscape character area, which may not be fully mitigated by existing landscape elements and features. The degree to which the landscape may accommodate the proposed Project will result in a number of perceived uncharacteristic and significant changes.

Table 4 – Landscape Character Area

	Lower Sensitivity		↔		**Higher Sensitivity**
	Low	**Low to Med**	**Medium**	**Med to High**	**High**
Landform and Scale			■		
	The landform across the site is visually level to gently sloping from around 110m AHD in the north portion of the wind farm site, dipping gently to around 103m AHD toward the southern extend of the Project site (around a 1(v):300 (h) in grade). Beyond the site landforms include a variety of features from low undulating rises and maars such as Keayang to the south east and Lake Keilambete around 6.2km north east of the wind farm site. Visually prominent landform features are located at distance from the wind farm site, including Mount Noorat around 13km to the north east, and Mount Warrnambool around 7.3km to the south west of the site. Landform to the south of the site falls away gently before descending over steeper slopes to the Mount Emu River Corridor. The overall landscape scale is moderate to small with an absence of any strong topographical variety; however, the predominant dairy farming associated with this landscape creates some distinctiveness with associated human scale indicators.				
Landcover		■			
	Landcover is both simple and predictable across the site and surrounding landscape areas. European settlement established an agricultural presence and defines much of the contemporary dairy farming, arable and general livestock areas				

	Lower Sensitivity		↔		Higher Sensitivity
	Low	**Low to Med**	**Medium**	**Med to High**	**High**
	across the project site and beyond. Cropping and pastoral fields create a regular and uniform appearance throughout the seasonal and repetitive operations associated with agricultural production. View lines across the wind farm site are disrupted from many locations by wind break planting, isolated/scattered trees and small discrete areas of woodland.				
Settlement and human influence		■			
	Settlement is generally dispersed throughout the surrounding landscape and consists largely of farmsteads and individual dwellings. There are limited examples of small scale, historic or vernacular structures within the landscape. The project site is directly north of the Princes Highway corridor Warrnambool Terang railway.				
Movement				■	
	Movement around the project site is generally restricted to vehicular movements, including cars and trucks travelling along the Princes Highway and other local roads, and occasional train movements along the rail corridor. A small number of local roads extend through or adjacent to the project site including the Sisters Garvoc Road and Coyles Lane. Occasional agricultural vehicles are seen within fields, with movement and activity increasing during seasonal agricultural activities.				
Rarity		■			
	The wind farm site and adjoining landscapes are a relatively common rural landscape type within the Moyne and Corangamite Shire and surrounding regional context which extends across the southwestern plains district. This LVIA has recognised the presence of volcanic structures (cones, lakes and maars) within the viewshed and surrounding landscape which are considered examples of landscape characteristics of importance in a regional context.				
Intervisibility			■		
	The wind farm site offers no elevated viewpoints and does not accommodate far distant and regional scale outlooks, where views from flat to very gently inclined areas are screened by trees and windbreaks within or adjoining the site. Whilst the wind turbines would be visible from some distant elevated landscape features, the distance between the wind turbines and elevated receptor locations would tend to render the wind turbines as generally indistinct features which would occupy a relatively small portion of the overall available view.				
Overall Sensitivity Rating	In consideration of the existing landscape characteristics, the landscape within and surrounding the project site is determined to have a moderate sensitivity to the Project. Distinguishable characteristics of the landscape character area may be altered by the proposed project, although the landscape character area may have the capability to absorb some change. The degree to which the landscape character area may accommodate the proposed project would potentially result in the introduction of prominent elements to the landscape character area but may be accommodated to some degree.				

Section 9. Zone of Theoretical Visibility

9.1 Zone of Theoretical Visibility (ZTV)

ZTV diagrams are used to identify theoretical areas of the landscape from which wind turbines, or portions of turbines, may be visible from areas within and surrounding the Project site. They are useful for providing an overview as to the extent to which the Project wind turbines may be visible from surrounding areas.

9.2 ZTV Methodology

The ZTV methodology is a purely geometric assessment where the visibility of the wind turbines is determined from carrying out calculations based on a digital terrain model of the Project site and the surrounding terrain.

Calculations have been made to determine the visibility of the wind turbines from blade tips (essentially a view toward any part of the wind turbine rotor, including views toward the tips).

The ZTV assessment methodology is considered to be very conservative as:

- the screening effects of any structures and vegetation (including extensive areas of trees within surrounding plantations and National Parks) above ground level are not considered in any way. Therefore, the Project may not be visible at many locations indicated on the ZTV diagrams due to the local presence of trees, buildings or other screening materials.
- additionally, the number of turbines visible from any location is also influenced by prevailing weather conditions. Inclement or cloudy weather would tend to mask the visibility of the wind turbines.

Accordingly, while a ZTV diagram is a useful visualisation tool, it is very conservative in nature and the level of visibility as illustrated in the ZTV diagram is unlikely to occur from all view locations within the viewshed.

A diagram illustrating the tip of blade is illustrated in **Figure 15** and the ZTV diagram is shown in **Figure 16**.

The tip of blade ZTV illustrates the extent of similar areas of potential visibility and highlight the extent and influence of landform surrounding the Project site; however, the ZTV do not illustrate the influence and significant degree of screening provided by tree cover within the pine plantations and National Parks beyond the project site. Whilst the pine plantations provide screening from some proximate view locations this LVIA notes that coupe plantation harvesting may remove trees providing screening to some built elements within the Project.

9.3 Visibility

The level of wind turbine visibility of the Project would result from several factors including, but not limited to:

- distance between view location and wind turbine
- directional movement (travelling toward or away from wind turbines)
- relative position and backdrops and
- climatic and atmospheric conditions

9.4 Distance

With an increase in distance the proportion of a person's horizontal and vertical view cone occupied by a visible turbine structure, or group of turbine structures, would decline. **Figure 17** illustrates the effect increasing view distance on the scale and visibility of wind turbines.

As the view distance increases so do the atmospheric effects resulting from dust particles and moisture in the atmosphere, which makes the turbines appear to be grey thus potentially reducing the contrast between the wind turbines and the background against which they are viewed.

Figure 18 has been prepared to illustrate the influence of distance on the perceived height of wind turbines. A single frame photo of the Murra Warra wind turbines, at a 211m tip height, was taken adjacent to the constructed wind farm. The distance between Murra Warra wind turbines and the photo location are noted on the figure and demonstrates the overall reduction in perceived height as view distance increases.

9.5 Movement

The visibility of the wind turbines would vary between the categories of static and dynamic view locations. In the case of static views, the relationship between a wind turbine and the landscape would not tend to vary greatly. The extent of vision may be relatively wide as a person would tend to scan back and forth across the landscape where panoramic views are available.

In contrast, views from a moving vehicle are dynamic as the visual relationship between wind turbines is constantly changing as well as the visual relationship between the wind turbines and the landscape in which they are seen. The extent of vision available from a vehicle can be partially constrained by the vehicle interior at proximate distances.

9.6 Relative position

In situations where the view location is at a lower elevation than the wind turbine structure most of it would be viewed against the sky. The degree of visual contrast between a white coloured turbine and the sky would depend on the presence of background clouds and their colour. Dark grey clouds would contrast more strongly with white turbines than a background of white clouds.

The level of contrast is also influenced by the position of the sun relative to the individual wind turbines and the view location. Where the sun is in front of the viewer, the visible portion of the wind turbine would be seen in shadow. Where the background to the wind turbine is dark toned the visual contrast would be reduced.

Where the sun is located behind the view location then the visible portion of the wind turbine would be in full sun. If the background is also light toned, such as white clouds, then the contrast is less when compared to a dark background.

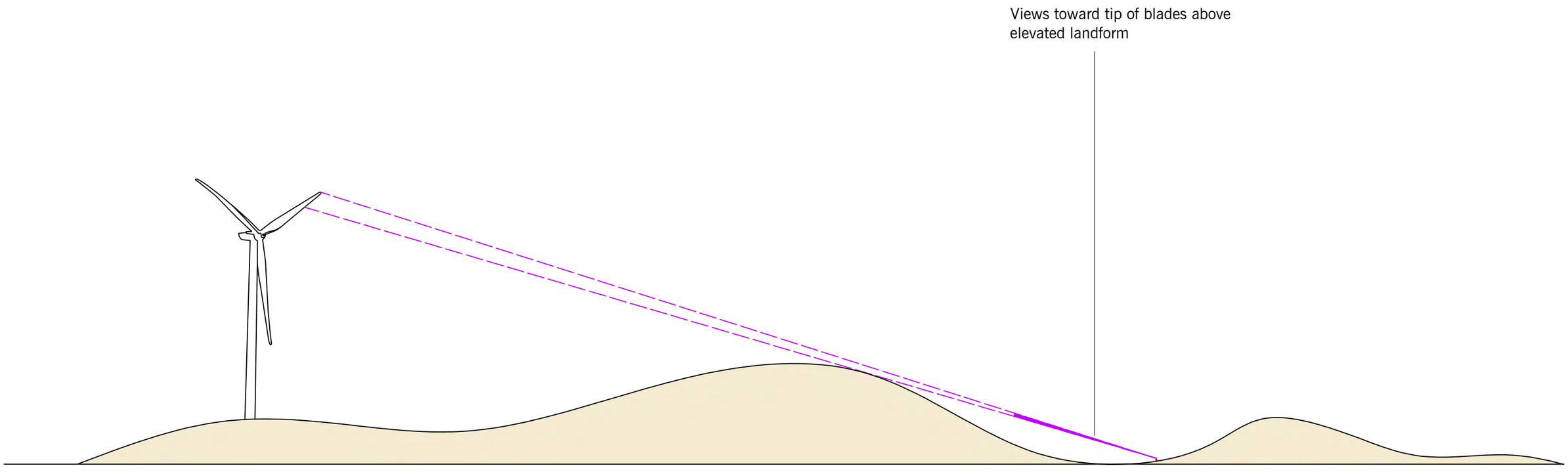
9.7 Climatic and Atmospheric Conditions

Local climatic and atmospheric conditions have the potential to influence the visibility of the Project from surrounding view locations, and more significantly, from middle ground and distant view locations.

Rainfall would tend to reduce the level of visibility toward the Project from several surrounding view locations, with the degree of visibility tending to decrease over distance. Rain periods may also reduce the number of visitors travelling through the areas from which the Project may be visible, and potentially decrease the duration of time spent at a particular public view location with a view toward the Project.

Cloud cover would also tend to reduce the level of visibility of the Project and lessen the degree of contrast between the wind turbine structures and the background against which the wind turbines may be visible.

On clear or partly cloudy days, the position of the sun would also influence the degree of visibility of the Project. The degree of effect would be largely dependent on the relationship between the position and angle of the sun relative to the view location. Late afternoon and early evening views toward the west would result in the wind turbines silhouetted above the horizon line, and with increasing distance would tend to reduce the contrast between the wind turbine structures and the surrounding landform.



'Tip of blade'

View toward 'tip of blade' - where views extend toward any part of the turbine including views toward the tip of blades above elevated landform and ridgelines.

Figure 15
Wind turbine ZTV extent

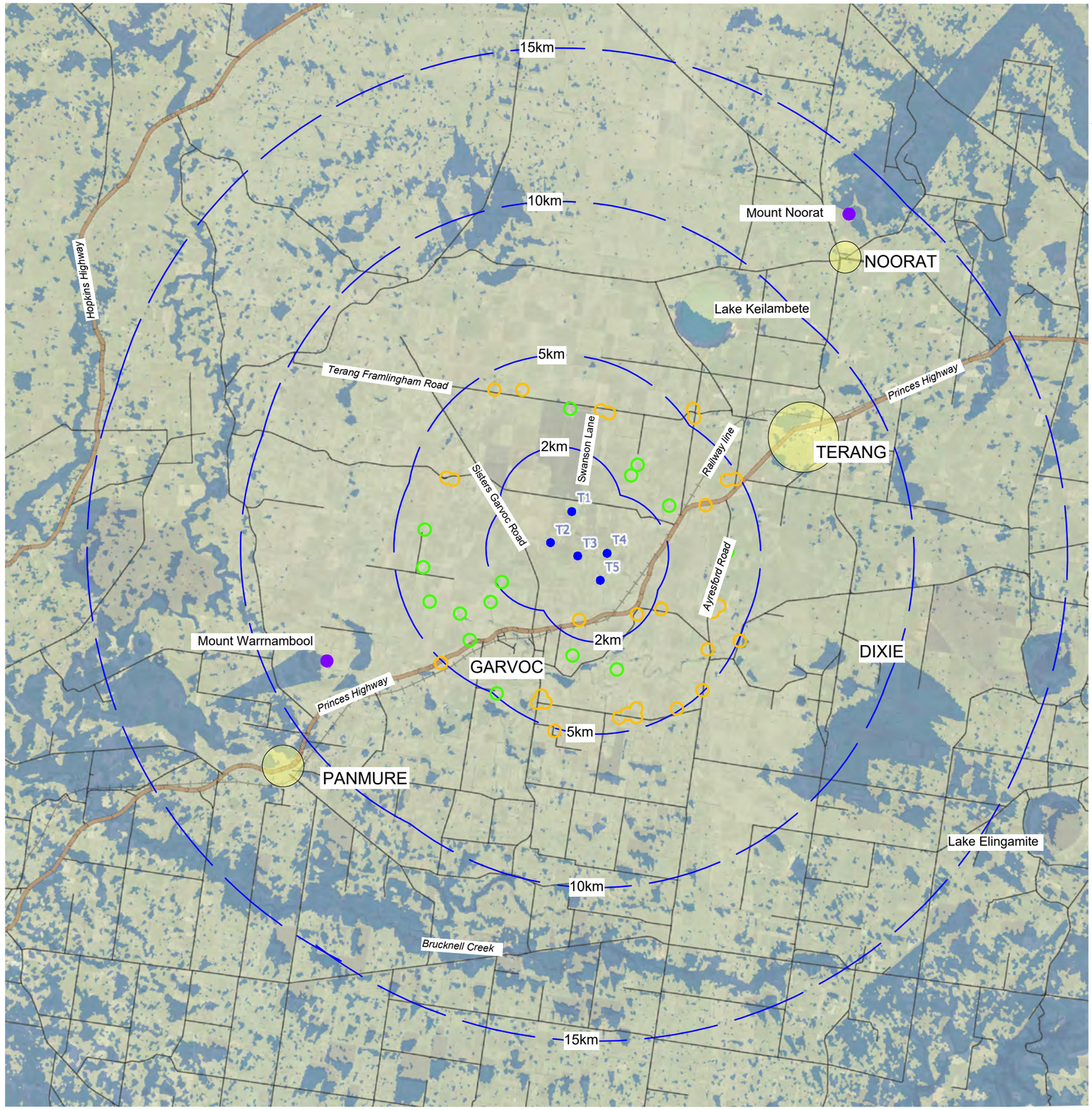


Figure 16
ZTV diagram for tip of blade

GBD
Landscape architecture

Image 1 Modelled wind turbine 240 metre tip height - view distance 2 km

Image 2 Modelled wind turbine 240 metre tip height - view distance 3 km

Image 3 Modelled wind turbine 240 metre tip height- view distance 4 km

Image 4 Modelled wind turbine 240 metre tip height - view distance 5 km

Modelled wind turbine 240 metre tip height
Photographs: Nikon D700, 50mm prime lens - single frame photo

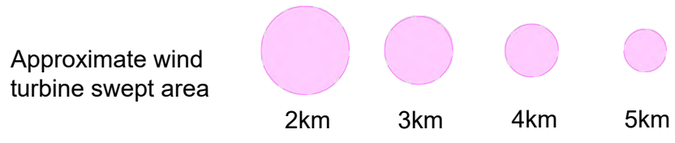
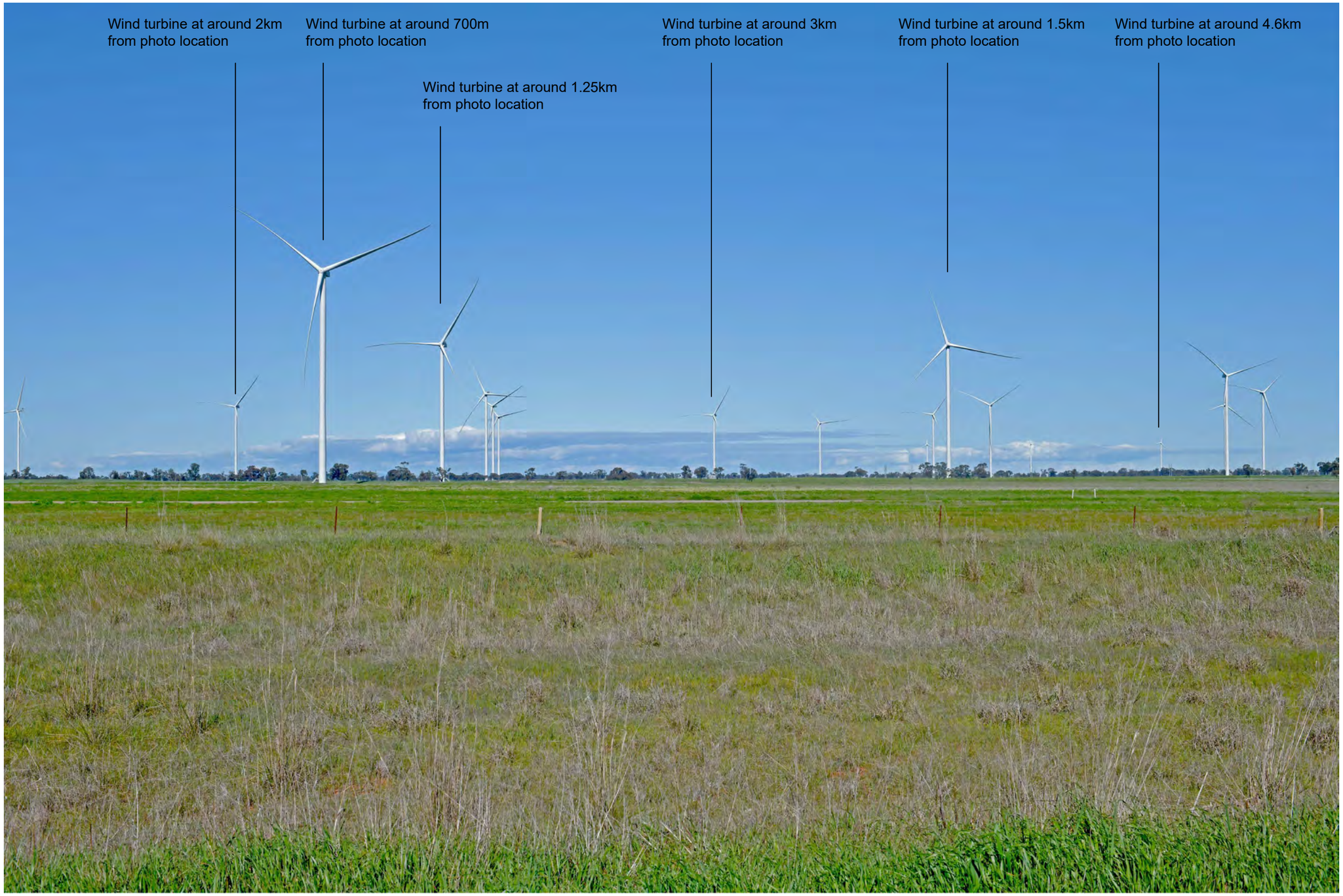


Figure 17
Wind turbine visual magnitude



View south from Barrat Road toward Murra Warra wind turbines

Image source GBD Pty Ltd, August 2022

GDA94, Zone 54, E: 621714 N: 5971935
Camera Nikon D850, 50mm focal length
Date 9 August 2022, Time 12:10pm

Murra Warra wind turbine: rotor diameter 144m, hub height 139m and tip height 211m

Figure 18
Murra Warra Wind Farm, Wimmera Plains Victoria, comparative wind turbine distance and visual magnitude

Section 10. Key views and visual effects

10.1 Introduction

The overall determination of visual effects resulting from the construction and operation of the wind turbines would result primarily from a combination of receptor sensitivity and the magnitude of visual effects.

A determination of visual effects from the combination of receptor sensitivity and the magnitude of visual effect is a well-established methodology and has been applied extensively on wind farm LVIA in Victoria and across Australia. The standard methodology is set out in industry and best practice guidelines including the Guidelines for Landscape and Visual Impact Assessment, Third Edition, Landscape Institute, and Institute of Environmental Management & Assessment, 2013 – Chapter 6 Assessment of visual effects.

10.2 Sensitivity of visual receivers

Judging the sensitivity of visual receivers needs to consider the occupation or activity of people experiencing the view at particular locations and the extent to which their attention or interest is focussed on views toward the wind turbines or electrical infrastructure within and surrounding the Project site.

10.3 Magnitude of visual effects

Judging the magnitude of visual effects has considered the:

Distance and resultant scale of the change in the view with respect to the loss or addition of features in the view

Changes in landscape composition, including the proportion of the view occupied by the Project

Degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line height, colour, and texture

Nature of the view of the proposed development, in terms of the relative amount of time over which it would be experienced and

Whether views from receiver locations would be screened to any degree by existing vegetation or other above ground structures.

View distance and the resultant change in wind turbine scale are illustrated in **Figures 17** and **18.** Wind turbines at around 4km view distance are clearly visible; however, the overall wind turbine scale presents a less dominant visual element within the available field of view. As the overall scale of wind turbine structures dimmish with distance the greater the potential for screening where trees are located between the receiver and the wind turbine. The overall height of planting required to screen wind turbines decreases as it moves nearer to the receiver.

Tables 5 and **6** set out definitions and criteria for sensitivity and magnitude.

The combination of sensitivity and magnitude would provide the rating of visual effect for viewpoints. **Table 17** sets out the relative visual impact grading values which combines issues of sensitivity and magnitude for the project.

Table 5 – Receiver location sensitivity

View Category	Sensitivity
Dwellings	***Highest Sensitivity***
Areas of high scenic value (National Parks or designated landscapes)	~
Public recreational areas/lookouts	~
Rural employment/farming	~
Motorists	~
Business (commercial)	~
Industrial areas	*Lower Sensitivity*

Table 6 – Magnitude assessment criteria

Criteria	Definition
Distance	
Very short	<1.5 km
Short	1.5 km – 3 km
Moderate	3 km – 5 km
Long	5 km+
Duration of effect	
High	> 2 hours
Moderate	30 – 120 minutes
Low	10 – 30 minutes
Very low	< 10 minutes
Degree of screening	
High	Screening effectively blocks views toward wind turbines
Moderate	Screening partially screens views toward wind turbines
Low	Screening filters some views toward wind turbines
Very low	Limited or no screening toward wind turbines

An overall determination of visual effect at each receiver location has also been assessed and determined against the visual impact grading matrix in **Table 7** below. The levels of sensitivity and magnitude of visual effects outlined in **Table 7** are **used as a guide** to determine levels of visual effect and are not absolute.

Whilst a receiver location may have both a high sensitivity and high magnitude, which result in a high visual effect; the visual effect may be offset and mitigated by screening, through tree cover or intervening landform surrounding or beyond the receiver location.

Dwelling locations are illustrated in **Figure 19** and **Figure 20**. Non-dwelling structures, such as agricultural sheds, within 5km of the proposed wind turbines have not been assessed.

Table 7 Visual effect grading matrix

			Scale or magnitude of visual effects			
			High	Moderate	Low	Negligible
			Very short distance view over a long duration of time. A high extent of wind turbine visibility would tend to dominate the available skyline view and significantly disrupt existing views or vistas. Total loss or major change to pre-development view or introduction of elements which are uncharacteristic to the existing landscape features.	Short to medium distance views over a medium duration of time. A moderate extent of wind turbine visibility would have the potential to dominate available views with visibility recessing over increasing distance. Partial alteration to pre-development view or introduction of elements that may be prominent but not uncharacteristic with the existing landscape.	Medium to long distance views over a low to medium duration of time. Wind turbines in views, at long distances or visible for a short duration not expected to be significantly distinct in the existing view. Minor alteration to pre-development view or introduction of elements that may not be uncharacteristic with the existing landscape.	Visible change perceptible at a very long distance, or visible for a very short duration, and/or is expected to be less distinct within the existing view. Very minor loss or alteration to pre-development view or introduction of elements which are not uncharacteristic with the existing landscape features.
Sensitivity of visual receptor		**Indicator**				
	High	People with a proprietary interest and prolonged viewing opportunities such as those in dwellings or visitors to attractive and/or well-used recreational facilities. Views from a regionally important location whose interest is specifically focussed on the landscape e.g., from lookouts or areas within National Parks.	High	High-moderate	Moderate	Negligible
	Moderate	People with an interest in their environment e.g., visitors to environmental areas, bush walkers, and horse riders etc…those travelling with an interest in their surroundings	High-moderate	Moderate	Moderate-low	Negligible
	Low	People with a passing interest in their surroundings e.g., those travelling along local roads between townships, or people whose interest is not specifically focussed on the wider landscape e.g., service providers or commuters.	Moderate	Moderate-low	Low	Negligible
	Negligible	People with no specific interest in their surroundings or those with occasional and transient views travelling at speed along highways or from a place of work where attention may not be focussed on surrounding views.	Negligible	Negligible	Negligible	Negligible

10.4 Views from townships and localities

Townships and localities beyond the Project site include:

- Terang (Rural Living Zone) around 6km northwest of the closest wind turbine location
- Garvoc (Township Zone) around 2.3km southwest of the closest wind turbine location

Whilst wind turbines will be visible over distances to low density populated urban areas (Refer **Figures 23** and **24** Photomontage PM01 Cameron Street, Terang), most views toward wind turbines within the Project site would be partially restricted by development, built structures and tree planting within urban areas. Potential views toward the wind turbines would also tend to be disrupted by discrete areas of vegetation both within and beyond urban and peri-urban areas. It is unlikely that the proposed wind turbines would have a significant visual impact on most people within the Terang and Garvoc townships and other localities surrounding the Project site.

Table 8 Visual effect grading – Terang township (RLZ)

Sensitivity of visual receiver	High
Magnitude of visual effects	Low Moderate
Visual Effect	Moderate

Table 9 Visual effect grading – Garvoc township (TZ)

Sensitivity of visual receiver	High
Magnitude of visual effects	Low Moderate
Visual Effect	Moderate

10.5 Views from the Princes Highway and Terang Warrnambool railway corridor

The Princes Highway extends in an approximate north east to south west alignment between Terang and Garvoc for around 11.5km in length. The highway has a posted speed limit of 100km per hour between the Terang and Garvoc townships and carries a moderate to large volume of traffic each day. The highway extends for around 2km along the eastern extent of the Project site including the connection point from the substation/switchyard to an existing powerline along the western side of the highway. The highway generally follows the railway corridor alignment between Terang and Garvoc and crosses over and above the railway around 2.5km east of Garvoc. Both the highway and railway corridors are partially visually constrained and contained within scattered and more substantive areas of tree planting which flank both sides of the transport corridors. This would tend to limit the visibility of the wind turbines from transport corridors to occasional and filtered views, or to views above tree cover from some locations.

Table 10 Visual effect grading – Princes Highway and Terang Warrnambool railway corridor

Sensitivity of visual receiver	Low
Magnitude of visual effects	Low Moderate
Visual Effect	Low Moderate

10.6 Views from local roads

A small number of local roads surround and extend through the Project site largely servicing dwellings and farms within the rural landscape. The site inspections noted a low number of vehicular movements along the local road network surrounding the Project site. Local roads include the Sisters Garvoc Road, Coyles Lane, Framlingham Terang Road and Swansons Lane.

The wind turbines would only be partially visible from some sections of local roads where views would be influenced by vegetation and tree planting alongside road corridors. The dynamic and constantly changing nature of views from vehicles travelling along local roads would also tend to be transitory in nature and generally short term; however, views from local roads are likely to offer proximate and direct views toward wind turbines. As the sensitivity of people travelling along main roads and local roads tends to be low, in combination with the generally short duration of views, the overall visual impact from roads is likely to be low moderate for proximate views.

Table 11 Visual effect grading – local roads

Sensitivity of visual receiver	Low
Magnitude of visual effects	Moderate
Visual Effect	Low Moderate

10.7 Views from agricultural land

The Project site and wind turbines may be viewed by people engaged in farming activities, where views toward wind turbines occur from surrounding and uninvolved agricultural areas. Ultimately the level of visual effect would depend on the type of activities engaged in as well as the location of the activities together with the degree of screening provided by local vegetation across the surrounding landscape.

Whilst views toward the turbines would occur from a wide area of surrounding rural agricultural land, this LVIA has determined that the sensitivity of visual impacts is less for those employed or carrying out work in rural areas compared to potential views from dwellings.

Table 12 Visual effect grading – agricultural land

Sensitivity of visual receiver	Low
Magnitude of visual effects	Moderate
Visual Effect	Low Moderate

10.8 Views from publicly accessible locations

Publicly accessible locations, other than road corridors, include various public open spaces, recreational areas, reserves or public meeting places. Most public open spaces and recreational areas are those located within surrounding urban localities, where the influence of both distance and existing vegetative cover is likely to screen any potential views toward the Project site.

Table 13 Visual effect grading – publicly accessible locations

Sensitivity of visual receiver	High
Magnitude of visual effects	Low
Visual Effect	Moderate

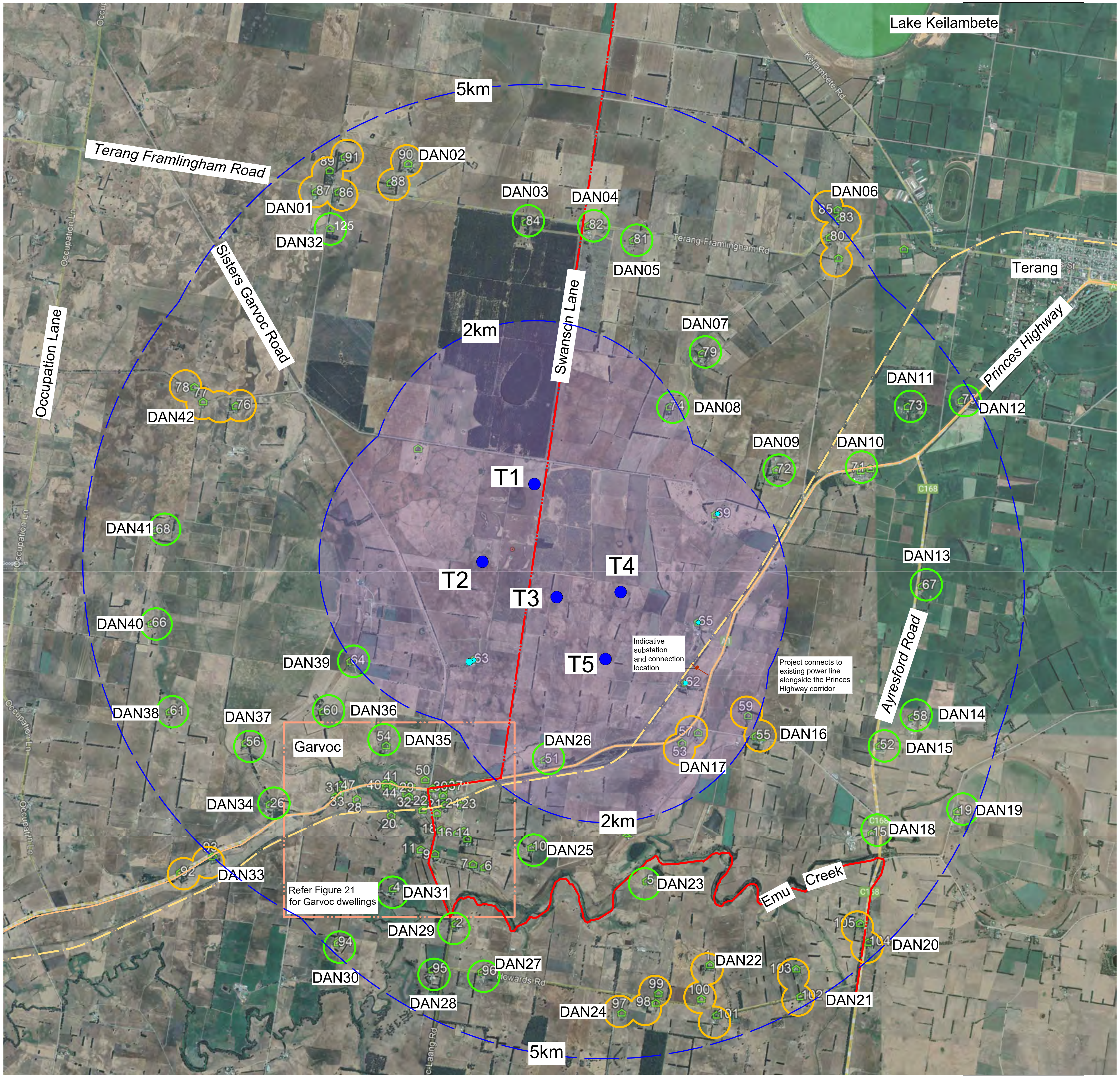
10.9 Views from dwellings within a 2km and 5km viewshed

Existing dwellings are illustrated in **Figures 19** and **20** and include dwellings on properties that are not involved with the proposed project. Uninvolved dwellings within the 2km viewshed have been assessed individually as detailed in Table 14.

Uninvolved dwellings between the 2km and 5km viewsheds have been assessed using dwelling assessment numbers which represent views from either single or multiple dwellings where the dwellings are considered to have similar visual outcomes in relation to distance, field of view and potential for screening. The dwelling assessment numbers (DAN) are illustrated in **Figures 19** and **20** and are detailed in Table 14. Individual dwelling numbers within multiple dwelling assessments are also identified in Table 14.

The site inspection noted that several dwellings within the landscape surrounding the wind turbines are screened by tree and/or windbreak shelter planting. It is possible that not all dwellings would have direct or significant views toward the proposed Swansons Lane wind turbines.

Source: Google Earth Pro 2023


Lake Keilambete
5km
2km
Terang Framlingham Road
Sisters Garvoc Road
Occupation Lane
Swanson Lane
Princes Highway
Ayresford Road
Terang
Garvoc
Emu Creek
T1
T2
T3
T4
T5
DAN01
DAN02
DAN03
DAN04
DAN05
DAN06
DAN07
DAN08
DAN09
DAN10
DAN11
DAN12
DAN13
DAN14
DAN15
DAN16
DAN17
DAN18
DAN19
DAN20
DAN21
DAN22
DAN23
DAN24
DAN25
DAN26
DAN27
DAN28
DAN29
DAN30
DAN31
DAN32
DAN33
DAN34
DAN35
DAN36
DAN37
DAN38
DAN39
DAN40
DAN41
DAN42
Indicative substation and connection location
Project connects to existing power line alongside the Princes Highway corridor
Refer Figure 21 for Garvoc dwellings

Legend

T1 Proposed wind turbine

Distance from wind turbine

2km viewshed

LGA boundary

Indicative substation location

Involved dwelling

Uninvolved dwellings

Single dwelling for assessment purposes

Multiple dwellings for assessment purposes

DAN01 Dwelling Assessment Number (DAN)

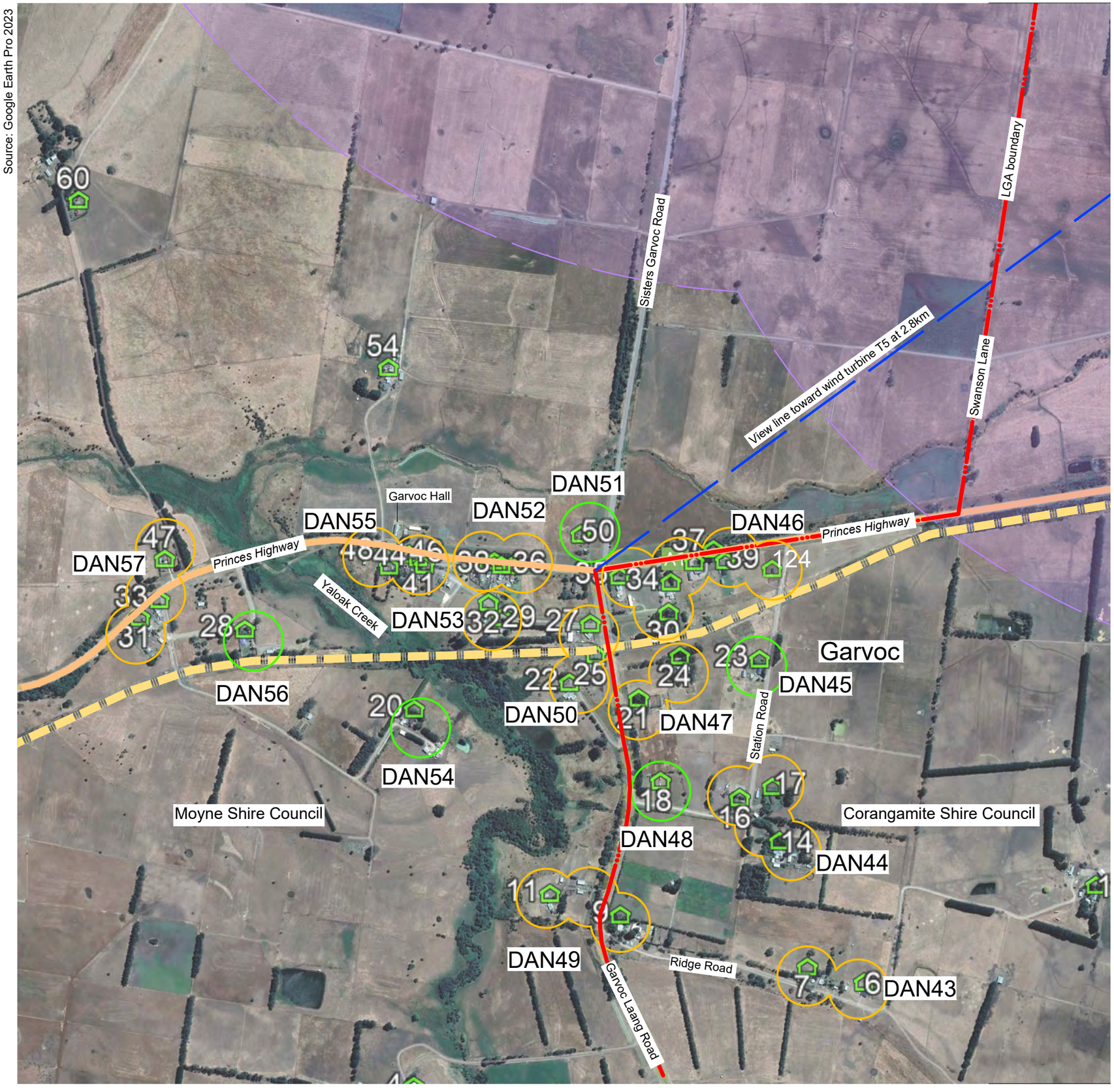
Princes Highway

Warrnambool rail line

0m 1km

Figure 19
Dwelling locations to 5km from wind turbines

Source: Google Earth Pro 2023



Legend

- View line toward closest wind turbine T6
- 2km distance from wind turbine
- 2km viewshed
- LGA boundary
- Non associated dwelling (single dwelling for assessment purposes)
- Non associated dwellings (multiple dwellings for assessment purposes)
- DAN01 Dwelling Assessment Number (DAN)
- Princes Highway
- Warrnambool rail line

0m 200m

Figure 20
Dwelling locations - Garvoc township

GBD
Landscape architecture

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
Dwellings within 2km of a wind turbine							
DAN08 Dwelling 74	**Uninvolved landowner** Sensitivity: High	1.96km Dwelling 74 to wind turbine #1	High	Yes	High	The dwelling is located around 800m north of Coyles Lane. The dwelling is located amongst a cluster of trees. View toward wind turbines will be largely screened from the dwelling, but visible from areas beyond the immediate dwelling curtilage and from sheds to the south of the dwelling	Low
DAN16 Dwellings 55 and 59	**Uninvolved landowner** Sensitivity: High	1.98km Dwelling 59 to wind turbine #5	High	Yes	High	The dwellings are located North and South of the Baxters Road corridor. The dwellings are located beyond tree screen planting which will largely obscure views toward the wind turbines.	Low
DAN17 Dwelling 53 and 57	**Uninvolved landowner** Sensitivity: High	1.5km Dwelling 53 to wind turbine #5	High	Yes	High	The dwellings are located off the Ridge Road corridor to the south of the intersection with Baxters Road and south to south east of the Princes Highway corridor. Both dwellings are situated at around 6m to 7m above the Princes Highway with small to moderate amounts of tree	Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
						cover at the dwelling locations with additional tree planting alongside the highway corridor. Short distance views from the dwellings and surrounding curtilage may extend toward some portions of wind turbine structures; however, some filtering of views would be expected to occur from the dwelling locations.	
DAN26 Dwelling 51	**Uninvolved landowner** Sensitivity: High	1.54km Dwelling 51 to wind turbine #5	High	Yes	High	The dwelling is located off the Princes Highway and to the north of the railway corridor approximately 500m east of Swansons Lane. Tree cover beyond the dwelling would screen or partially filter views toward the nearest wind turbines.	Moderate
DAN39 Dwelling 64	**Uninvolved landowner** Sensitivity: High	2.1km Dwelling 64 to wind turbine #2	High	Yes	High	The dwelling is located around 1.2km south west of the Garvoc Sisters Road and occupies an elevated location above a cultivated maar. View are generally open extending toward and across the Project site.	Moderate High

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
Dwellings between 2km and 5km of a wind turbine							
DAN01 Dwellings 86, 87, 89 and 91	**Uninvolved landowner** Sensitivity: High	4.4km Dwelling 86 to wind turbine #1	High	Yes	High	The dwellings are located to the north and south of the Terang Framlingham Road at the Dairy Lane intersection. Views toward wind turbines would be largely screened and/or filtered by privacy and windbreak planting around the dwellings or by tree cover extending along road corridors beyond the dwellings.	Low
DAN02 Dwellings 88 and 90	**Uninvolved landowner** Sensitivity: High	4.2km Dwelling 88 to wind turbine #1	High	Yes	High	The dwellings are located to the north and south of the Terang Framlingham Road east of the Dairy Lane intersection. Views toward wind turbines would be largely screened and/or filtered by privacy and windbreak planting around the dwellings or by tree cover extending along road corridors beyond the dwellings.	Negligible
DAN03 Dwelling 84	**Uninvolved landowner** Sensitivity: High	3.2km	High	Yes	High	The dwelling is located to the south of the Terang Framlingham Road amongst a plantation. Views toward wind turbines will be	Negligible

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
		Dwelling 84 to wind turbine #1				screened by plantation trees. Non-plantation tree cover surrounding and beyond the dwelling would provide screening and filtering of views should plantation areas be harvested during the Project lifespan.	
DAN04 Dwelling 82	**Uninvolved landowner** Sensitivity: High	3.27km Dwelling 82 to wind turbine #1	High	Yes	High	The dwelling is located to the south of the Terang Framlingham Road adjacent to an existing tree plantation. Both plantation trees and tree cover beyond the dwelling will provide some degree of screening to the nearest wind turbines. Views toward visible wind turbines are likely to extend in excess of 4km.	Low Moderate
DAN05 Dwelling 81	**Uninvolved landowner** Sensitivity: High	3.29km Dwelling 81 to wind turbine #1	High	Yes	High	The dwelling is located to the south of the Terang Framlingham Road and around 750m east of an existing tree plantation. Both plantation trees and tree cover beyond the dwelling will provide some degree of screening to the nearest wind turbines. Views toward visible wind turbines are likely to extend in	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
						excess of 4km with some disruption to views caused by tree planting along field boundaries south of the dwelling.	
DAN06 Dwellings 80, 83 and 85	**Uninvolved landowner** Sensitivity: High	5.11km Dwelling 80 to wind turbine #1	High	Yes	High	The dwellings are located to the north and south of the Terang Framlingham Road corridor around 1.2km west of the Keilambete Road intersection. The dwellings are situated amongst varying degrees of tree cover which will tend to screen and/or filter most views from both dwelling and curtilage toward wind turbines.	Low
DAN07 Dwelling 79	**Uninvolved landowner** Sensitivity: High	2.6km Dwelling 79 to wind turbine #1	High	Yes	High	The dwelling is located at the southern end of Cosgrove Road around 1.5km south of the Terang Framlingham Road. The dwelling is located amongst a small cluster of agricultural sheds and structures and adjoining tree cover. View toward wind turbines may be partially screened from the dwelling, but visible from areas beyond the immediate dwelling curtilage.	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN09 Dwelling 72	**Uninvolved landowner** Sensitivity: High	2.5km Dwelling 72 to wind turbine #4	High	Yes	High	The dwelling is located around 500m north west of the Princes Highway. The dwelling is located amongst a cluster of trees. View toward wind turbines will be largely screened from the dwelling, but visible from areas beyond the dwelling curtilage.	Low
DAN10 Dwelling 71	**Uninvolved landowner** Sensitivity: High	3.5km Dwelling 71 to wind turbine #4	High	Yes	High	The dwelling is located to the south of the Princes Highway corridor adjacent to the Rural Industries Training Centre. Views toward wind turbines from the dwelling are likely to be disrupted by tree cover to the west and south west of the dwelling location.	Low
DAN11 Dwelling 73	**Uninvolved landowner** Sensitivity: High	4.3km Dwelling 73 to wind turbine #4	High	Yes	High	The dwelling is located around 500m north west of the Princes Highway. The dwelling is located amongst a cluster of trees. View toward wind turbines will be largely screened from the dwelling, but visible from areas beyond the dwelling curtilage.	Low

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN12 Dwelling 75	**Uninvolved landowner** Sensitivity: High	4.95km Dwelling 75 to wind turbine #4	High	Yes	High	The dwelling is located off the Princes Highway. Potential views toward wind turbines will be largely screened by tree and shrub planting south west of the dwelling, but partially visible from areas beyond the dwelling curtilage.	Low
DAN13 Dwelling 67	**Uninvolved landowner** Sensitivity: High	3.8km Dwelling 67 to wind turbine #4	High	Yes	High	The dwelling is located off the Ayresford Road corridor around 1.6km south of the Princes Highway. Views toward wind turbine are likely screened by tree planting to the west of the dwelling alongside the road corridor.	Low
DAN14 Dwelling 58	**Uninvolved landowner** Sensitivity: High	4km Dwelling 58 to wind turbine #5	High	Yes	High	The dwelling is located around 400m east of the Ayresford Road corridor amongst several sheds and agricultural structures. Views may extend west toward the wind turbines generally in excess of four kilometres. Some partial screening may be provided by tree cover and windbreak planting extending across agricultural land west of the dwelling.	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN15 Dwelling 52	**Uninvolved landowner** Sensitivity: High	3.7km Dwelling 52 to wind turbine #5	High	Yes	High	The dwelling is located around 70m east of the Ayresford Road corridor with views potentially extending west across cultivated agricultural land with potential partial screening provided by mid distance windbreak planting.	Low Moderate
DAN18 Dwelling 15	**Uninvolved landowner** Sensitivity: High	4km Dwelling 15 to wind turbine #5	High	Yes	High	The dwelling is located around 100m to the west of the Ayresford Road corridor. Tree planting to the north and northwest of the dwelling will largely screen potential views toward the wind turbines.	Low
DAN19 Dwelling 19	**Uninvolved landowner** Sensitivity: High	5km Dwelling 19 to wind turbine #5	High	Yes	High	The dwelling is located adjacent to the Keayang Road and on the western edge of the cultivated Keayang Maar. Existing tree planting to the West of the dwelling will largely screen views toward the wind turbines.	Low
DAN20	**Uninvolved landowner**	4.7km	High	Yes	High	The dwellings are located to the east and west of the Ayresford Road corridor. Trees adjoining and	Low

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
Dwellings 104 and 105	Sensitivity: High	Dwelling 105 to wind turbine #5				beyond the dwelling locations will largely screen views toward the wind turbines.	
DAN21 Dwellings 102 and 103	**Uninvolved landowner** Sensitivity: High	4.76km Dwelling 103 to wind turbine #5	High	Yes	High	The dwellings are located to the north and south of the Howards Road corridor. Views toward the wind turbines will be largely screened by tree planting beyond the dwellings and alongside the Howards Road corridor as well as windbreaks extending across adjoining agricultural land.	Low
DAN22 Dwellings 1, 100 and 101	**Uninvolved landowner** Sensitivity: High	4.1km Dwelling 100 to wind turbine #5	High	Yes	High	The dwellings are located to the north and south of the Howards Road corridor. Views toward the wind turbines will be largely screened by tree planting beyond the dwellings and alongside the Howards Road corridor as well as windbreaks extending across adjoining agricultural land.	Low
DAN23 Dwelling 5	**Uninvolved landowner** Sensitivity: High	2.9km	High	Yes	High	The dwelling is located around 1.4km north of the Howards Road corridor and to the south of the Mount Emu Creek riparian corridor. Views	Negligible

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
		Dwelling 5 to wind turbine #5				toward the wind turbines are likely to be screened by landform rising north toward the Ridge Rd corridor.	
DAN24 Dwellings 97, 98 and 99	**Uninvolved landowner** Sensitivity: High	4.3km Dwelling 99 to wind turbine #5	High	Yes	High	The dwellings are located to the north and south of the Howards Road corridor. Views toward the wind turbines are likely to be screened by tree planting beyond the dwellings as well as trees extending alongside road corridors and field boundaries to the north of the dwelling locations.	Low
DAN25 Dwelling 10	**Uninvolved landowner** Sensitivity: High	2.64km Dwelling 10 to wind turbine #5	High	Yes	High	The dwelling is located at the eastern end of Smiths Road and is generally surrounded by tree planting which will screen views toward the wind turbines. Additional shelter belt planting along field boundaries to the north of the dwelling will also provide some degree of screening toward the Project site.	Low

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN27 Dwelling 96	**Uninvolved landowner** Sensitivity: High	4.33km Dwelling 96 to wind turbine #5	High	Yes	High	The dwelling is located to the south of the Howards Road corridor. Tree screen planting beyond the dwelling and alongside the road corridor will largely screen and/or partially filter views toward the wind turbines and the Project site.	Low
DAN28 Dwelling 95	**Uninvolved landowner** Sensitivity: High	4.5km Dwelling 95 to wind turbine #5	High	Yes	High	The dwelling is located to the west of the Garvoc Laang Road corridor. Tree planting to the north of the dwelling will effectively screen views toward the wind turbines and Project site.	Negligible
DAN29 Dwelling 2	**Uninvolved landowner** Sensitivity: High	3.9km Dwelling 2 to wind turbine #5	High	Yes	High	The dwelling is located to the east of the Garvoc Laang Road corridor and to the south of the Mount Emu Creek riparian corridor. Views extend north from the dwelling across the Mount Emu Creek corridor toward Ridge Road. Views toward the wind turbines and the Project site will be partially screened and filtered by tree planting alongside the Ridge Road corridor as	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
						well as tree planting between Ridge Road and the Princes Highway.	
DAN30 Dwelling 94	**Uninvolved landowner** Sensitivity: High	4.9km Dwelling 94 to wind turbine #5	High	Yes	High	The dwelling is located at the eastern end of Stonehouses Road and is situated on a small rise in the landscape. Main views extend in an east west alignment from the dwelling toward tree planting alongside field boundaries beyond the dwelling. Some filtering of views is likely to partially obscure wind turbines at around 5km from the dwelling.	Low
DAN31 Dwelling 4	**Uninvolved landowner** Sensitivity: High	3.97km Dwelling 4 to wind turbine #5	High	Yes	High	The dwelling is located around 600m to the west of Laang Road and to the west of the Yaloak Creek corridor. Views toward the wind turbines and Project site are likely to be screened by tree cover surrounding the dwelling as well as more distance tree cover alongside the Laang Road between Ridge Road and Pearsons Road.	Low

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN32 Dwelling 125	**Uninvolved landowner** Sensitivity: High	4.1km Dwelling 125 to wind turbine #1	High	Yes	High	The dwelling is located off Dairy Lane around 450m south of the Terang Framlingham Road. Views toward the wind turbines would be partially screened by tree planting south of the dwelling.	Low
DAN33 Dwellings 92 and 93	**Uninvolved landowner** Sensitivity: High	4.87km Dwelling 93 to wind turbine #2	High	Yes	High	The dwellings are located to the south of the Princes Highway corridor. Both dwellings generally screened by tree planting which will largely restrict views toward the wind turbines and Project site.	Low
DAN34 Dwelling 26	**Uninvolved landowner** Sensitivity: High	4.1km Dwelling 26 to wind turbine #2	High	Yes	High	The dwelling is located around 160m northwest of the Princes Highway on Carolls Lane. The dwelling is situated amongst several agricultural buildings and also surrounded by tree cover which will generally restrict views toward the wind turbines and the Project site.	Low
DAN35	**Uninvolved landowner**	2.6km	High	Yes	High	The dwelling is located around 400m to the north of the Princes Highway. The dwelling is	Low

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
Dwelling 54	Sensitivity: High	Dwelling 54 to wind turbine #2				situated next to existing agricultural sheds and structures as well as some scattered tree planting. These will provide some degree of screening toward the wind turbines from the dwelling location. Distant views toward wind turbines from the dwelling curtilage will be partially restricted by tree planting across agricultural land as well as tree planting alongside the Sisters Garvoc Road corridor.	
DAN36 Dwelling 60	**Uninvolved landowner** Sensitivity: High	2.7km Dwelling 60 to wind turbine #2	High	Yes	High	The dwelling is located around 1km north west of the Princes Highway and occupies an elevated location above and south east of a cultivated maar. Views are generally open extending toward and across the Project site.	Moderate High
DAN37 Dwelling 56	**Uninvolved landowner** Sensitivity: High	3.54km Dwelling 56 to wind turbine #2	High	Yes	High	The dwelling is located around 1km north of the Princes Highway and north of the Yaloak Creek corridor. Views toward wind turbines and the Project site will be largely screened by shelter	Negligible

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
						belt planting surrounding and beyond the dwelling location.	
DAN38 Dwelling 61	**Uninvolved landowner** Sensitivity: High	4.16km Dwelling 61 to wind turbine #2	High	Yes	High	The dwelling is located around 2km north of the Princes Highway and at the northern end of Meads Lane. Scattered tree planting beyond the dwelling and around the rising landform along the eastern portion of the cultivated maar will provide some screening toward some portions of the wind turbines and the Project site.	Low
DAN40 Dwelling 66	**Uninvolved landowner** Sensitivity: High	4.2km Dwelling 66 to wind turbine #2	High	Yes	High	The dwelling is located around 2.9km north west of the Princes Highway and accessed from Harneys Road. A gently rising landform along the eastern portion of the cultivated maar will provide some screening toward some portions of the wind turbines and the Project site.	Low
DAN41 Dwelling 68	**Uninvolved landowner** Sensitivity: High	3.96km	High	Yes	High	The dwelling is located around 1.7km east of Occupation Lane on the western edge of the cultivated maar. The dwelling would have partial	Low

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
		Dwelling 68 to wind turbine #2				views extending east toward wind turbines and the Project site. Views would be partially restricted by tree/shelter belt planting beyond the dwelling, as well as more distant tree planting across agricultural land and drainage lines.	
DAN42 Dwellings 76, 77 and 78	**Uninvolved landowner** Sensitivity: High	3.9km Dwelling 76 to wind turbine #1	High	Yes	High	The dwellings are located to the north and south of the Framlingham Garvoc Road corridor. Whilst dwelling 78 has some tree planting to the east and south east of the dwelling, dwellings 76 and 77 have potential for more open and direct views toward the wind turbines and the Project site.	Moderate High
Dwellings within the Garvoc township							
DAN43 Dwellings 6 and 7	**Uninvolved landowner** Sensitivity: High	3.1km Dwelling 6 to wind turbine #5	High	Yes	High	The dwellings are located to the north of Ridge Road with dwelling 7 having some potential screening through existing tree cover. However, both dwellings will have opportunities to view	Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
						wind turbines from either dwelling or curtilage locations.	
DAN44 Dwellings 14, 16 and 17	**Uninvolved landowner** Sensitivity: High	2.9km Dwelling 17 to wind turbine #5	High	Yes	High	The dwellings are in the vicinity of Station Road and east of Laang Road. Dwellings 14 and 16 are likely to be largely screened by existing tree planting within proximity to the dwellings, with some potential views of wind turbines to be gained from dwelling 17 including from the dwelling curtilage.	Low Moderate
DAN45 Dwelling 23	**Uninvolved landowner** Sensitivity: High	2.7km Dwelling 23 to wind turbine #5	High	Yes	High	The dwelling is located to the west side of Station Road around 320m south of the Princes Highway. Existing tree planting beyond the dwelling will provide screening toward some wind turbines within the Project site including the nearest wind turbines. Scattered trees across landscape to the north of the Princes Highway will provide screening to some portions of wind turbines.	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN46 Dwellings 30, 34, 35, 37, 39, 45 and 124	**Uninvolved landowner** Sensitivity: High	2.5km Dwelling 124 to wind turbine #5	High	Yes	High	The dwellings extend alongside and to the south of the Princes Highway and will have views toward wind turbines largely screened by tree planting around dwellings or scattered tree cover along the northern side of the highway corridor.	Low
DAN47 Dwellings 21 and 24	**Uninvolved landowner** Sensitivity: High	2.8km Dwelling 24 to wind turbine #5	High	Yes	High	The dwellings are located to the east and accessed from Laang Road and are situated to the south of the rail. Both dwellings have tree planting surrounding and beyond the dwelling that will effectively screen views toward the wind turbines and Project site.	Negligible
DAN48 Dwelling 18	**Uninvolved landowner** Sensitivity: High	3.1km Dwelling 18 to wind turbine #5	High	Yes	High	The dwelling is located off Pearsons Road with views extending north to north east with views extending toward wind turbines within the Project site amongst scattered tree planting and shelter belts within the Project site.	Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN49 Dwellings 9 and 11	**Uninvolved landowner** Sensitivity: High	3.5km Dwelling 11 to wind turbine #5	High	Yes	High	The dwellings are located to the east and west of Laang Road at the intersection with Ridge Road. Both dwellings have tree planting proximate to the dwelling locations which will largely screen views toward wind turbines and the Project site.	Negligible
DAN50 Dwellings 22, 25 and 27	**Uninvolved landowner** Sensitivity: High	2.9km Dwelling 27 to wind turbine #5	High	Yes	High	The dwellings are located to the west of Laang Road and to the north and south of the railway line. Views toward the wind turbines and the Project site will be largely filtered or screened by scattered tree planting within the Garvoc township as well as tree planting/shelter belts extending across the Project site.	Low
DAN51 Dwelling 50	**Uninvolved landowner** Sensitivity: High	2.8km Dwelling 50 to wind turbine #5	High	Yes	High	The dwelling is located to the north of the Princes Highway and accessed from the Sisters Garvoc Road. There is some tree planting to the east of the dwelling that will provide some filtering of views toward the wind turbines.	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN52 Dwellings 36, 38, 42, 43, and 112	**Uninvolved landowner** Sensitivity: High	3km Dwelling 36 to wind turbine #5	High	Yes	High	The dwellings are located to the south of the Princes Highway with a frontage to Farrell Street which runs parallel to the highway. Views toward wind turbines and the Project site will be largely screened by tree planting along the northern edge of the highway corridor.	Low
DAN53 Dwellings 29 and 32	**Uninvolved landowner** Sensitivity: High	3.1km Dwelling 29 to wind turbine #5	High	Yes	High	The dwellings are located to the south and south west of Farrell Street with views toward wind turbines and the Project site largely obscured by buildings and structures to the north and north east of the dwellings and/or tree planting between the dwellings and Farrell Street.	Negligible
DAN54 Dwelling 20	**Uninvolved landowner** Sensitivity: High	3.4km Dwelling 20 to wind turbine #5	High	Yes	High	The dwelling is located at the eastern end of Rec Reserve Road with tree planting around and adjacent to the dwelling screening views toward the wind turbines and Project site.	Negligible

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
DAN55 Dwellings 40, 41, 44, 46 and 48	**Uninvolved landowner** Sensitivity: High	3,18km Dwelling 41 to wind turbine #5	High	Yes	High	The dwelling assessment for 48 and 41 have also incorporated the pub building (46) and the general store building (44) and shed structure (40). At the time of assessment both the pub and general store were noted as vacant during the site inspection works. Views toward wind turbines within the Project site would extend from dwelling location 48 where views are not obscured by trees or structures. Views from dwelling 41 would be largely screened by tree planting surrounding the dwelling. Views from both the pub and general store would extend toward wind turbines within the Project site from vantage points within or surrounding the buildings with a northerly aspect.	Low Moderate
DAN56 Dwelling 28	**Uninvolved landowner** Sensitivity: High	3.7km Dwelling 28 to wind turbine	High	Yes	High	The dwelling is located around 120m south of the Princes Highway and accessed from the Garvoc School Road. Views toward the wind turbines and Project site will be partially	Low Moderate

Table 14 – Dwelling visual effect matrix (Refer Figures 19 and 20 for dwelling locations)

	SENSITIVITY	**MAGNITUDE**					
Receiver location	Category of receiver location and sensitivity grading	Approximate distance to closest turbine	Potential duration of effect	Theoretical visibility (ZTV tip height)	Overall magnitude grading	Degree of visibility and screening	Potential visual effect
		#5				screened by tree planting within the dwelling curtilage and planting beyond the dwelling property. Views toward wind turbines will occur from areas to the north of the dwelling including the Garvoc School Road.	
DAN57 Dwellings 31, 33 and 47	**Uninvolved landowner** Sensitivity: High	3.7km Dwelling 47 to wind turbine #5	High	Yes	High	The dwellings are located to the north and south of the Princes Highway. Dwellings 31 and 47 are both partially screened by adjoining structures and/or tree planting which is likely to obscure of partially filter views toward the wind turbines and Project site. Partial views are likely to extend toward wind turbines from dwelling 33; however, existing tree cover beyond the dwelling location will obscure some wind turbines whilst others will be visible with some screening to lower sections of the wind turbine towers.	Low Moderate

10.10 Summary of dwelling visual effect within 2km viewshed

This LVIA identified a combined total of 5 uninvolved dwellings within the Project 2km viewshed.

An assessment of dwellings within the 2km viewshed determined:

- 1 dwelling would have a Moderate High visual effect
- 2 dwellings would have a Moderate visual effect
- 2 dwellings would have a Low visual effect

The field assessment for most dwelling locations was undertaken from the closest publicly accessible location, with a conservative approach adopted where there was no opportunity to confirm the actual extent of available view from areas within or immediately surrounding the dwelling. It is anticipated that some visibility ratings would be less than those determined subject to a process of verification of existing screening from private property.

10.11 Summary of dwelling visual effect between 2km and 5km of wind turbines

The LVIA identified 98 dwellings between the 2km and 5km viewsheds. An assessment of dwellings between the 2km and 5km viewshed determined:

- 5 dwellings would have a Moderate High visual effect
- 6 dwellings would have a Moderate visual effect
- 20 dwellings would have a Low Moderate visual effect
- 53 dwellings would have a Low visual effect and
- 14 dwellings would have a Negligible visual effect.

Most dwellings located beyond the 2km wind turbine viewshed are unlikely to be significantly impacted by the wind turbines. This is largely due to the relatively small number of wind turbines in the Project, the spatial arrangement of the wind turbines and the varying extents of tree planting (scattered and shelter belt) within proximity to dwellings which may offer greater degrees of screening as distance to the wind turbines increases.

10.12 Switchyard / Substation

The project would incorporate a switchyard connected by a single circuit 66kV powerline extending for 850m above ground south east from the switchyard to an existing powerline easement extending alongside the Princes Highway corridor. The overhead section of powerline would not result in a significant visual effect and would be viewed as a contiguous visual element with existing powerline structures once connected.

The switchyard footprint would be approximately 40m x 30m and would contain a typical arrangement of electrical infrastructure components including overhead gantry and busbars. The switchyard would also include a switchyard control room. This would be generally single storey small-scale building within the switchyard footprint surrounded within a gated chainmesh security fence.

The switchyard, associated buildings and electrical infrastructure would not be out of character with other moderate to large scale agricultural and existing electrical infrastructure located within the landscape surrounding the project site.

10.13 Visual Absorption Capability

Visual Absorption Capability (VAC) is a classification system used to describe the relative ability of the landscape to accept modifications and alterations without the loss of landscape character or deterioration of visual amenity. VAC relates to physical characteristics of the landscape that are often inherent and often quite static in the long term. The visual expanse of the agricultural landscape occasionally interrupted by scattered and groups of trees will have a moderate to high capability to visually absorb the switchyard without significantly altering the character of the landscape.

A moderate to high VAC would tend to mitigate views toward the switchyard where the proposed structures would be viewed against an expansive agricultural landscape.

10.14 Substation/Switchyard visual effect

This LVIA has considered and assessed potential view locations within the vicinity of the proposed substation/switchyard.

There would be no direct views from surrounding uninvolved dwellings toward the proposed substation/switchyard site. The closest uninvolved dwelling (57) would be located around 815m to the south of the substation/switchyard site with views screened by wind break planting. Other uninvolved dwellings, generally located beyond 1km from the substation/switchyard site, would have direct views screened by tree cover at, or beyond, the dwelling location.

The substation/switchyard would be viewed in the context of transitory and very short-term views from vehicles travelling along the Princes Highway. The visual magnitude of the substation/switchyard structures would not result in significant visual effects as viewed by passing motorists. The substation/switchyard would not be significantly visible from the railway corridor due to tree cover alongside the railway corridor, or to an extent that might result in significant visual effects.

Section 11. Cumulative impact assessment

11.1 What is Cumulative Impact Assessment?

A cumulative landscape and visual impact may result from a wind farm being constructed in conjunction with other existing or proposed wind farms or other large-scale infrastructure projects which may be either associated or separate to it.

Separate wind farm or other developments may occur within the established viewshed of the proposed wind farm or may be located within a regional context where visibility is dependent on a journey between each site or project viewshed.

This LVIA is not aware of any separate wind farm developments within approximately 15km of the Project site. The Timboon Wind Farm is the nearest operational wind farm at around 15km south of the project site.

11.2 Other wind farm developments

There are around 7 wind energy developments that are currently operational, approved or proposed within the same regional context (to around 50km) as the Project. These wind farms are illustrated in **Figure 21** and identified in Table 16.

Table 15 Other wind farm developments

Other Wind Farms	Status	Number of turbines or expected generation capacity	Approximate distance between project sites
Darlington	Pre planning	61	26km
Hexham	Pre planning	108	33km
Salt Creek	Operating	15	45km
Mt Fyans	Planning	85	30km
Mortlake South	Construction	35	17km
Timboon West	Operating	2	15km
Ferguson	Operating	3	29km

'Direct' cumulative visual impacts may occur where two or more winds farms or other infrastructure projects have been constructed within the same locality and may be viewed from the same view location simultaneously.

The Swansons Lane wind turbines are unlikely to be directly visible in addition to other wind farm wind turbines from the majority of the viewshed where gently undulating rises and tree cover combine to restrict distant views beyond the wind farm site. Regional views from elevated landforms such as Mount Noorat would take in views to multiple wind farms (approved and operational); however, there would be no distinct overlap between the Project turbines and other wind farm developments. The small number of wind turbines included in the Project would reduce the potential for extending an excessive horizontal field of view toward wind turbines.

'Indirect' cumulative visual impacts may occur where two or more wind farms or other infrastructure projects have been constructed within the same locality and may be viewed from the same view location but not within the same field of view (i.e., the viewer turns their head to view both wind farms).

'Sequential' cumulative visual impacts may arise because of multiple wind farms or other infrastructure projects being observed at different locations during a journey (e.g., from a vehicle travelling along a highway or from a network of local roads), which may form an impression of greater magnitude within the construct of short-term memory.

The Project wind turbines are unlikely be visible from vehicles travelling northeast or southwest along sections of the Princes Highway (around 30km from the site), with views from local roads offering a combination of partially screened views with more direct, but intermittent views, where roadside screening is present. Views from vehicles within the viewshed would be transitory and generally short term.

Overall, all cumulative visual impacts would be mitigated by the very small number of wind turbines within the project site reducing the extent of visual influence and potential for cumulative visual impacts to occur.

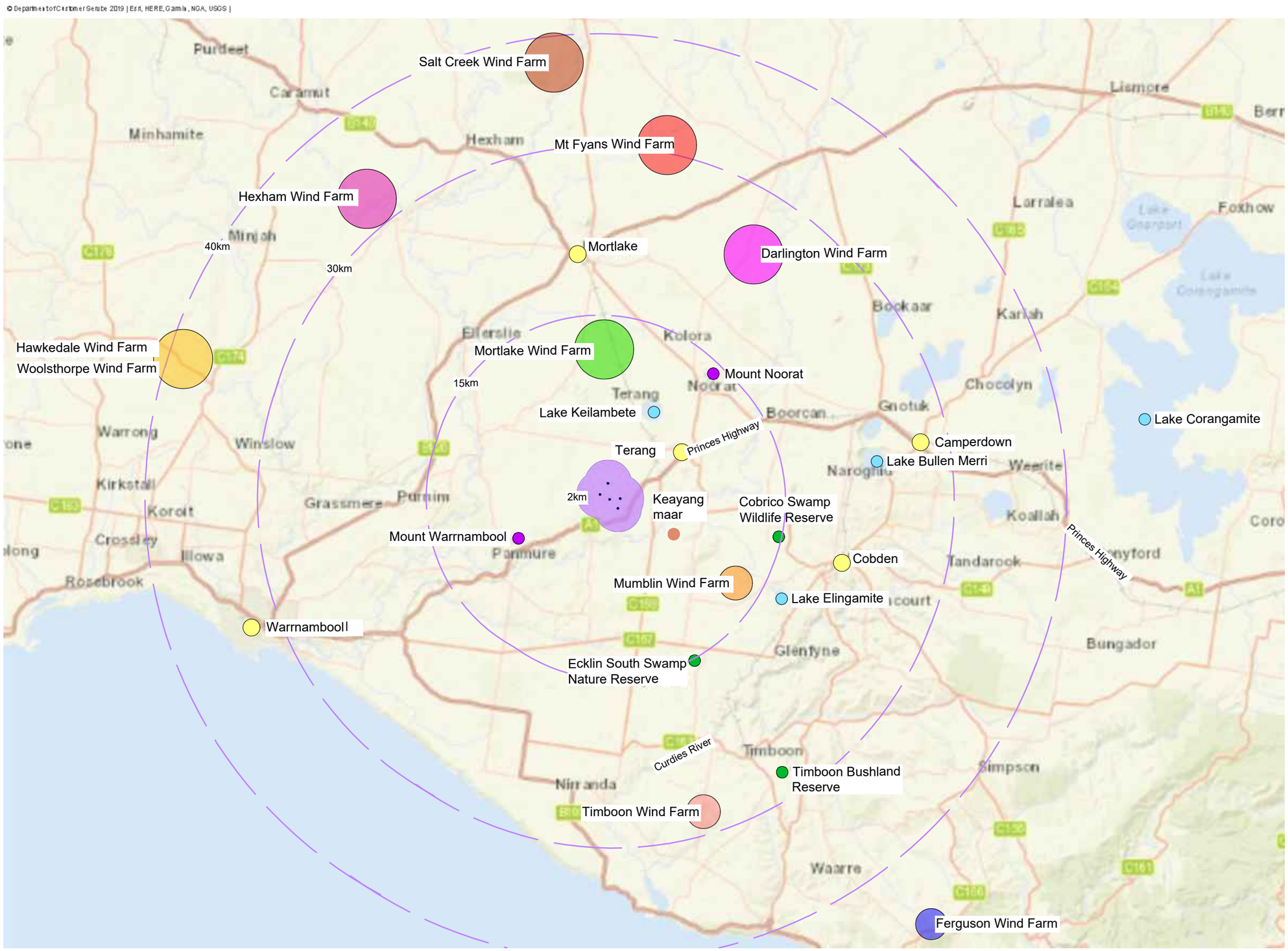


Figure 21
Cumulative impacts

GBD
Landscape architecture

Section 12. Pre-construction and construction

12.1 Potential visual impacts

There are potential visual impacts that could occur during both pre-construction and construction phases of the project. The Project construction phase is likely to occur over a period of around 12 months, although the extent and nature of pre-construction and construction activities would vary at different locations within the Project area.

The key pre-construction and construction activities that would be visible from areas surrounding the proposed wind farm include:

- ongoing detailed site assessment including sub surface geotechnical investigations
- various civil works to upgrade local roads and access point
- temporary construction compound buildings and facilities
- temporary construction facilities, including portable structures and laydown areas
- various temporary construction and directional signage
- mobilisation of rock crushing equipment and concrete batching plant (if required)
- excavation and earthworks and
- various construction activities including erection of wind turbines, monitoring mast and electrical infrastructure works.

The majority of pre-construction and construction activities, some of which would result in physical changes to the landscape (which have been assessed in this LVIA report), are generally temporary in nature and for the most part restricted to various discrete areas within or beyond the immediate wind farm site. Most pre-construction and construction activities would be unlikely to result in an unacceptable level of visual impact for their duration and temporary nature. The following images illustrate typical construction activities during preparation and installation of wind turbines:

Plate 1 Cable laying equipment

Plate 2 Typical crane plant utilised in wind turbine construction

Plate 3 Typical storage and laydown area

Plate 4 Typical contractors site office and amenities compound

Plate 5 Typical view toward wind turbines under construction

Section 13. Mitigation measures

13.1 Mitigation measures

The British Landscape Institute states 'the purpose of mitigation is to avoid, reduce, or where possible remedy or offset any significant negative (adverse) effects on the environment arising from the proposed development' (2012). In general mitigation measures would reduce the potential visual impact of the project in one of two ways:

- firstly, by reducing the visual prominence of the wind turbines and associated structures by minimising the visual contrast between the wind turbines and the landscape in which they are viewed; and
- secondly, by screening views toward the wind turbines from specific receptor locations.

The mitigation measures generally involve reducing the extent of visual contrast between the visible portions of the proposed structures and the surrounding landscape, and/or screening direct views toward the proposed wind turbines where possible.

13.2 Detail design

Mitigation measures during the detail design process should consider:

- further refinement in the design and layout if necessary to assist in the mitigation of bulk and height of proposed structures
- consideration in selection and location for tree planting which may provide partial screening or backdrop setting for constructed elements (excluding wind turbine structures) and
- a review of materials and colour finishes for selected components including the use of non-reflective finishes to structures where possible.

13.3 Construction

Mitigation measures during the construction period should consider actions to:

- avoidance of temporary light spill beyond the construction site where temporary lighting is required and
- progressively rehabilitate disturbed areas.

13.4 Operation

Mitigation measures during the operational period should consider:

- ongoing maintenance and repair of constructed elements
- replacement of damaged or missing constructed elements.

13.5 On-site and off-site landscape works

Both on-site and offsite landscape works would be actively considered to reduce the visual impact of the wind turbines and associated ancillary infrastructure where determined to result in a Moderate High or High visual effect on uninvolved view locations. A programme of landscape works would be documented in accordance with any relevant permit conditions.

Section 14. Conclusion

The key findings of the Swansons Lane Wind Farm LVIA are summarised below:

14.1 Landscape effects

The Project landscape character type identified and described in this LVIA, is generally well represented throughout the Moyne Shire and Corangamite Shire Council LGA's as well as broader surrounding Council areas and generally within southwestern Victoria.

This LVIA determined the overall landscape character sensitivity to be moderate. Distinguishable characteristics of the landscape character area may be altered by the proposed project, although the landscape character area may have the capability to absorb some change. The degree to which the landscape character area may accommodate the proposed project would potentially result in the introduction of prominent elements to the landscape character area but may be accommodated to some degree.

The proposed wind turbines would be located between 7km and 13km from prominent landscape features including Mount Noorat, Mount Warrnambool, and Lake Keilambete. Given that distance is one key determinant for establishing degrees of visual impact, the proposed wind turbines are unlikely to dominate or significantly detract from the existing view from significant landscape features.

14.2 Visual effects

The proposed 5 wind turbines are unlikely to have a significant visual impact on the character of the surrounding townships and localities, where views toward the wind turbines from most dwelling view locations would be screened by adjoining residences, and a combination of tree cover and low undulations in local landforms.

Views from most dwellings located within 5km of a wind turbine would not result in significant levels of visual effect with most dwellings determined to have a Negligible, Low, Low Moderate and Moderate level of visual effect.

A small number of uninvolved dwellings were determined to have Moderate High visual effects; however, no uninvolved dwellings (or public view locations) were determined to have a High visual effect.

Views toward the proposed 5 wind turbines from the Princes Highway, railway line and local roads would offer a range of transitory views which would be subject to direction of travel and potential screening influence of vegetation alongside road corridors. Views from transport corridors would not result in significant visual effects.

14.3 Cumulative effects

There is limited potential for cumulative effects to occur where direct views to other wind farms are largely screened, or where wind turbines within other projects are located at distance to the Projects wind turbines. Views extend toward wind turbines within the Mortlake South Wind Farm site from some elevated locations south of the Princes Highway (Howards Road) and from Terang; however, they do not form prominent elements within the Project viewshed. The small number of proposed wind turbines will not increase the overall ability to extend contiguous views toward wind turbines between wind farm projects.

14.4 Construction effects

Both pre-construction and construction activities are unlikely to result in an unacceptable level of visual impact due to the temporary nature of these activities, together with proposed restoration and rehabilitation strategies. The preferred location for some of the construction activities would be located away from publicly accessible areas, with the closest dwelling locations generally comprising involved landowners.

14.5 Mitigation

Although some mitigation measures (including soft landscape works) may be considered appropriate to minimise the visual impact for elements associated with the wind farm (including wind turbines), it is acknowledged that the degree to which the wind turbines may be visually mitigated is potentially limited by their scale and position within the landscape relative to surrounding view locations.

It is recommended that offsite landscape mitigation be offered to uninvolved dwellings within 5km of a wind turbine where a potential Moderate High level of visual effect has been determined to occur. In our opinion, the influence of distance on wind turbine visibility and the potential for wind turbines to become a dominant visual element beyond a 5km view distance, obviates the need for direct screening mitigation measures to be implemented.

Appendix A Photomontage methodology

A.1 Photomontage methodology

A total of ten photomontages have been prepared to illustrate the general appearance of the proposed Project turbines following construction. The photomontage panorama images have been prepared by GBD and the photomontages have been prepared by RE Future.

The photomontage locations were selected following a review of ZVI maps, together with a site inspection to identify potential representative viewpoints. The photomontage locations were selected from surrounding road corridors and at a range of distances between the viewpoint and wind turbine to illustrate the potential influence of distance on visibility. The photomontages are presented at around 90 degrees with an additional detailed field of view at around 40 degrees. The photomontage includes an extended panorama view to provide context within the photomontage. The detailed view illustrates a view within the human central cone of binocular vision and provides a greater level of detail.

The photomontage locations are illustrated in **Figure 22** and photomontages presented in the following figures:

Figures 23 and 24 Photomontage PM01 Cameron Road, Terang

Figures 25 and 26 Photomontage PM02 Ayresford Road at Princes Highway

Figures 27 and 28 Photomontage PM03 Terang Framlingham Road

Figures 29 and 30 Photomontage PM04 Sisters Garvoc Road

Figures 31 and 32 Photomontage PM05 Edwards Lane

Figures 33 and 34 Photomontage PM06 Farrell Street, Garvoc

Figures 35 and 36 Photomontage PM07 Howards Road (west)

Figures 37 and 38 Photomontage PM08 Howards Road (east)

Figures 39, 40 and 41 Photomontage PM09 Coyles Road

Figures 42 and 43 Photomontage PM10 Keayang Road

Each photomontage was generated through the following steps:

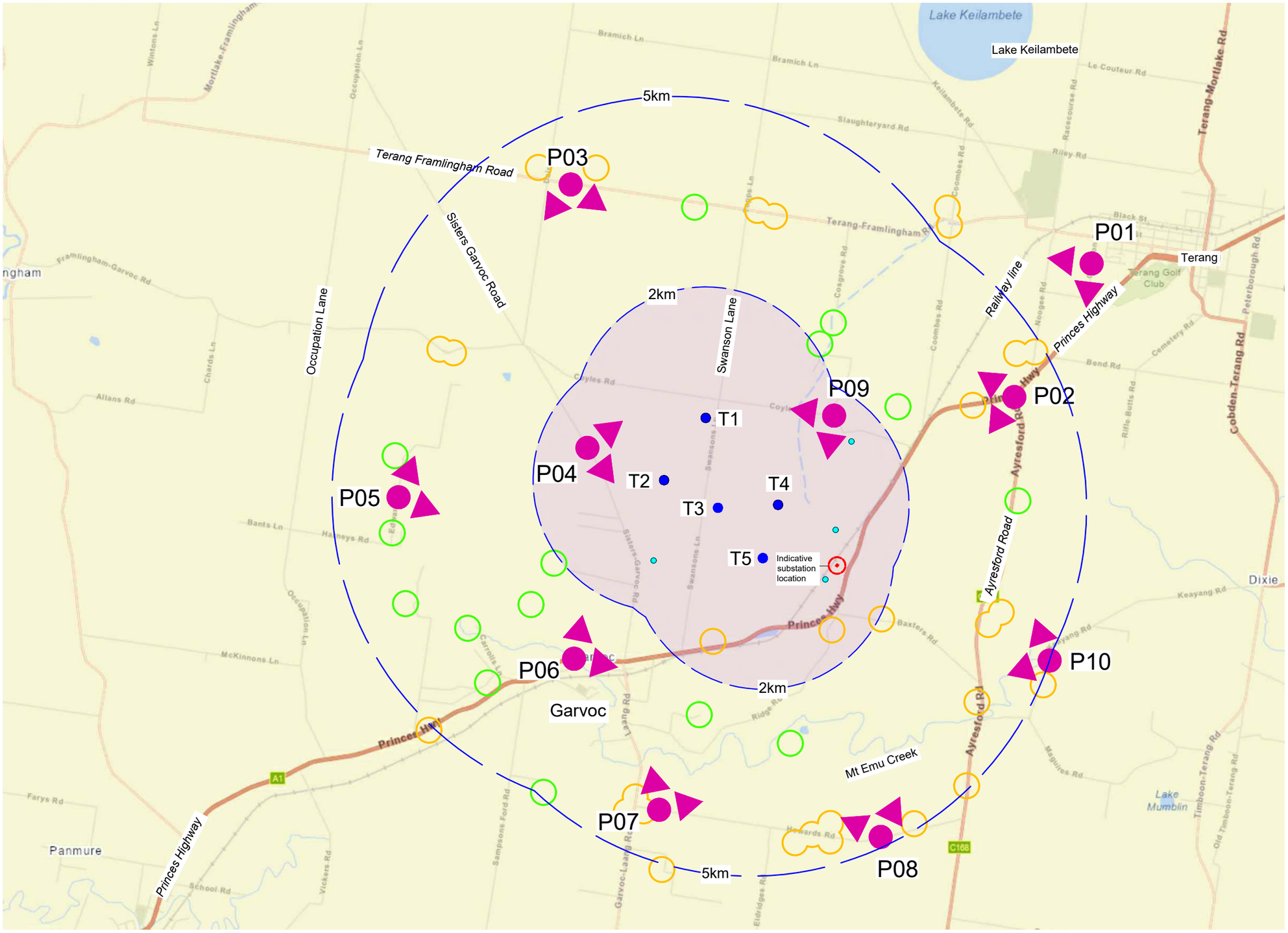
1. A digital terrain model (DTM) of the proposed Project site was created from a terrain model of the surrounding area using digital contours
2. The site DTM was loaded into the Wind Pro software package
3. The layout of the wind farm and 3-dimensional representation of the wind turbine was configured
4. The location of each viewpoint (photo location) was configured in Wind Pro – the sun position for each viewpoint was configured by using the time and date of the photographs from that viewpoint
5. The view from each photomontage location was then assessed in Wind Pro. This process requires accurate mapping of the terrain as modelled, with that as seen in the photographs. The photographs, taken from each photomontage location were loaded into Wind Farmer and the visible turbines superimposed on the photographs.

6. The photomontages were adjusted using Photoshop CS3 to compensate for fogging due to haze or distance, as well as screening by vegetation or obstacles and
7. The final image was converted to JPG format and imported and annotated as the final figure.

The horizontal and vertical field of view within most of the photomontages exceeds the parameters of normal human vision. However, the eyes, head and body can all move and under normal conditions a person would sample a broad area of landscape within a panorama view. Rather than restricting the extent of each photomontage to a single photographic image, a broader field of view is presented to illustrate the extent of the wind turbines more fully.

Whilst a photomontage can provide an image that illustrates an accurate representation of a wind turbine in relation to its proposed location and scale relative to the surrounding landscape, this LVIA acknowledges that large scale objects in the landscape can appear smaller in photomontage than in real life and is partly because a flat image does not allow the viewer to perceive any information relating to depth or distance.

Vicmap, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS



Legend

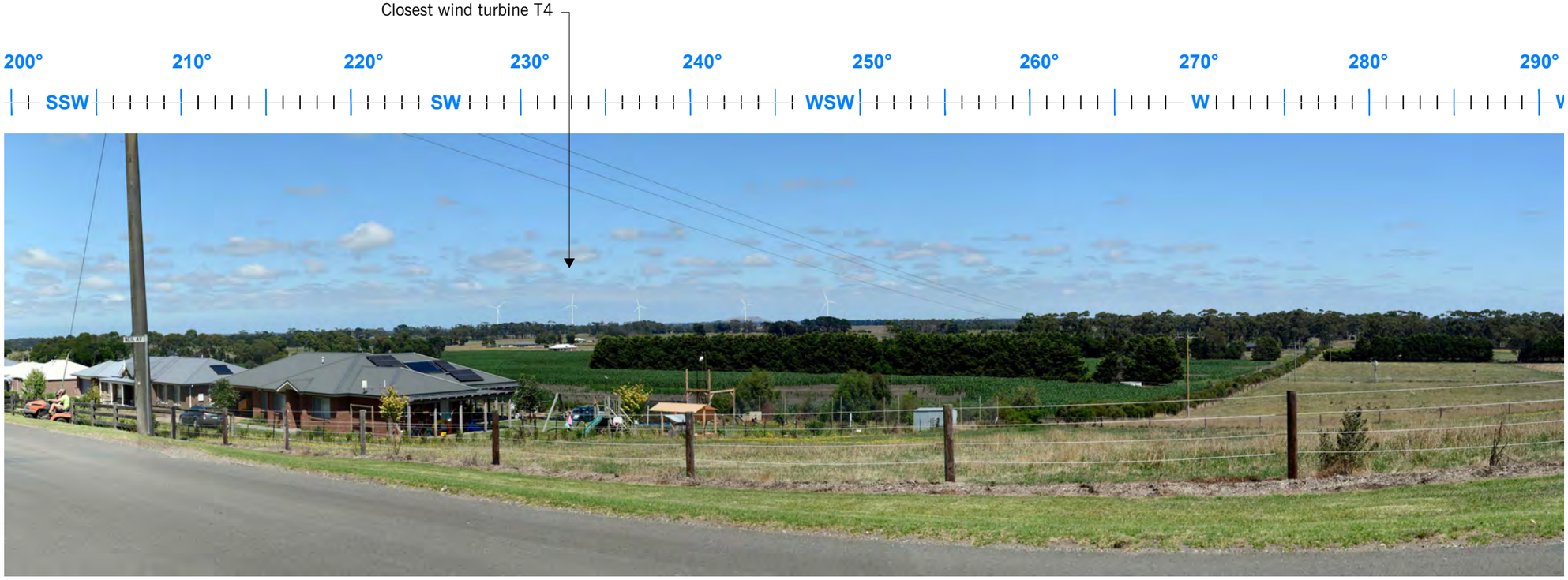
- T1 — Proposed wind turbine
- Distance from wind turbine
- 2km viewshed
- P6 — Photomontage location
- Proposed substation location
- Involved dwelling
- Uninvolved single dwelling
- Uninvolved grouped dwellings
- Princes Highway

0m — 2km

Figure 22
Photomontage locations

GBD
Landscape architecture

Photo location PM01 - Existing view south south west to west north west from Cameron Street, Terang.



Photomontage PM01 - Approximate 90° field of view south south west to west north west from Cameron Street, Terang. Approximate distance to closest visible wind turbine (T4) 6.4km

General Notes:

Panorama photo coordinates:
UTM Easting 666297, Northing 5765758

Photo date: 19th February 2023, 10.59am

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM01 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 23
Photomontage PM01 Cameron Road, Terang - 90 degree field of view

GBD
Landscape architecture

Photomontage PM01 - Approximate 40° field of view south west to west from Cameron Street, Terang. Approximate distance to closest visible wind turbine (T4) 6.4km

Figure 24
Photomontage PM01 Cameron Street, Terang - 40 degree field of view

Photo location PM02 - Existing view south west to north west from the Princes Highway and Ayresford Road intersection.

Photomontage PM02 - Approximate 90° field of view south west to north west from Princes Highway and Ayresford Road intersection. Approximate distance to closest visible wind turbine (T4) 4.18km

General Notes:

Panorama photo coordinates:
UTM Easting 664999, Northing 5763614

Photo date: 19th February 2023, 11.06am

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM02 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 25
Photomontage PM02 Princes Highway and Ayresford Road intersection - 90 degree field of view

GBD
Landscape architecture

Photomontage PM02 - Approximate 40° field of view south west to west from Princes Highway and Ayresford Road intersection. Approximate distance to closest visible wind turbine (T5) 4.18km

Figure 26
Photomontage PM02 Princes Highway and Ayresford Road intersection - 40 degree field of view

GBD
Landscape architecture

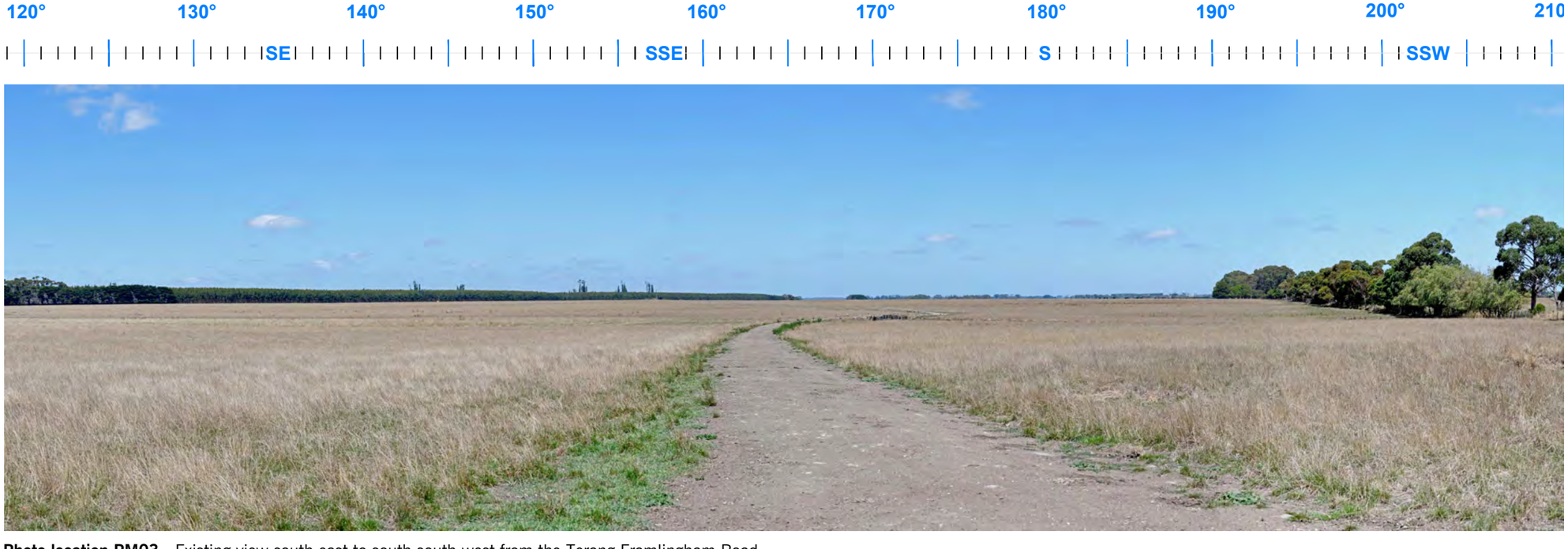
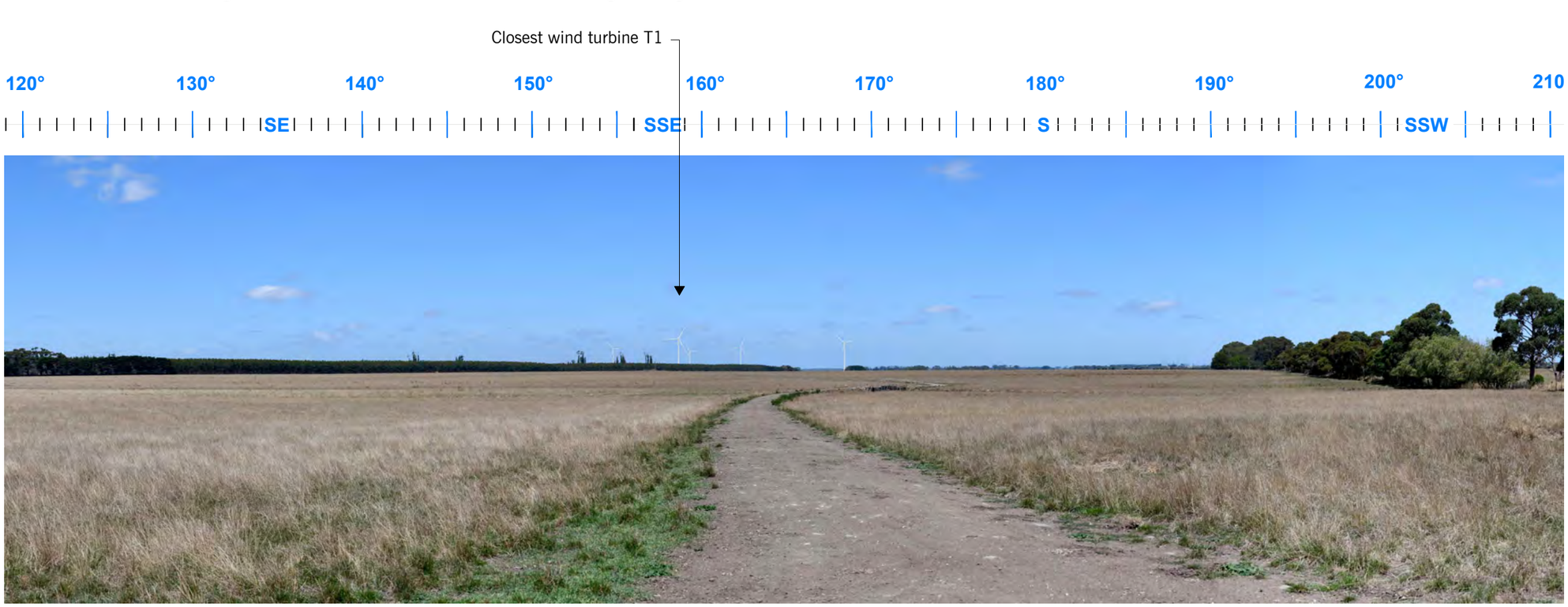


Photo location PM03 - Existing view south east to south south west from the Terang Framlingham Road.



Photomontage PM03 - Approximate 90° field of view south east to south south west from the Terang Framlingham Road. Approximate distance to closest visible wind turbine (T1) 4.1km

General Notes:

Panorama photo coordinates:
UTM Easting 658469, Northing 5767009

Photo date: 19th February 2023, 12.59pm

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM03 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 27
Photomontage PM03 Terang Framlingham Road - 90 degree field of view

GBD
Landscape architecture

Photomontage PM03 - Approximate 40° field of view south east to south from the Terang Framlingham Road. Approximate distance to closest visible wind turbine (T1) 4.1km

Figure 28
Photomontage PM03 Terang Framlingham Road - 40 degree field of view

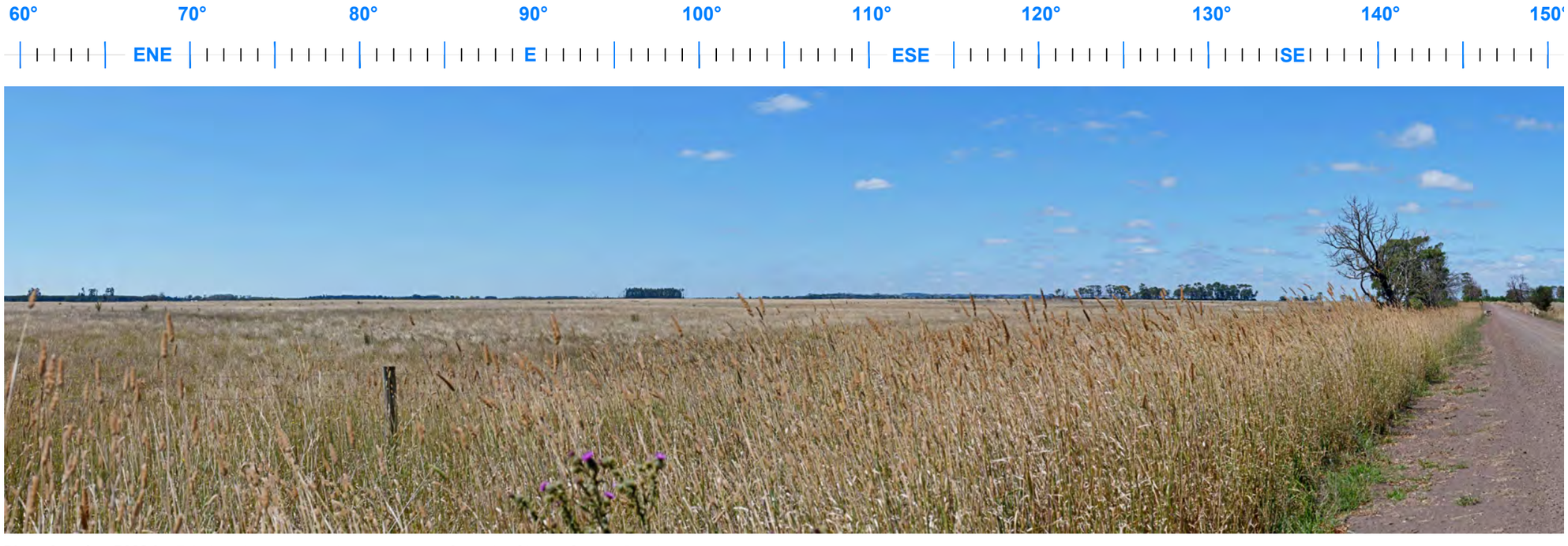
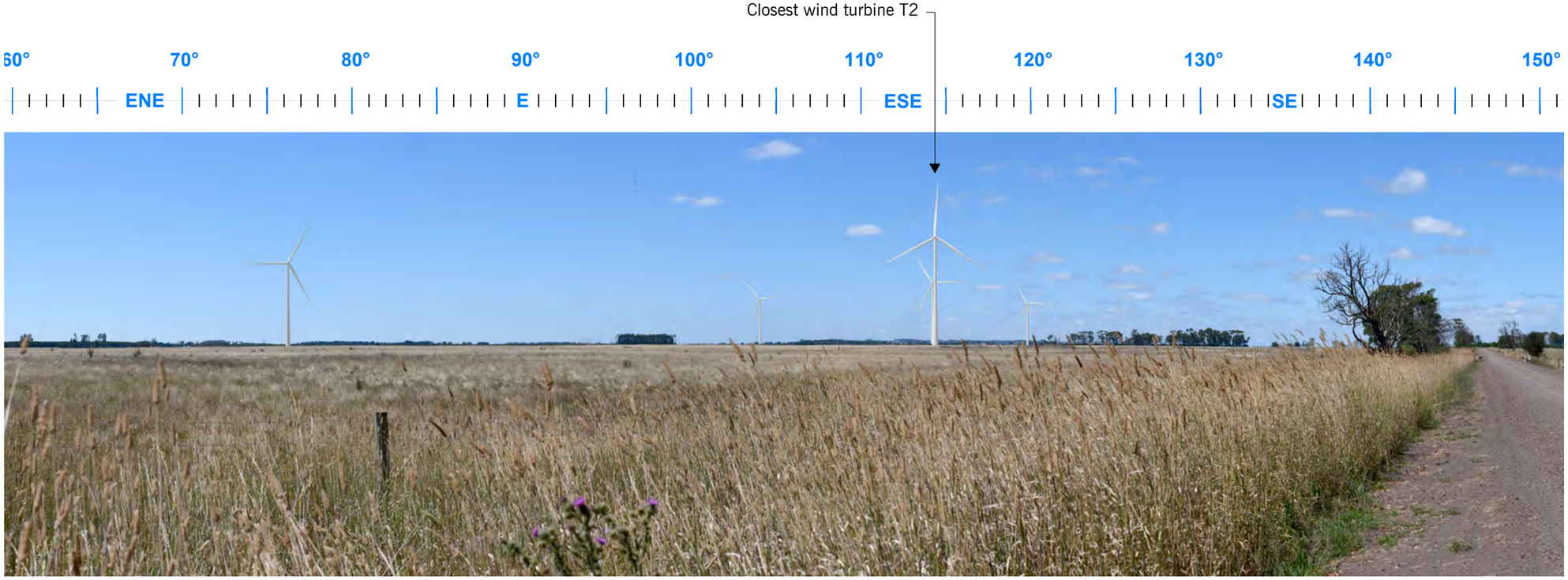


Photo location PM04 - Existing view east north east to south from the Sisters Garvoc Road.



Photomontage PM04 - Approximate 90° field of view east north east to south from the Sisters Garvoc Road. Approximate distance to closest visible wind turbine (T2) 1.6km

General Notes:

Panorama photo coordinates:
UTM Easting 658070, Northing 5763144

Photo date: 19th February 2023, 11.53am

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM04 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 29
Photomontage PM04 Sisters Garvoc Road - 90 degree field of view

GBD
Landscape architecture

Photomontage PM04 - Approximate 40° field of view east to south east from the Sisters Garvoc Road. Approximate distance to closest visible wind turbine (T2) 1.6km. T1 not shown - out of frame.

Figure 30
Photomontage PM04 Sisters Garvoc Road - 40 degree field of view

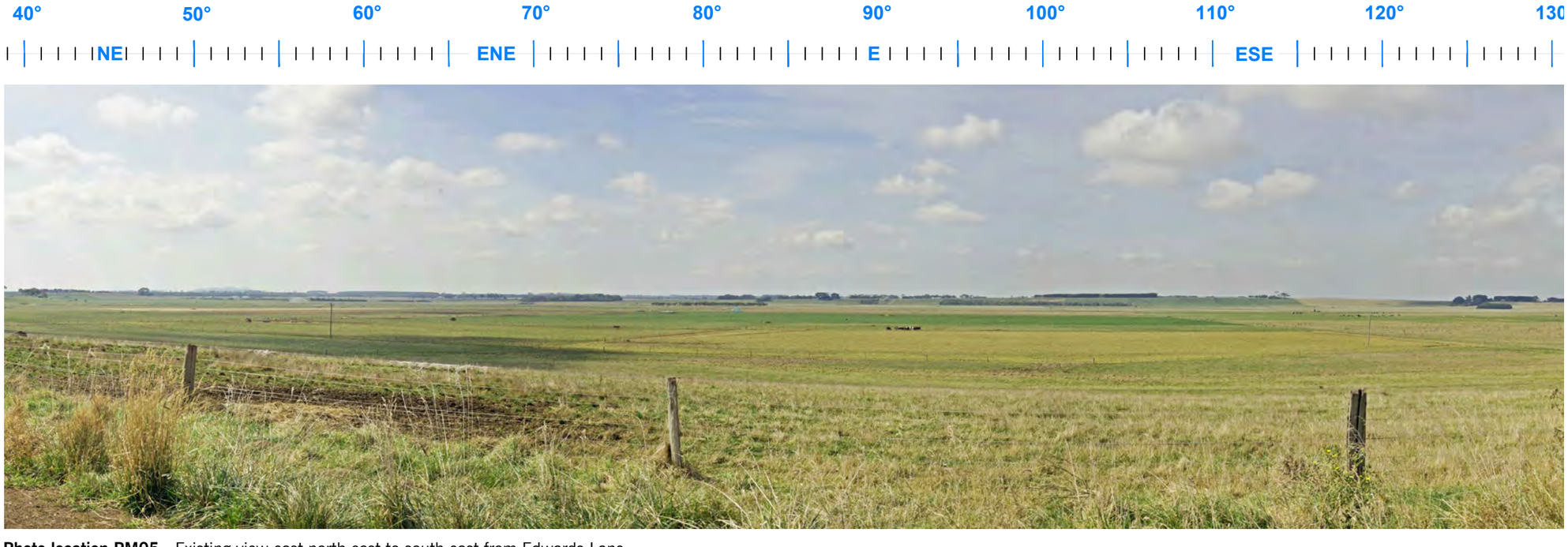
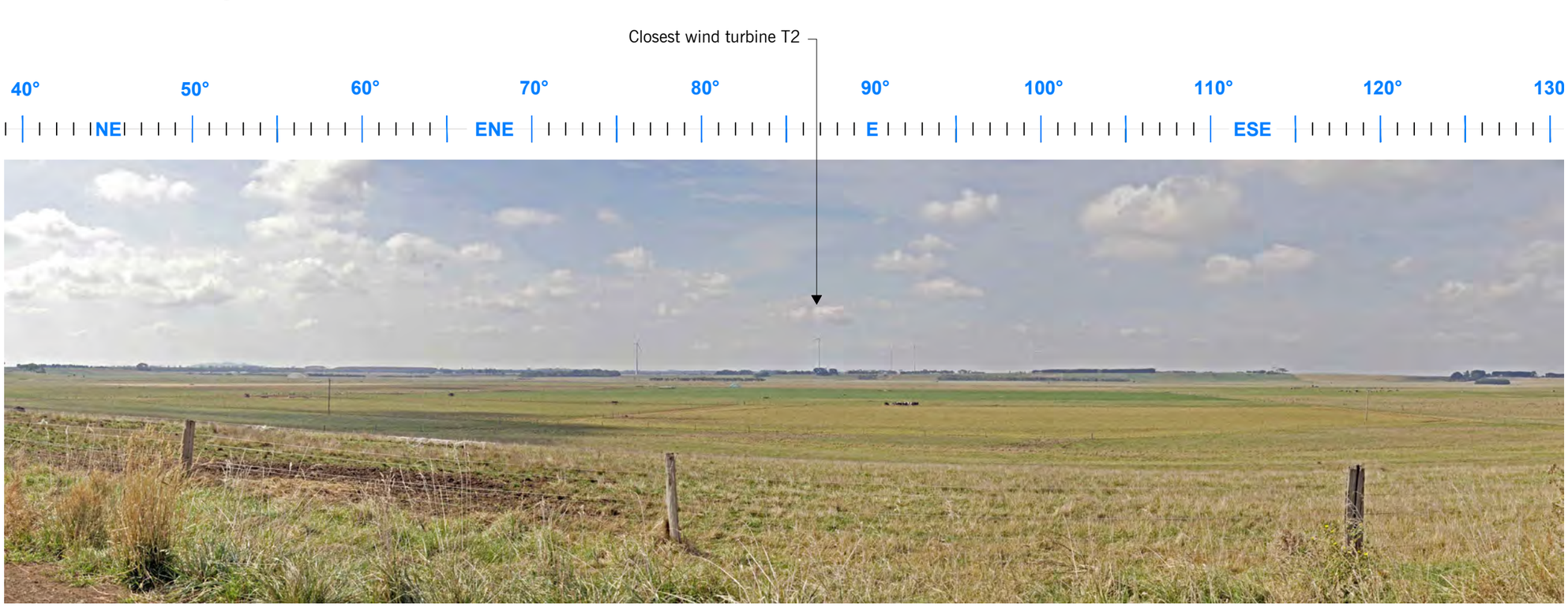


Photo location PM05 - Existing view east north east to south east from Edwards Lane.



Photomontage PM05 - Approximate 90° field of view east north east to south east from Edwards Lane. Approximate distance to closest visible wind turbine (T2) 4.3km

General Notes:

Panorama photo coordinates:
UTM Easting 655178, Northing 5762240

Photo date: 4th April 2023, 1.09pm

Camera: Nikon D700, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM05 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

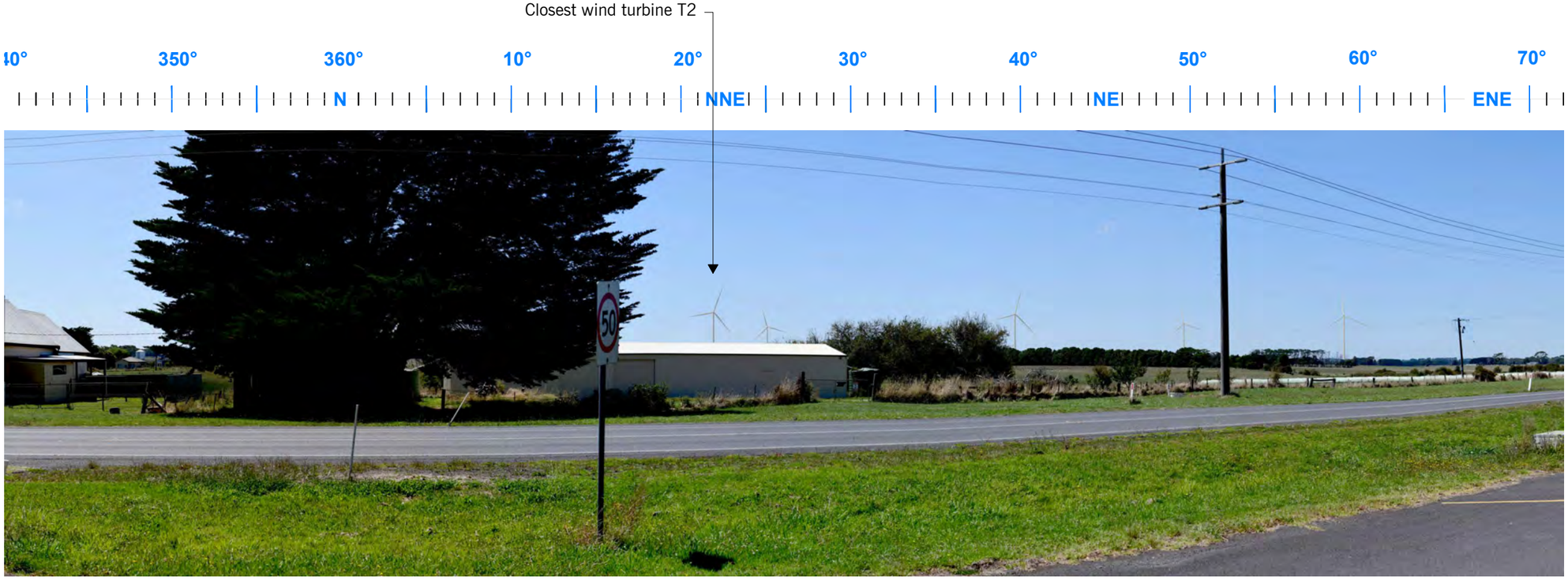
Figure 31
Photomontage PM05 Edwards Lane - 90 degree field of view

GBD
Landscape architecture

Photomontage PM05 - Approximate 40° field of view east north east to east south east from Edwards Lane. Approximate distance to closest visible wind turbine (T2) 4.3km

Figure 32
Photomontage PM05 Edwards Lane - 40 degree field of view

Photo location PM06 - Existing view north north west to north east from Farrell Street at Princes Highway, Garvoc.



Photomontage PM06 - Approximate 90° field of view north north west to north east from Farrell Street at Princes Highway, Garvoc. Approximate distance to closest visible wind turbine (T2) 3.1km

General Notes:

Panorama photo coordinates:
UTM Easting 658201, Northing 5759564

Photo date: 19th February 2023, 1.18pm

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM06 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 33
Photomontage PM06 Farrell Street at Princes Highway, Garvoc - 90 degree field of view

GBD
Landscape architecture

Photomontage PM06 - Approximate 40° field of view north north east to east north east from Farrell Street, Garvoc. Approximate distance to closest visible wind turbine (T2) 3.1km

Figure 34
Photomontage PM06 Farrell Street, Garvoc - 40 degree field of view

Photo location PM07 - Existing view north north west to north east from Howards Road.

Photomontage PM07 - Approximate 90° field of view north north west to north east from Howards Road. Approximate distance to closest visible wind turbine (T5) 4.3km

General Notes:

Panorama photo coordinates:
UTM Easting 659271, Northing 5757162

Photo date: 19th February 2023, 1.18pm

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM07 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 35
Photomontage PM07 Howards Road, Garvoc - 90 degree field of view

GBD
Landscape architecture

Photomontage PM07 - Approximate 40° field of view north to north north east from Howards Road. Approximate distance to closest visible wind turbine (T3) 1.51km

Figure 36
Photomontage PM07 Howards Road, Garvoc - 40 degree field of view

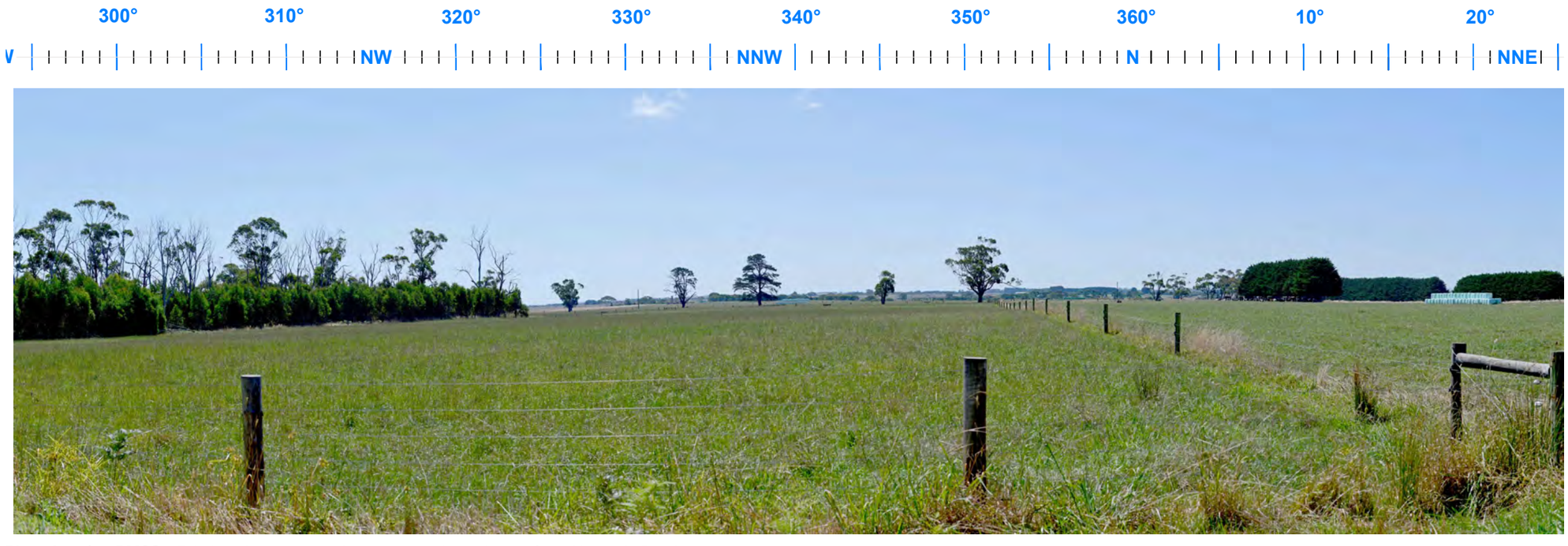
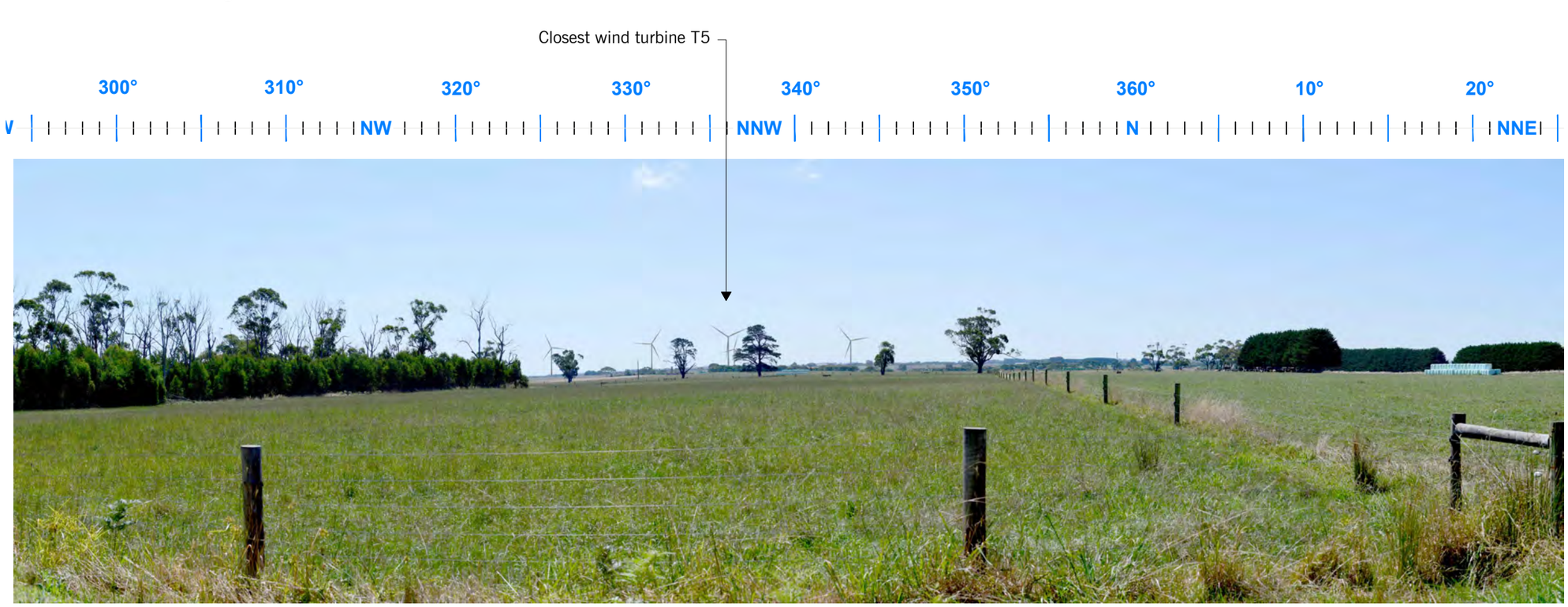


Photo location PM08 - Existing view west north west to north north east from Howards Road.



Photomontage PM08 - Approximate 90° field of view west north west to north north east from Howards Road. Approximate distance to closest visible wind turbine (T5) 4.7km

General Notes:

Panorama photo coordinates:
UTM Easting 662713, Northing 5756664

Photo date: 19th February 2023, 1.52pm

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM08 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

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The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

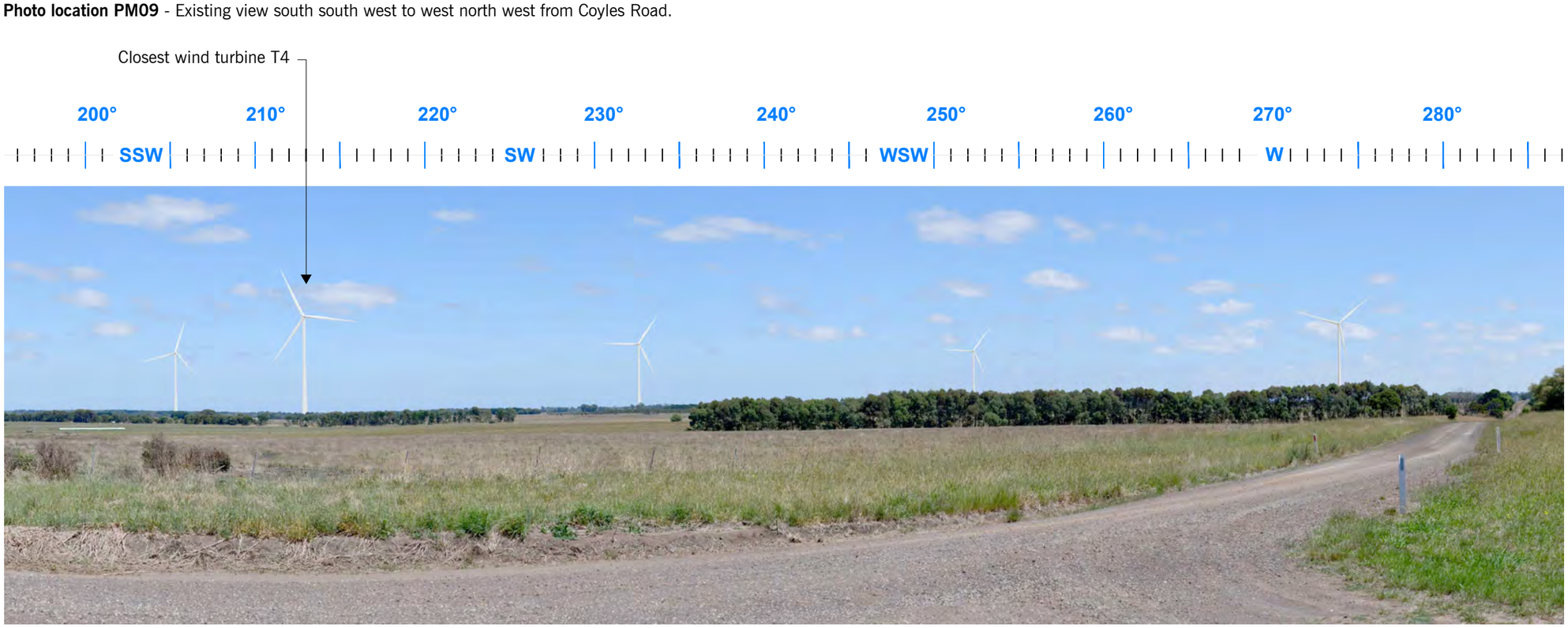
Figure 37
Photomontage PM08 Howards Road, Garvoc - 90 degree field of view

GBD
Landscape architecture

Photomontage PM08 - Approximate 40° field of view north west to north from Howards Road. Approximate distance to closest visible wind turbine (T5) 4.7km

Figure 38
Photomontage PM08 Howards Road, Garvoc - 40 degree field of view

Photo location PM09 - Existing view south south west to west north west from Coyles Road.



Photomontage PM09 - Approximate 90° field of view south south west to west north west from Coyles Road. Approximate distance to closest visible wind turbine (T4) 1.7km

General Notes:

Panorama photo coordinates:
UTM Easting 662143, Northing 5763347

Photo date: 19th February 2023, 12.17pm

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM09 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

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The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 39
Photomontage PM09 Coyles Road - 90 degree field of view

GBD
Landscape architecture

Photomontage PM09 - Approximate 40° field of view south south west to west south west from Coyles Road. Approximate distance to closest visible wind turbine (T4) 1.7km

Figure 40
Photomontage PM09 Coyles Road - 40 degree field of view

Photomontage PM09 - Approximate 40° field of view west south west to west north west from Coyles Road. Approximate distance to closest visible wind turbine (T1) 1.9km

Figure 41
Photomontage PM09 Coyles Road - 40 degree field of view

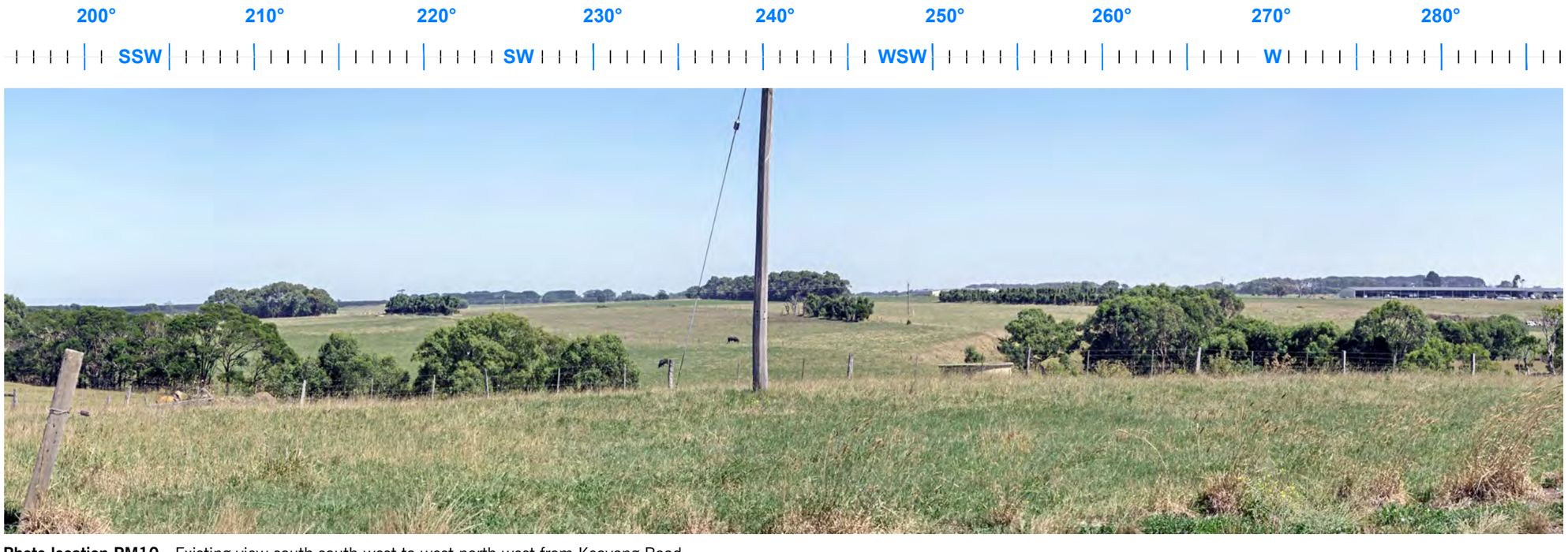

Photo location PM10 - Existing view south south west to west north west from Keayang Road.

Photomontage PM10 - Approximate 90° field of view south south west to west north west from Keayang Road. Approximate distance to closest visible wind turbine (T5) 4.7km

General Notes:

Panorama photo coordinates:
UTM Easting 662143, Northing 5763347

Photo date: 17th February 2023, 11.58am

Camera: Nikon D850, 50mm 1:1.4D Lens

Original Page Format - A3 Landscape

Photomontage PM10 is illustrated at a view angle of around 90 degrees which is within the central, binocular field, of human vision.

Photomontage limitations

A photomontage can never show exactly what the wind farm will look like in reality due to factors such as different lighting, weather and seasonal conditions which vary through time and the resolution of the image. Also a static image cannot convey turbine movement.

The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but can never be 100% accurate.

The viewpoints illustrated are representative of views in this location, but cannot represent visibility at all locations.

Figure 42
Photomontage PM10 Keayang Road - 90 degree field of view

GBD
Landscape architecture

Photomontage PM10 - Approximate 40° field of view south south west to west south west from Keayang Road. Approximate distance to closest visible wind turbine (T5) 4.7km

Figure 43
Photomontage PM10 Keayang Road - 40 degree field of view

Appendix B Photomontages

A.2 Photomontages

Appendix C Andrew Homewood qualifications and experience

This Landscape and Visual Impact Assessment (LVIA) has been prepared by Andrew Homewood, Director and Principal Landscape Architect of Green Bean Design (GBD) Pty Ltd (ABN 866 035 75702). Andrew has held this position for the past 17 years.

Andrew holds post graduate, graduate and tertiary qualifications:

- Graduate Diploma Landscape Management (Sheffield University 1995)
- Bachelor Science (Dual Honours) Landscape Design and Archaeology (Sheffield University 1991-1994)
- National Diploma Amenity Horticulture (Writtle University College 1986-1989)

Andrew is a Registered Landscape Architect (membership #001245) and a member of the Australian Institute of Landscape Architects and the Environmental Institute of Australia and New Zealand. Andrew has been directly employed or engaged in landscape related work/studies for the past 37 years in the United Kingdom and Australia.

Andrew has prepared numerous landscape and visual impact assessments across a range of state significant developments including renewable energy, mining, electricity transmission, waste management and transport.

GBD has been commissioned to undertake LVIA for over 60 renewable energy projects across Australia. Our Victorian wind farm project experience includes:

- Woolsthorpe Wind Farm Amendment VIA
- Mumblin Wind Farm LVIA
- Brewster Wind Farm LVIA
- Kentbruck Green Energy Hub LVIA (referral)
- Berrybank Wind Farm (micro siting review)
- Hawkesdale Wind Farm amendments
- Ryan Corner Wind Farm amendments
- Jung and Wimmera Plains Wind Farm LVIA
- Alberton Wind Farm LVIA
- Moorabool Wind Farm (offsite landscape mitigation plan)
- Kiata Wind Farm LVIA
- Murra Warra Wind Farm LVIA (preliminary assessment/reporting)
- Ararat Wind Farm (terminal substation assessment)
- Willatook Wind Farm LVIA (preliminary assessment/reporting)

GBD

Landscape Architecture

gbdla.com.au

Green Bean Design Pty Ltd (GBD) is a highly experienced landscape architectural consultancy specialising in landscape and visual impact assessment. Established in 2006 as an independent consultancy, GBD provide professional advice to a range of commercial and government clients involved in large infrastructure project and policy development.

GBD Director Andrew Homewood is a Registered Landscape Architect, member of the Australian Institute of Landscape Architects and the Environmental Institute of Australia and New Zealand. Andrew has over 35 years' continuous employment in landscape consultancy and has completed numerous landscape and visual impact assessments for a range of state significant developments including wind energy, solar, mining, industrial and transport developments.

GBD has been commissioned for large scale renewable energy projects across New South Wales, Victoria, South Australia, Queensland and Tasmania.

GBD have prepared Expert Witness Statements and been engaged as a peer reviewer of renewable energy landscape and visual impact assessments in Victoria and New South Wales.

CONTACT
Green Bean Design Pty Ltd
Andrew Homewood
0430 599 995

gbdla.com.au

PO Box 3178 Austral NSW 2179