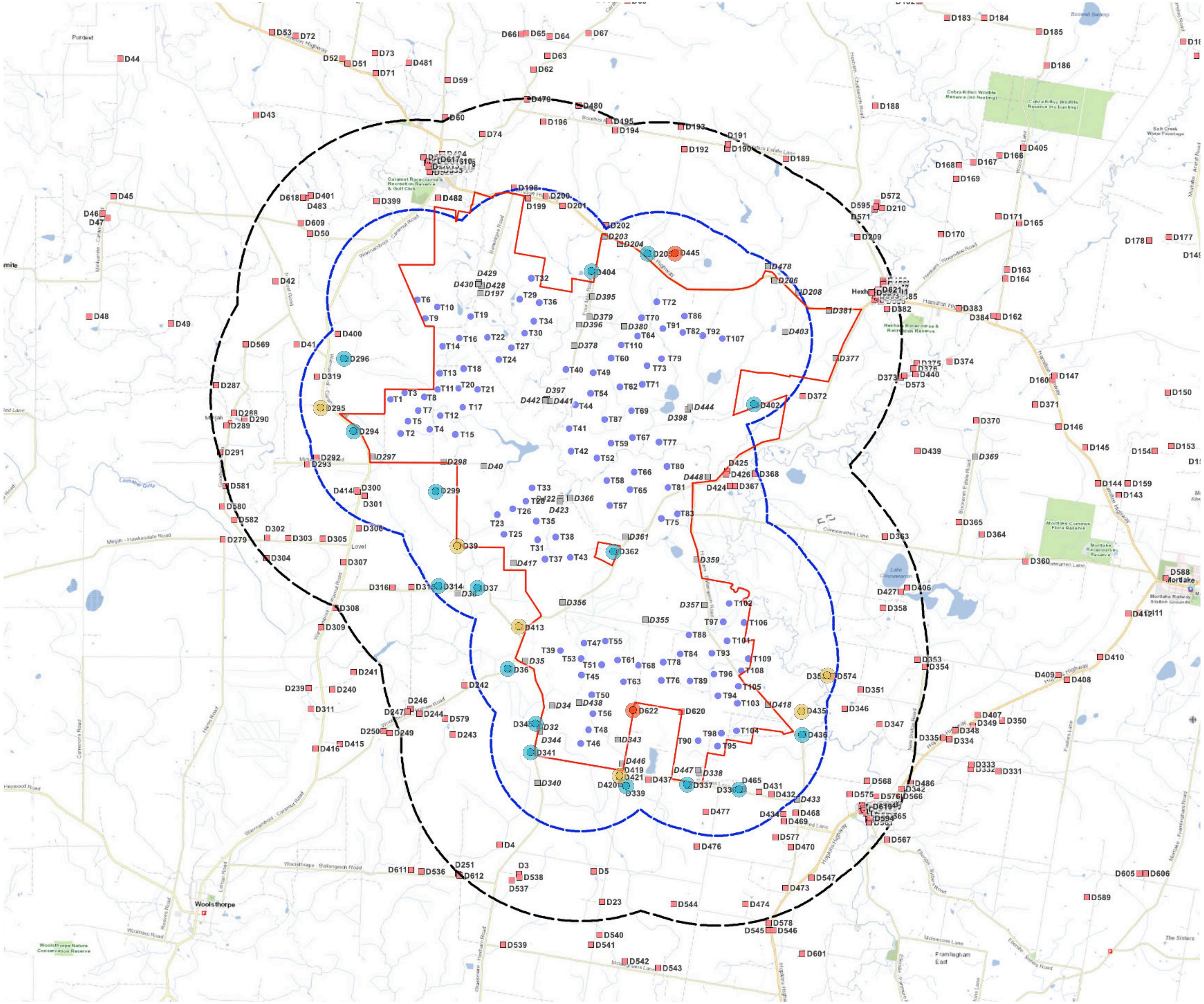


Detailed Dwelling Assessment Locations

Hexham Wind Farm

LEGEND

- Project Boundary
- Proposed 260 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- 3,000 m from nearest turbine
- 6,000 m from nearest turbine
- Main Road
- Minor Road

DWELLING IMPACT RATINGS:

- Nil / Negligible Visual Impact Rating
- Low Visual Impact Rating
- Moderate Visual Impact Rating
- High Visual Impact Rating

Detailed Dwelling Assessments prepared for the Project have been included as Appendix A.

N

0 2 4 6 8 10km

Figure 18 Dwelling Assessment Locations (Source: VicPlan 2023)

Non-involved dwellings within 3,000 metres of nearest WTG

Dwelling ID:	Distance to nearest Turbine:	Nearest Turbine:	Number of turbines within 3,000 m	Number of turbines within 3,000 - 6,000 m:	Number of potentially visible turbines:	Visual Impact Rating:	Assessment Notes:
D36	1.81 km	T39	5	20	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.1.**
D37	1.98 km	T25	6	23	**106** all at hub	LOW	A desktop assessment was undertaken for this dwelling. **Refer to Appendix A.2.**
D39	1.53 km	T27	7	28	**106** all at hub	MODERATE	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.3.**
D205	1.63 km	T72	6	20	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.4.**
D294	1.50 km	T2	8	18	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.5.**
D295	2.30 km	T1	4	17	**106** all at hub	MODERATE	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.6.**
D296	1.99 km	T1	5	19	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.7.**
D299	1.99 km	T4	10	29	**106** all at hub	LOW	A desktop assessment was undertaken for this dwelling. **Refer to Appendix A.8.**
D314	2.75 km	T25	1	20	**106** all at hub	LOW	A desktop assessment was undertaken for this dwelling. **Refer to Appendix A.9.**
D336	1.64 km	T95	5	21	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.10.**
D337	1.53 km	T90	4	27	**106** all at hub	LOW	A desktop assessment was undertaken for this dwelling. **Refer to Appendix A.11.**
D339	2.09 km	T46	4	26	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.12.**
D341	1.66 km	T46	4	14	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.13.**
D345	1.60 km	T46	8	13	**106** all at hub	LOW	A desktop assessment was undertaken for this dwelling. **Refer to Appendix A.14.**
D352	2.77 km	T109	2	18	**106** all at hub	MODERATE	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.15.**
D362	1.86 km	T43	12	43	**106** all at hub	LOW	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.16.**

Table 13 Summary of Non-involved Dwelling Assessment within 3,000 m of nearest turbine

D402	**2.50 km**	**T107**	**2**	**28**	**106** all at hub	**LOW**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.17.**
D413	**1.54 km**	**T39**	**9**	**23**	**106** all at hub	**MODERATE**	A desktop assessment was undertaken for this dwelling. **Refer to Appendix A.18.**
D421	**1.69 km**	**T46**	**5**	**25**	**106** all at hub	**MODERATE**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.19.**
D435	**2.18 km**	**T103**	**7**	**14**	**96** at hub **10** at tip	**MODERATE**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.20.**
D436	**2.22 km**	**T104**	**6**	**15**	**64** at hub **32** at tip	**LOW**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.21.**
D445	**1.68 km**	**T72**	**6**	**17**	**106** all at hub	**HIGH**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.22.**
D622	**1.04 km**	**T63**	**19**	**16**	**106** all at hub	**HIGH**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.23.**
D424	**1.99 km**	**T83**	**5**	**35**	**106** all at hub	**LOW**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.24.**
D367	**2.12 km**	**T83**	**5**	**33**	**78** all at hub	**LOW**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.25.**
D425	**2.02 km**	**T83**	**5**	**33**	**106** all at hub	**MODERATE**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.26.**
D301	**2.40 km**	**T2**	**2**	**21**	**106** all at hub	**LOW**	Moir Studio attended the dwelling in May 2023. **Refer to Appendix A.27.**

Table 13 Summary of Non-involved Dwelling Assessment within 3,000 m of nearest turbine

9.4 Summary of Dwelling Assessment

An overview of the visual assessment for each of the representative dwellings and detailed assessments have been included in **Appendix A**. The following provides a summary of the assessment and proposed recommendations.

9.4.1 Dwellings within 3,000 metres of the nearest turbine

49 non-involved dwellings were identified within 3,000 m of a proposed turbine. Of these, 39 dwellings are surrounded by screening elements such as vegetation and/or structures which will help limit views of the Project. Representative dwelling assessments have been undertaken from 27 non-involved dwellings within 3,000 m of the nearest turbine. These dwellings were selected based on a combination of factors, including property owner consent to access, proximity to the nearest turbine, and location within varying landscape contexts. The term "representative" indicates that these assessment locations were chosen to reflect a range of distances, orientations, and potential visibility scenarios from within the 3,000 m study buffer, and are considered indicative of the broader group of dwellings in similar conditions.

Of the 27 non-involved dwellings within 3,000 m the assessment found:

- 18 were rated as having a low visual impact rating,
- Seven (7) were assessed as having a moderate visual impact rating,
- Two (2) were assessed as having a high visual impact rating.

Practical and feasible mitigation measures have been recommended for the nine (9) non-involved dwellings rated as having the potential for a moderate or high visual impact rating. The proposed mitigation measures (as outlined in **Section 15.0**) would significantly reduce the level of visual impact. Once established, it is anticipated the residual impacts would be acceptable.

10

Photomontages and Wire Frame Diagrams

10.0 Photomontages and Wire Frame Diagrams

10.1 Overview of Photomontages and Wire Frame Diagrams

10.1.1 Photomontages

A photomontage combines a photograph of an existing view with a computer-rendered image of a proposed development. Photomontages are used to illustrate the likely appearance of a proposal as it would be seen in a photograph, rather than as it would appear to the human eye in the field.

Although photomontages are based on photographs of the existing landscape, it is important to emphasise that they are not a substitute for visiting a viewpoint in person. They are one tool to aid assessment, providing a two-dimensional image that can be compared with the actual landscape to give information on aspects such as the scale and potential appearance of a proposed development.

Photomontages prepared from public viewpoints have been included as Appendix C.

10.1.2 Wire Frame Diagrams

A wire frame diagram is a computer-generated image derived from a digital terrain model, that indicate the 3D form of the landscape along with proposed development elements along with proposed development elements. They are a valuable tool in the wind farm LVIA process, as they allow the assessor to compare the position and scale of the turbines with the existing landscape (Scottish Natural Heritage, 2017). Wire frame images can represent a worst case scenario, as they do not take into account factors such as vegetation, building structures.

Wire frame diagrams have been utilised in this LVIA to assist in the assessment of the Project from inaccessible locations. In instances where access to a location was not available, wire frame diagrams have been utilised as an assessment tool to provide a worst case scenario view of the proposal.

10.2 Photomontage Limitations

Visualisations in themselves can never provide the full picture in terms of potential impacts; they only inform the assessment process by which judgements are made. Photomontages of wind farms have inherent limitations that stakeholders should consider when interpreting them:

- A visualisation 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;
- 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;
- A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move.

Source: Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.2 February 2017.

In accordance with the NSW Wind Energy Guideline: Technical Supplement (2024), the photomontages for this assessment have been rendered with a 180-degree field of view to present the full extent of the Project within its broader context. To better approximate the perspective of the human eye, 60-degree crops of these panoramas are also provided in **Appendix C**.

10.3 Photomontage Selection Process

Indicative viewpoints have been selected for the preparation of photomontages from public locations and private dwelling locations to best illustrate the potential appearance of the proposed wind farm from varying distances and locations with differing views in public locations (refer to **Figure 20**).

Public Photomontage Locations:

Of the 37 public viewpoints assessed in **Section 8.0** and **Appendix B**, six (6) locations were selected for the preparation of photomontages. These locations were chosen to reflect a range of distances and orientations to the Project, different landscape characters and land uses (e.g. town entry points), and to incorporate feedback received from the community. The exact photomontage positions were determined on site to represent a worst-case view from each location, with localised screening elements such as vegetation avoided where possible to maximise visibility of the Project.

Public Photomontages		
Photomontage 01	Viewpoint VP02	Hamilton Highway, Hexham
Photomontage 02	Viewpoint VP04	Intersection of Boorktoi Road and Hamilton Highway, Hexham
Photomontage 03	Viewpoint VP05	Hamilton Highway, Caramut
Photomontage 04	Viewpoint VP09	Warrnambool-Caramut Road, Minjah
Photomontage 05	Viewpoint VP11	Warrnambool-Caramut Road, Woolsthorpe
Photomontage 06	Viewpoint VP17	Ellerslie Cemetery, Ellerslie-Panmure Road, Ellerslie

Table 14 Overview of Photomontage and Wire Frame Locations

10.4 Photomontage Development Methodology

The process for generating the photomontages involves computer generation of a wire frame perspective view of the Wind Turbines and the topography from each viewpoint. Photomontages have been prepared in accordance with the Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.2 February 2017. The process for photomontage development is demonstrated in **Figure 19**.

The photomontages are based on a worst case scenario of a maximum turbine height dimension of 260 m with a hub height of 170 m, with all turbines oriented toward the viewpoint, without the inclusion of the proposed mitigation methods.

Moir Studio have prepared the photomontages using the most current available version of Wind Pro software using the following process:

Step 1: Develop 3D Model

Detailed 3D model of the Site is developed in Wind Pro. The wind turbines and associated infrastructure (substations, transmission lines, wind masts etc) are modelled and sited in the 3D model to scale.

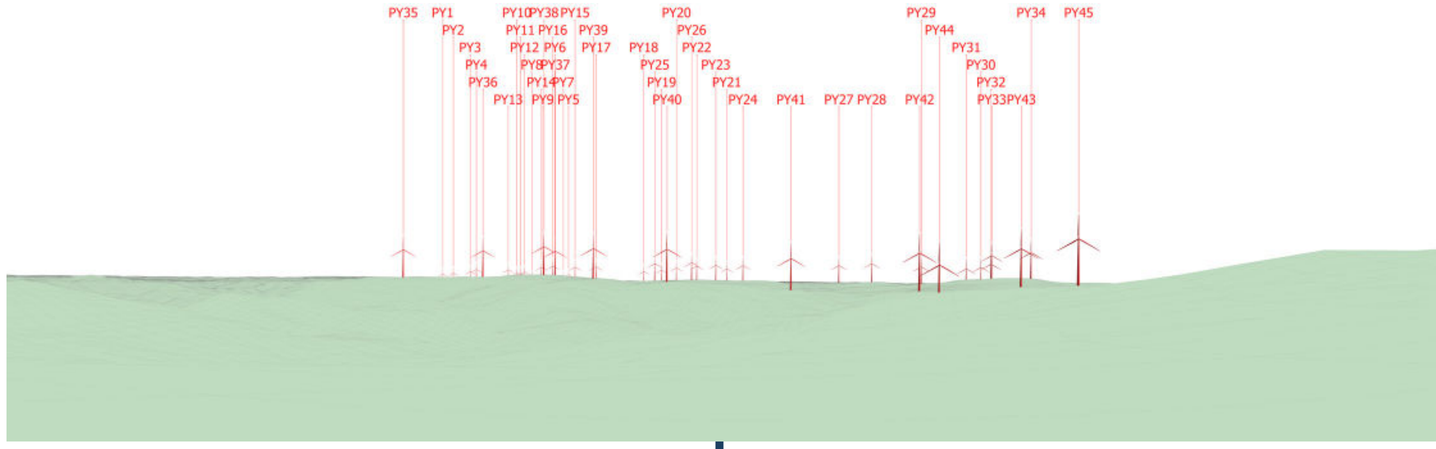
Step 2: Align Photograph and Model

The digital panorama is imported into Wind Pro and EXIF properties of the file are inserted automatically defining all relevant visualization information as e.g. type of camera lens used, field of view for panoramas, the position and direction. Topography, control points, obstacle objects, existing wind masts can be used as reference to calibrate the camera model precisely.

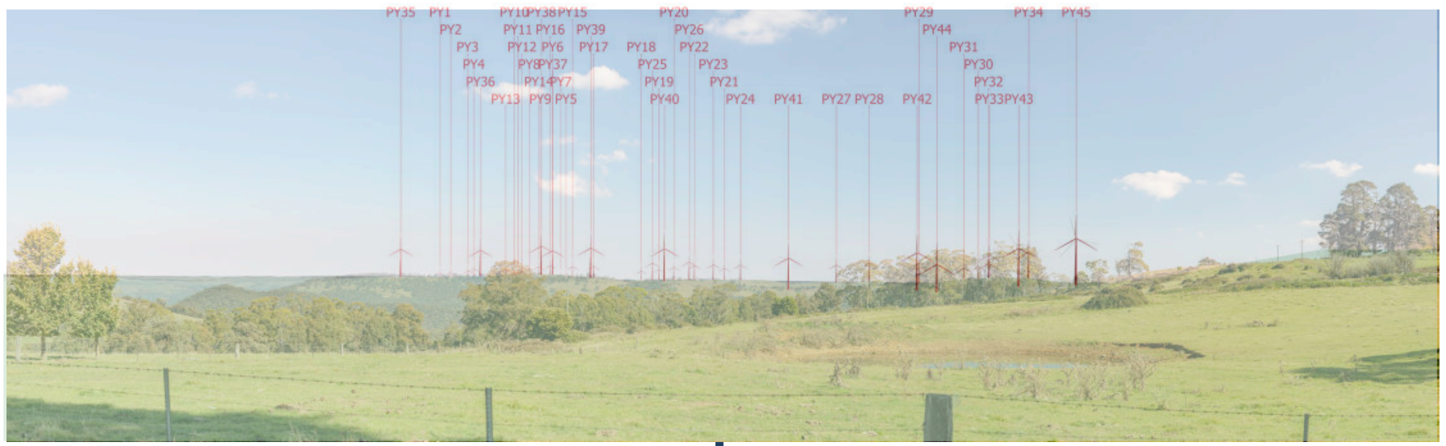
Step 3: Render Photomontage

The software calculates the position of the sun based on the time and date of photograph and renders the wind turbines in accordance with the specific weather conditions and position of the sun. Once rendered, detailed removal of intervening elements (such as vegetation) is undertaken to provide an accurate representation of the Project.

Step 1: Develop 3D Model (Wire Frame Diagram)

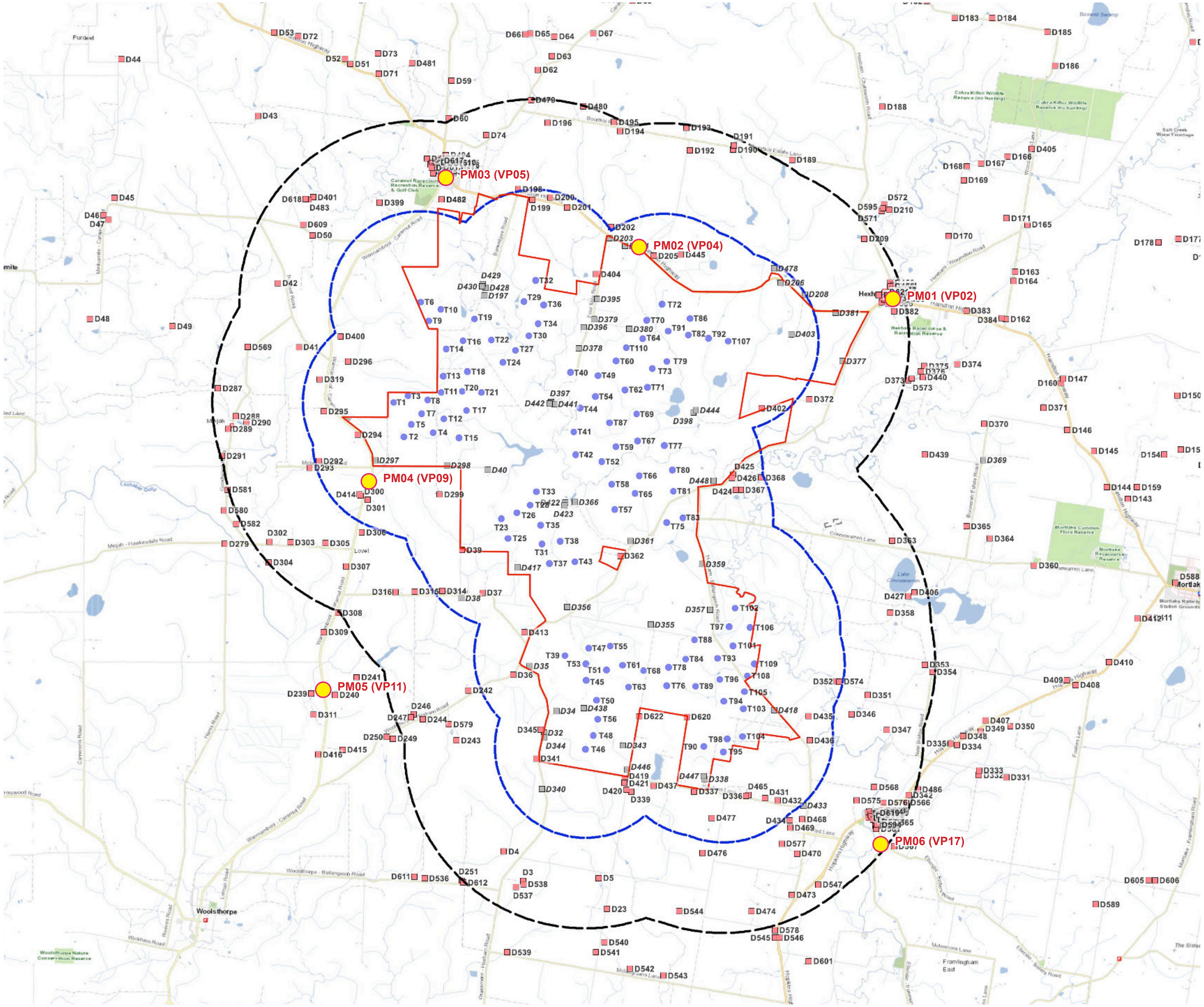


Step 2: Align photograph and model



Step 3: Render Photomontage

Figure 19 Photomontage Development Process



Photomontage and Wire Frame Diagram Locations

Hexham Wind Farm

LEGEND

- Project Boundary
- Proposed 260 m Turbine Location
- Involved Dwelling
- Non-involved Dwelling
- 3,000 m from nearest turbine
- 6,000 m from nearest turbine
- Main Road
- Minor Road
- PM01 Public Photomontage Locations

Photomontages prepared for the Project have been included as Appendix C.

0 2 4 6 8 10km

Figure 20 Photomontages and Wire Frame Diagram Locations (Source: VicPlan 2023)

11

Night Lighting Assessment

11.0 Night Lighting Assessment

11.1 Overview of Night Lighting

The following section of the report provides an assessment of the visual impacts of potential night lighting of the Project. Night lighting has the potential to result in the alteration of the night time landscape character of the region. Potential light sources include:

- Aviation Hazard Lighting (AHL) on nacelle of wind turbines (height of up to 170 metres AGL)
- Night lighting for safety and security on ancillary structures.

11.2 Aviation Hazard Lighting

The requirement of AHL on wind turbines for the Project is subject to the advice of the Civil Aviation Safety Authority (CASA). It is noted that the turbines proposed for the Project will possibly be up to 260 m in height and CASA generally recommends night lighting if an obstacle exceeds 160 metres above ground level.

If determined to be required, potential CASA specifications for lighting could include:

- Two flashing red medium intensity obstacle lights should be provided per turbine where required.
- The light fixtures should be mounted sufficiently above the surface of the nacelle so that the lights are not obscured by the rotor hub, and are at a horizontal separation to ensure an unobstructed view of at least one of the lights by a pilot approaching from any direction.
- Sufficient individual wind turbines should be lit to indicate the extent of the group of turbines.
- The interval between obstacle lighted turbines should not exceed 900m, and the most prominent (highest for the terrain) turbine(s) should be lit. (CASA, 2004)

Representative images of aviation lighting (installed in August 2020) on turbines at Biala Wind Farm (located in the Upper Lachlan Shire in New South Wales) have been included to best illustrate the potential visual appearance of aviation lighting. Photographs of the aviation lighting at varying distances and times have been included in this report.

Images 24 - 30 illustrate the appearance of night lighting on a dark rural landscape at intervals after sunset.

Image 24: View towards Biala Wind Farm - 2.0 Kilometres from turbine at 6:20pm (30 minutes after sunset)

Image 25: View towards Biala Wind Farm - 1.75 Kilometres from turbine at 6:35pm (45 minutes after sunset)

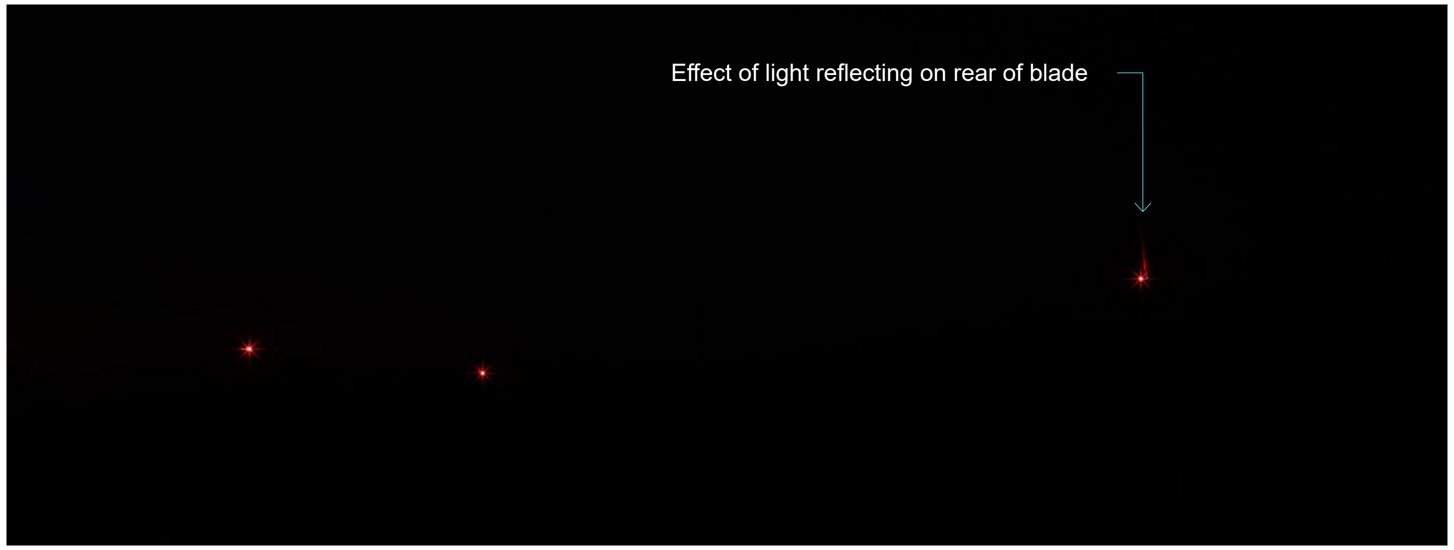


Image 26: View towards Biala Wind Farm - 1.85 Kilometres from turbine at 6:50pm (60 minutes after sunset)

Image 27: View towards Biala Wind Farm - 3.5 Kilometres from turbine

Image 28: View towards Biala Wind Farm - 8.5 Kilometres from turbine

Image 29: View at night towards Biala Wind Farm - 3.5 Kilometres from turbine

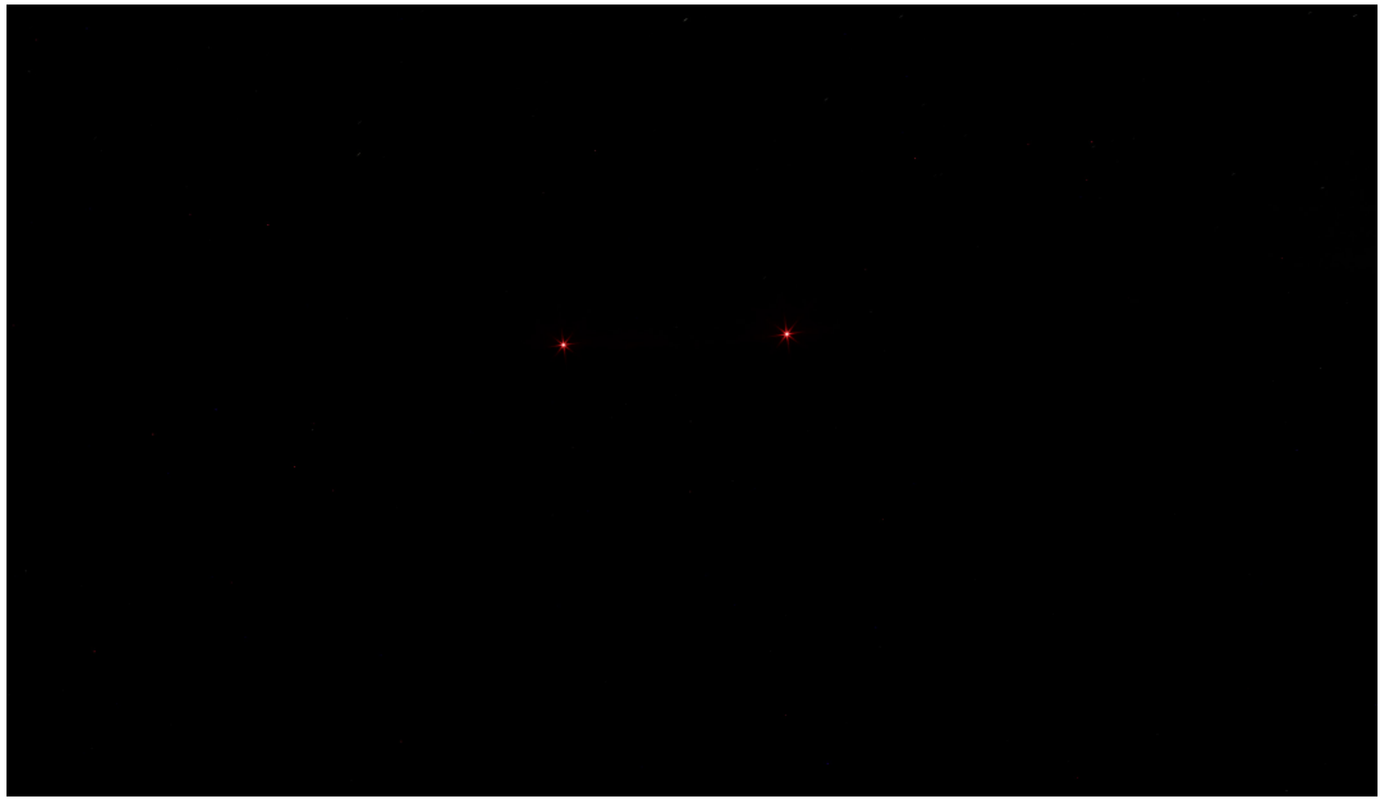


Image 30: View at night towards Biala Wind Farm - 8.5 Kilometres from turbine

11.3 Overview of potential visual impacts from Night lighting

Night lighting of turbines and associated infrastructure has the potential to extend the visual effect into the night time. Aviation hazard lighting has the potential to be visible from distances in excess of 20 kilometres (Scottish Natural Heritage). However, the distance depends on a number of variables, including light intensity, topography, vegetation coverage and climatic conditions.

Due to the relatively isolated location of the Project, very little existing sources of lighting are present in the night time landscape of the Study Area. Some existing lighting associated with homesteads and motor vehicles is dispersed around the Study Area. Isolated receptors within the Study Area experience a dark night sky with minimal light sources. The impact of night lighting is unlikely to be experienced from inside of a dwelling as internal lights reflect on windows and limit views to the exterior at night time.

The highest visual impact is likely to be people who experience the night landscape outdoors. Dark sky is a valued quality of the rural landscape, due to the lack of light pollution. According to the International Dark Sky Places program, there are currently seven designated locations registered within Australia, none of which are located in Victoria. Aviation lighting has the potential to impact on receptors who view the landscape at night, in particular night-sky enthusiasts, photographers, star gazers, campers and some land owners with potential visibility of the turbines hub.

The visual impact of potential aviation lighting could be reduced by employing mitigation methods outlined in **Section 11.4.** Considering the high elevation of the turbines and the implementation of shields, the source of visible light is likely to be reduced to ambient lighting as opposed to direct visibility of the light itself when viewed from a close proximity.

11.4 Recommendations to reduce the potential visual impacts from Night lighting

To assist in the amelioration of the effect of AHL on wind turbines the following should be applied:

- If used, air navigation lighting should be spaced around the outer edges of the wind farm. Lights are not required on every tower. Where possible, careful consideration should be given to the selection of turbines requiring lighting to avoid unnecessary impact upon residences.
- Treatment of the rear of blades with a non-reflective coating to reduce reflection off the rotating blade at night.
- Use of the lowest candela intensity allowed by CASA.
- According to the CASA requirements, shielding may be provided to restrict the downward spill of light to the ground plane by ensuring that no more than 5% of the nominal light intensity should be emitted at or below 5° below horizontal (Refer to **Figure 22**).
- No light should be emitted at or below 10° below horizontal.

Technology in both aviation and wind farm development is constantly evolving. One example of evolving technology is Air Detection Lighting System (ADLS). An ADLS has recently been installed at the Lal Lal Wind Farm just east of Ballarat in Victoria. An ADLS is an effective measure to reduce visual impacts, save electricity and improve aviation safety. Aviation lighting is activated when an aircraft approaches within four to 6 km.

As this technology such as ADLS become more cost effective and readily available, it may become a viable option for the Project.

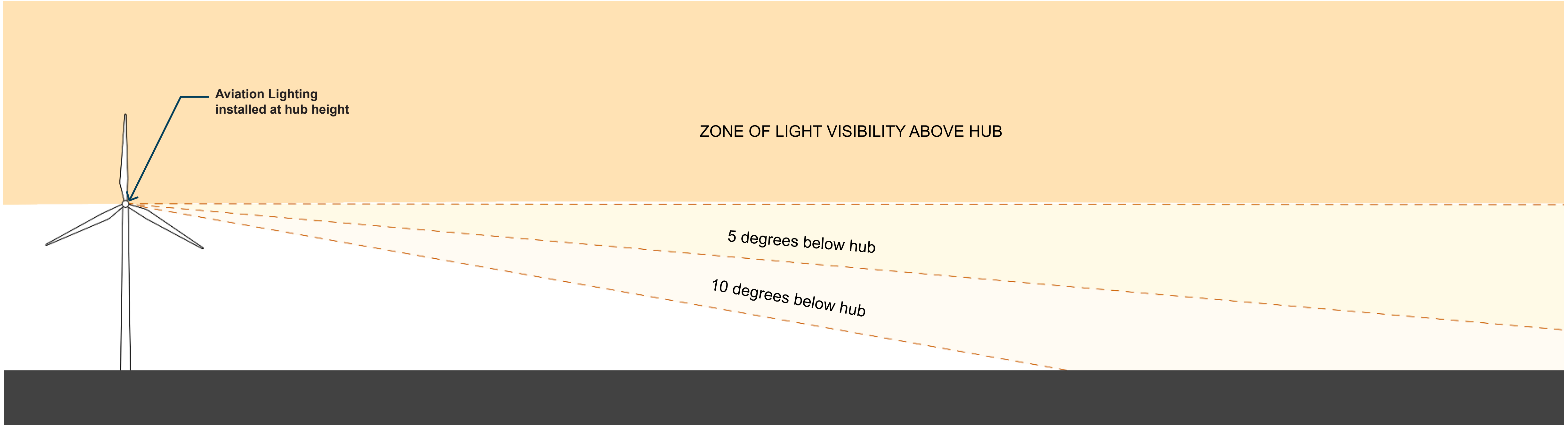


Figure 22 Recommended Light Shielding to reduce lighting spread

11.5 Potential Impacts of Lighting Associated with Ancillary Infrastructure

In addition to aviation hazard lighting on wind turbines, night lighting is likely to be required on ancillary infrastructure including switching stations, collector substations and facilities buildings.
Maintenance lighting will be installed at the terminal station and at the O&M building for night work including emergency operations. All maintenance lighting will be designed to reduce disturbance to neighbouring properties and will be used only when there are staff onsite or during emergencies.

Continuously operating security lighting would be installed on posts up to 3.5 m high adjacent to the security fencing and O&M buildings.

It is unlikely the proposed night lighting associated with the ancillary infrastructure would create a noticeable impact on the existing night time landscape.

To assist in the amelioration of the effect of night lighting on ancillary structures the following should be applied:

- Security lighting throughout the wind farm, switching station and the substation should be minimised to decrease the contrast between the wind farm and the night time landscape of the area.
- Motion detectors should be used to activate night time security lighting when required.
- Lighting is to be designed to ensure it does not spill onto nearby roads or residences.

If design principles and requirements outlined in the '*Australian Standard 4282 - Control of the obtrusive effects of outdoor lighting*' are applied to the lighting installations for Ancillary Infrastructure, potential visual impacts from night lighting can be effectively minimised. Key considerations are summarised below:

1. Control the level of lighting:
• Only use lighting for areas that require lighting ie. paths, building entry points.
• Reduce the duration of lighting:
• Switch off lighting when not required
• Consider the use of sensors to activate lighting and timers to switch off lighting

2. Lighting Design:
• Use the lowest intensity required for the job
• Use energy efficient bulbs and warm colours
• Direct light downwards
• Ensure lights are not directed at reflective surfaces
• Use non-reflective dark coloured surfaces to reduce reflection of lighting **(Figure 21)**
• Keep lights close to the ground and / or directed downwards **(Figure 22)**
• Use light shield fittings to avoid light spill (refer to **Figure 23**).

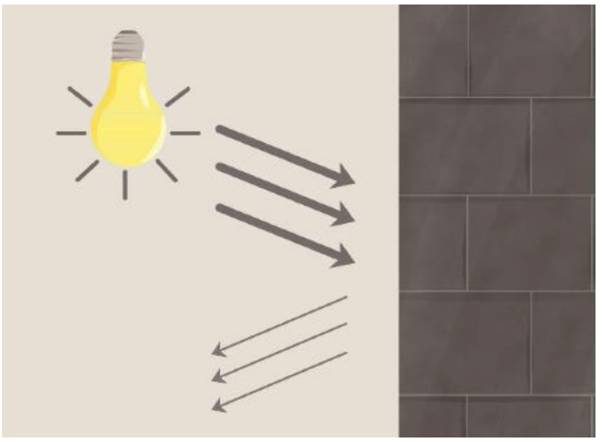


Figure 21 Surface Reflectivity
Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife (2020)

In accordance with the recommendations of the LVIA, ancillary structures are to painted in a dark non-reflective paint to reduce any potential reflectivity from light and remain sympathetic to the surrounding landscape.

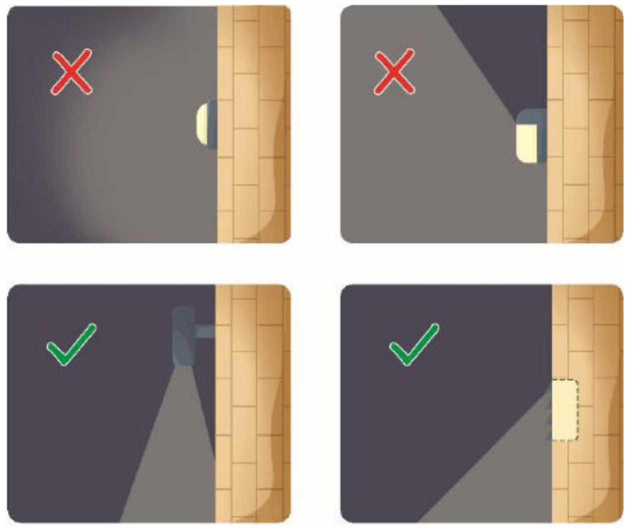


Figure 22 Downward Lighting
Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife (2020)

Where possible, lighting is to be directed downwards.

Where possible, lighting should be fully or partially shielded to prevent spill into surrounding areas.

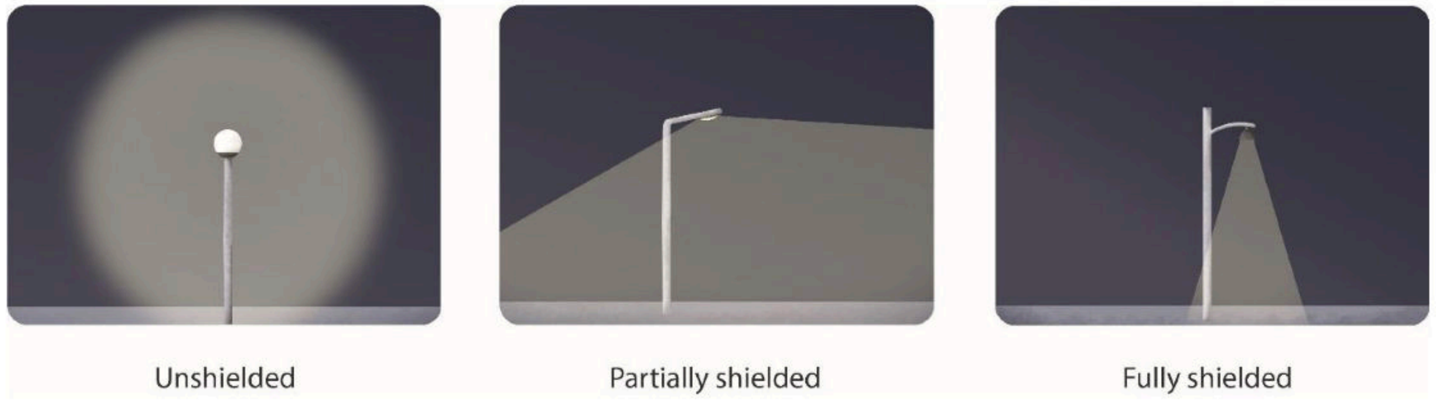


Figure 23 Light Shielding
Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife (2020)

12

Cumulative Impact Assessment

12.0 Cumulative Impact Assessment

12.1 Overview of Cumulative Visual Impacts

The EES Draft Scoping Requirements state:

Assess the potential for cumulative impacts associated with the development of the project in the context of existing built infrastructures and nearby proposed/approved wind farm developments.

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future (Landscape Institute et al, 2008). Cumulative effects may also affect the way a landscape is experienced and can be positive or negative. Where they comprise benefits, they may be considered to form part of the mitigation measures.

It is important the proposed Hexham Wind Farm considers the potential cumulative effects on the immediate and broader regional context it forms part of.

A cumulative impact assessment has several dimensions:

- The impact of the wind farm, when added to the combined impacts of all other existing developments and environmental characteristics of the area.
- The impact of this development in the context of the potential for development of wind energy developments in the local, regional and national context.
- The impact of developments which are ancillary to or otherwise associated with the proposed wind farm eg. the development of transmission lines.
- The potential for future development of wind farms in the region.

12.2 Nearby Wind Farm Projects

The Project is located within Victoria's South West Renewable Energy Zone (REZ). The REZ has been identified by the Victorian Government through its Climate Change Strategy. The REZ is expected to play a vital role in providing clean energy to communities across Victoria (DELWP, 2021). See **Figure 24**.

Project	Project Size *Estimated	Status	Distance to Hexham Wind Farm
Mount Fyans Wind Farm	85 turbines	Planning Permit Application lodged and process underway	Approx. 4km (east)
Mortlake South Wind Farm	35 turbines	Operational	Approx. 15km (Southeast)
Woolsthorpe Wind Farm	20 turbines	Approved	Approx. 17km (Southwest)
Hawkesdale Wind Farm	23* turbines	Construction completed - being commissioned	Approx. 14km (Southwest)
Mortons Lane Wind Farm	13 turbines	Operational	Approx. 16km (Northwest)
Salt Creek Wind Farm	15 turbines	Operational	Approx. 14km (Northeast)
Dundonnell Wind Farm	80 turbines	Operational	Approx. 28km (Northeast)
Darlington Wind Farm	61 turbines	Planning Permit Application lodged and process underway	Approx. 24km (East)

Table 15 Overview of Nearby Wind Farms

12.3 Cumulative Impact with Nearby Wind Farms

Mount Fyans Wind Farm

The proposed Mount Fyans Wind Farm Project is situated approximately 4 kilometres to the east of the Project Site and is the only Project located within 6 km of the Project. The Mount Fyans Wind Farm Project is located on mostly cleared pastoral lands southeast of the Mortlake township, in the South West of Victoria. The wind turbines at the Mount Fyans Wind Farm Project are shorter (200 m high) than those proposed at the Project Site (up to 260 m in height).

Nine (9) non-involved dwellings have been identified within 6,000 m of a nearest turbine of the Project and the Mount Fyans Wind Farm (refer to **Figure 24**). Detailed assessment identified that all nine (9) dwellings are likely to have limited or no views to the Projects due to screening factors including existing vegetation and structures (refer to **Figure 17**).

Due to the relatively flat topography, there may be opportunities to view both projects simultaneously. Therefore, further assessment has been undertaken ensure a thorough analysis of potential cumulative visual impacts is undertaken.

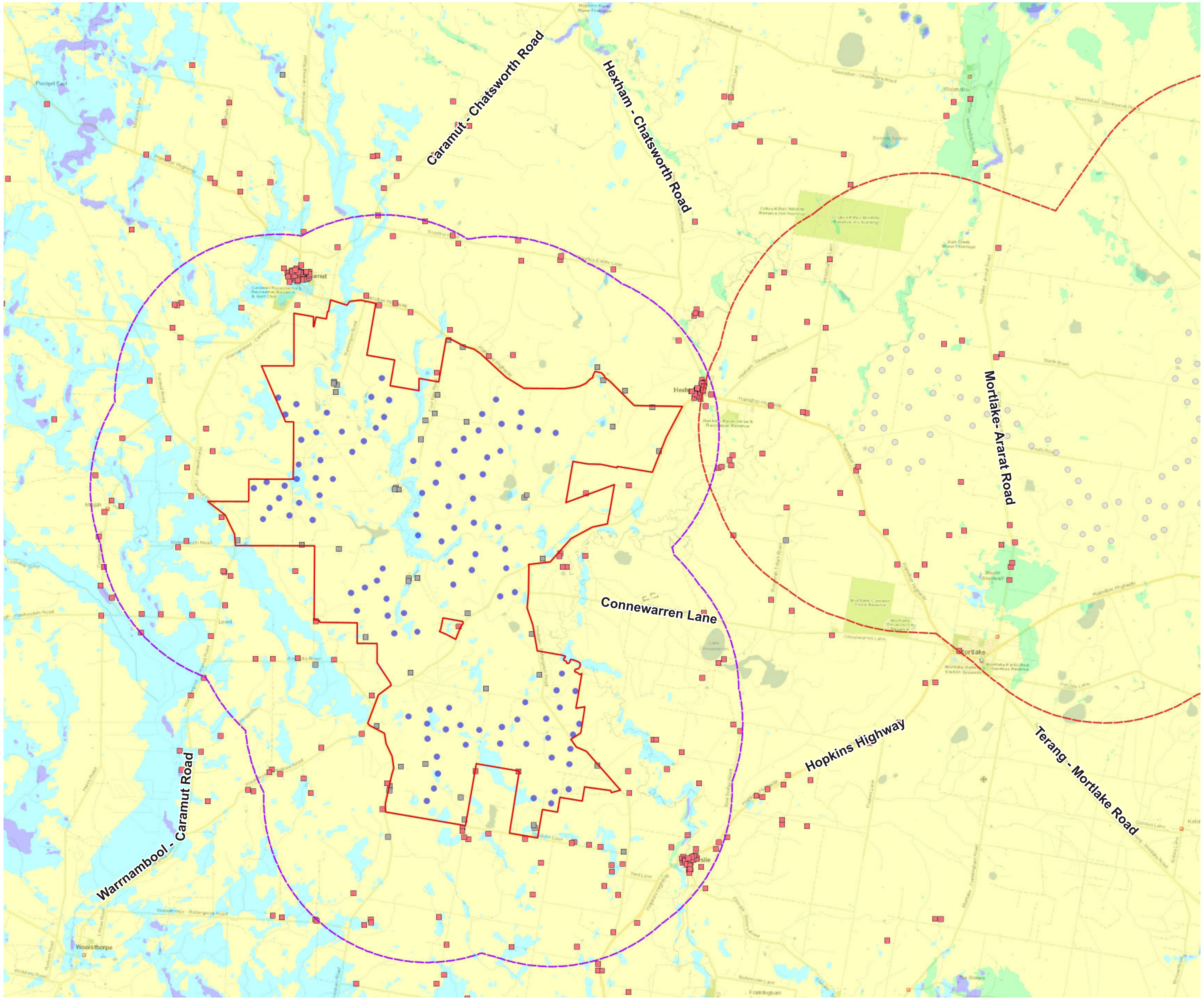
To assist in the cumulative visual impact assessment, a Zone of Visual Influence (ZVI) has been prepared to illustrate areas from which there is the potential to view both Projects (based on topography alone). The Zone of Visual Influence demonstrates areas of land from which turbines associated with Mount Fyans Wind Farm, the Project or potential to view both Projects simultaneously. Refer to **Figure 24.**

Theoretically, areas located between both the wind farm projects, ie, areas along Hamilton Highway. Hopkins Highway and Connewarren Lane are likely to view both the Project and Mount Fyans Wind Farm. Hamilton Highway and Hopkins Highway are categorised as major roads and are contain stretches of dense roadside vegetation which helps limit views from the road corridors. There are opportunities to view the two projects from the road, however considering the direction and speed of travel, motorists would have limited opportunities to view both projects. Connewarren Lane Road is a main road which is used to access farm lots and rural dwellings in the area. Patches of dense vegetation along these roads will also contribute towards limiting views of multiple wind farm projects.

Mortlake South, Salt Creek and Mortons Lane Wind Farm

Mortlake South, Mortons Lane and Salt Creek Wind Farms are operating wind farms situated more than 14km from the Project. The wind farms are located on mostly cleared pastoral lands. The turbines at these Projects are significantly shorter than those proposed at the Project Site (up to 260 m in height) with turbines associated with Mortlake South Wind Farm having a 186 m blade tip height and Salt Creek Wind Farm and Mortons Lane Wind Farm consisting of turbines with a 150 m blade tip height.

The Hamilton Highway runs in a generally northwest direction to the north of the Project connecting Hexham and Caramut. When travelling along Hamilton Highway to the northwest of the Project, there are opportunities to view Mortons Lane Wind Farm and the Project simultaneously and when travelling along Hamilton Highway to the northeast of the Project there are opportunities to view Salt Creek Wind Farm and the Project. However, the turbines are located at a distance where they will not be a dominant element in the landscape. Similarly, when travelling along Hopkins Highway, given the distance to the Project, views to the turbines associated with the Mortlake South Wind Farm Project are likely to be difficult to discern for most motorists. Hamilton Highway and Hopkins Highway contain stretches of dense vegetation which is likely to assist in screening views to the Projects from these road corridors. Considering the direction and speed of travel, motorists would have limited opportunities to view both Projects.



Cumulative ZVI

Hexham & Mt Fyans Wind Farm

LEGEND

- Involved Dwelling
- Non-involved Dwelling
- Proposed Turbine Location - Hexham Wind Farm
- 6,000 m from Hexham Wind Farm turbine
- Proposed Turbine Location - Mount Fyans Wind Farm
- 6,000 m from Mount Fyans Wind Farm turbine

ZVI LEGEND:

- **No Visible Wind Farms** (Based on topography alone)
- **Hexham Wind Farm Visible** (Based on topography alone)
- **Mount Fyans Wind Farm Visible** (Based on topography alone)
- **Hexham & Mount Fyans Wind Farm Visible** (Based on topography alone)

N

0 2 4 6 8 10km

Figure 24 Cumulative Zone of Visual Influence - Hexham and Mt Fyans Turbines (Source: VicPlan 2023)

12.4 Cumulative Impact on the Broader Landscape Character and Surrounding Dwellings

The Victorian Government has identified six (6) key Renewable Energy Zones (REZ) in the State's South West, Western, Central North, Murray River, Ovens Murray and Gippsland regions. The Project is located within the extents of the land defined as the Western Victoria REZ. The existing landscape character of the region allows for optimum harvest of wind energy due to the flat to gently undulating topography and minimal obstructions in the landscape. These characteristics are beneficial to the output of wind energy and it is inevitable that overtime this will be utilised for the development of wind farm projects.

The re-occurrence of wind farms within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. As wind farm developments prevail it is important to determine whether the effect of multiple wind farms and other major infrastructure within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

The potential cumulative visual impact must also be considered in relation to the potential visual impact when viewed sequentially. If a number of wind farms are viewed in succession as a traveller moves through the landscape (eg. motorist travel routes or walking tracks) this may result in a change in the overall perception of the landscape character. The viewer may only see one wind farm at a time, but if each successive stretch of the road is dominated by views of a wind farm, then that can be argued to be a cumulative visual impact (EPHC, 2010).

The Project is located on a flat to gently undulating terrain that is surrounded by scattered dwellings. **Section 7.0** of this report highlights that some dwellings near the Project are surrounded by moderate to dense vegetation which will help limit views of the Project. It is, therefore, highly likely that the impact on majority of the private viewing locations will be limited. Considering the likely impact on public viewing locations and important travel corridors such as the Hamilton Highway, it is likely that the turbines will be visible as a key feature in the landscape.

Due to the close proximity of Mt Fyans Wind Farm, it is likely that the Project will be viewed as an extension of this Project. The height of the proposed turbines (tip height 260 m) is generally consistent with the height of the turbines associated with Mt Fyans (200m tip height), and therefore, the regions broader character is likely to be perceived as a landscape that is characterised by operations that harness wind energy.

The maximum tip height of turbines associated with Stockyard Hill Wind Farm is 180 m and maximum tip height of turbines associated with Golden Plains Wind Farm is 230 m. Due to scale and distance of turbines, it is likely that the height difference will not have significant impacts on the existing visual character which is defined by a landscape utilised for wind energy production.

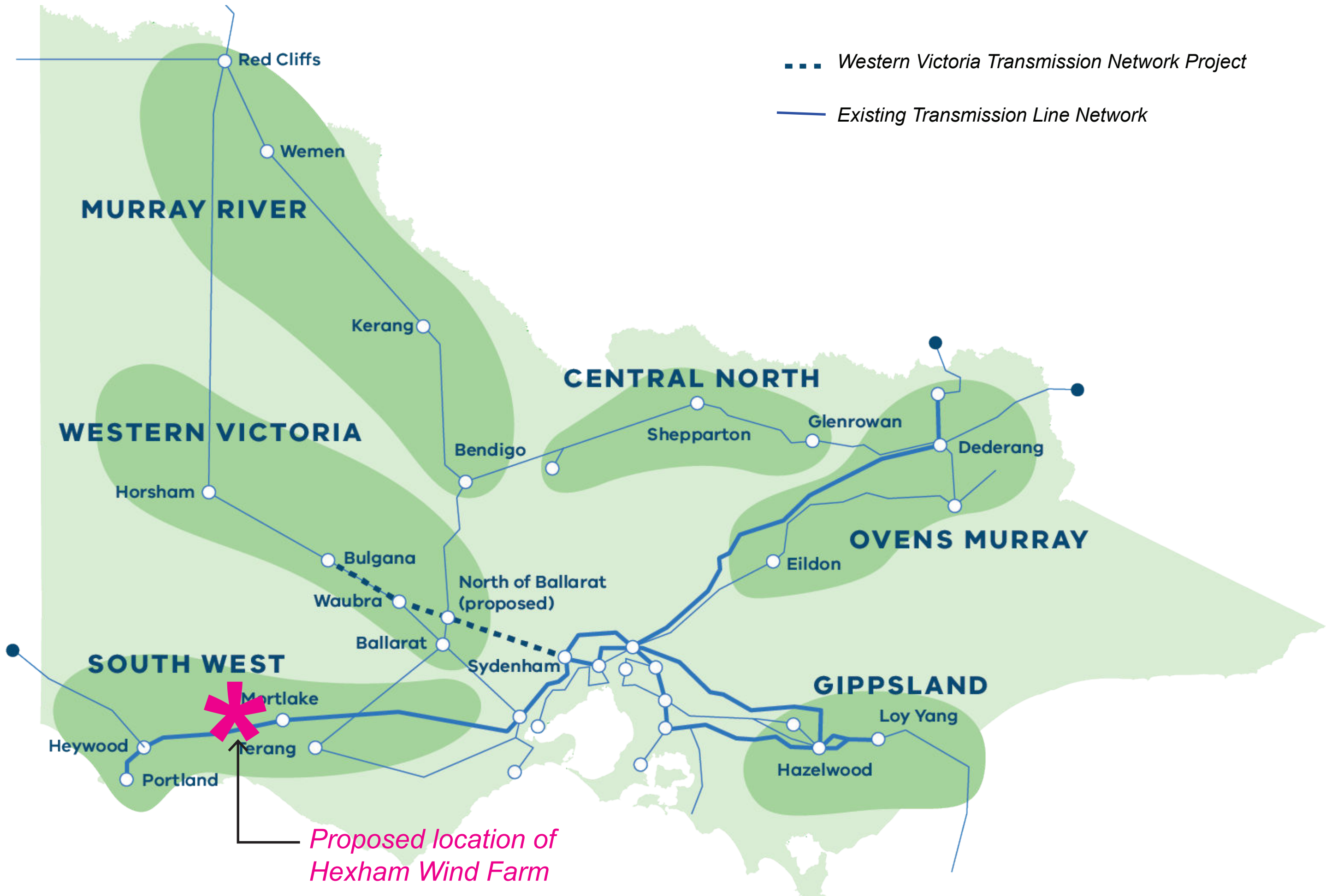
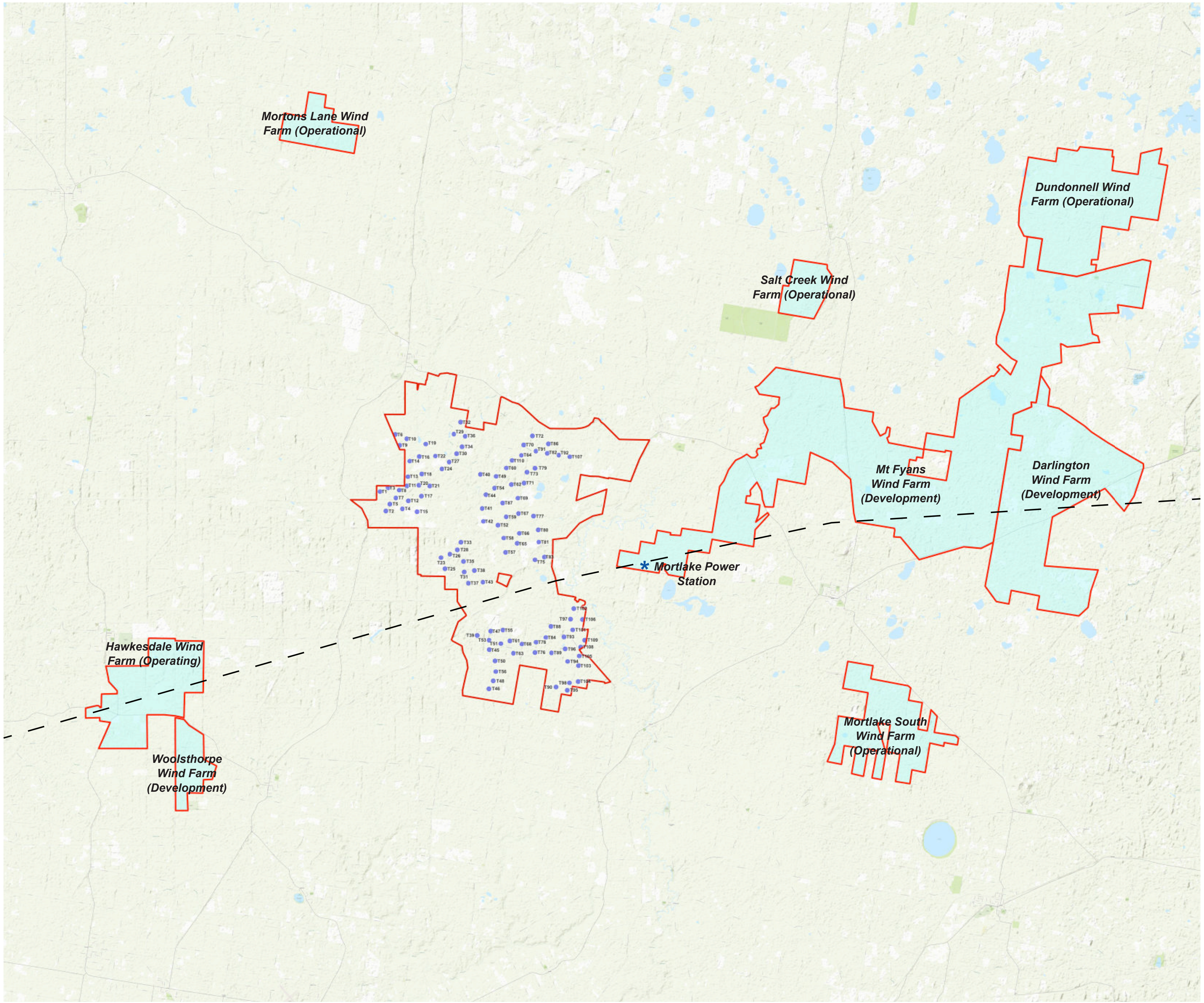


Figure 25: Renewable Energy Zones of Victoria (Source: AEMO 2021)



Cumulative Visual Impacts

Hexham Wind Farm

LEGEND

- Proposed 260 m Turbine Location
- Project Site
- Surrounding wind farm projects
- Existing transmission line

N

0 4 8 12 16km

Figure 26 Nearby Wind Farms (Source: ESRI Imagery 2023)

13 Associated Infrastructure

13.0 Assessment of Associated Infrastructure

13.1 Overview of Associated Infrastructure

In addition to the proposed wind turbines, the associated infrastructure (as described in **Section 3.4** of this report) is likely to contrast with the existing visual landscape. Due to the large scale and elevated siting of the proposed wind farm, access roads, transmission lines and other ancillary structures have the potential to alter the existing visual landscape. An overview of the potential visual impact resulting from associated infrastructure and project components is provided in this section of the report.

13.2 Transmission Lines

Each of the turbines will be connected to an onsite terminal substation via a system comprising of a network of underground and overhead electrical cables, at 33 kV (66kV are an alternate option). Approximately 144 km of underground cabling and approximately 40 kilometres of overhead transmission lines are proposed. Overhead lines are to consist of either single or parallel pole lines (single poles up to 26 m high). The Project is currently being designed to connect to the National Electricity Market via the existing Moorabool to Heywood 500 kV transmission line located within the southern part of the Project Site.

The proposed TL's design is in keeping with the scale and appearance of existing power lines which are an existing element in the landscape.

Proposed mitigation methods to be considered during detailed design phase include:

- *Where possible underground cabling is to be used to connect wind turbines to the electricity grid.*
- *Utilise existing transmission lines where possible.*
- *The route for any proposed overhead transmission lines should be chosen to reduce visibility from surrounding areas.*
- *Plan route to minimise vegetation loss.*
- *Use of subtle colours and a low reflectivity surface treatment on power poles to ensure that glint is minimised.*

Image 31. Existing 500kV Transmission Lines are a visible element in the landscape

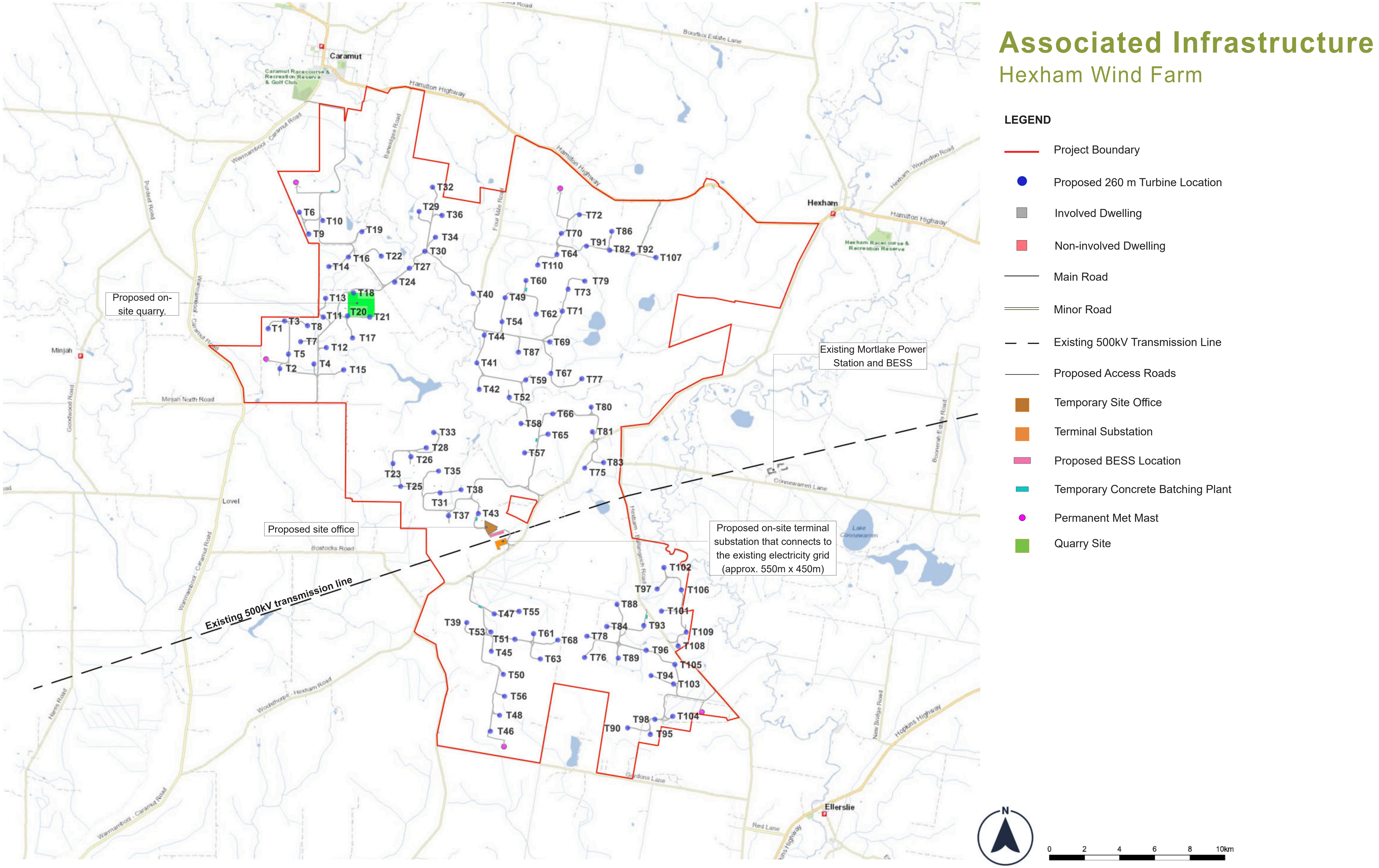


Figure 28 Associated Infrastructure (Source: VicPlan 2023)

13.3 Internal Access Tracks

Access tracks are proposed on site between the wind turbines and connecting to existing arterial roads. 12 site access locations to the Project Area are proposed from two (2) arterial roads and five (5) local council roads.

Internal access tracks will be constructed to provide access to the proposed turbine locations. This includes upgrades to some existing access tracks currently formed within the Project Area and the establishment of new access tracks. Micro-siting of the internal roads is to be undertaken as part of the detailed design and construction process within the development corridor. The access tracks are generally unsealed surfaces.

Generally, the internal tracks have been sited to reduce potential vegetation loss and limit earth work requirements. Due to the existing agricultural land use of the Study Area, farm roads traversing the landscape form a significant part of the existing landscape character. The proposed access tracks are likely to be viewed as part of the existing character of the landscape. Mitigation measures for reducing residual visual impact resulting from the construction of access tracks include:

- *Where possible utilise or upgrade existing roads, trails or tracks to provide access to the proposed turbines to reduce the need for new roads.*
- *Allow for the provision for down sizing roads or restoring roads to existing condition following construction where possible.*
- *Any new tracks must minimise cut and fill and avoid the loss of vegetation.*
- *Utilise local materials where possible and practical.*

13.4 On-site Substation and Battery Energy Storage System (BESS)

The Project will include one on-site terminal substation located adjacent to the existing Moorabool to Heywood 500kV transmission line (refer to **Figure 28**) along Woolsthorpe-Hexham Road. The BESS will be located adjacent to the on-site terminal substation and will be sited on a hardstand area of up to 2 ha.

There are two (2) non-involved dwellings within 2,000 m of the proposed substation/BESS locations (D362 and D356). The substation/BESS is sited in a location that has been previously cleared, however views to the infrastructure are likely to be difficult to discern due to a combination of vegetation and structures surrounding these dwellings. The substation and BESS are likely to be visible from Woolsthorpe-Hexham Road. Following construction, raised earthwork perimeters and or small areas of native tree planting may be undertaken to screen any parts of the substations/BESS that are visible.

The proposed terminal substation design is in keeping with the scale and appearance of existing Mortlake Terminal Station (located approx. 7 km northeast of the proposed substation) which is an existing element in the landscape.

Image 32. Example of unsealed farm road typical of the landscape character in the area

Image 33. Example of screen planting to mitigate a substation

13.5 Meteorological Monitoring Masts

Up to five (5) permanent meteorological monitoring masts are proposed to be located within the Project Area to record wind speed and other meteorological data. The wind monitoring masts will be fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment.

Meteorological masts are generally difficult to discern at a distance and have been sited at least 1km from nearby residences and public viewing locations to reduce impact.

13.6 Operation and Maintenance Facility

A permanent operations and maintenance (O&M) facility will be constructed to provide office and storage and to support the operation of the wind farm.

The proposed O&M facility will have the ability to be screened by proposed screening vegetation. The following mitigation measures would assist in reducing any residual visual impacts:

- *Siting to ensure minimal vegetation loss.*
- *Consideration should be given to controlling the type and colour of building materials used. Where possible a recessive colour palette is to be used which blends into the existing landscape.*
- *Avoidance of unnecessary lighting, signage on fences, logos etc.*
- *Any proposed buildings to be sympathetic to existing architectural elements in the landscape.*
- *Minimise cut and fill and loss of existing vegetation throughout the construction process.*
- *Boundary screen planting is an effective mitigation method which could be utilised to ameliorate potential visual impacts resulting from the construction of ancillary structures with a small vertical scale such as collector substations, switching stations and the operations facilities building.*