Warracknabeal
Energy Park

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Attachment A.4: Preliminary Landscape and Visual Assessment

XURBAN

Warracknabeal Energy Park

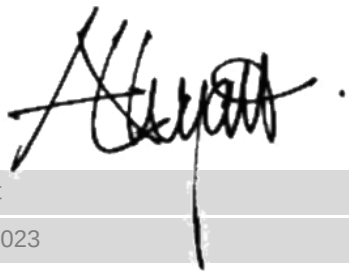
Preliminary Landscape & Visual Assessment

For: Warracknabeal Energy Park Pty Ltd

March 2023 | Final

Warracknabeal Energy Park

Preliminary Landscape & Visual Assessment

Client	**Warracknabeal Energy Park Pty Ltd**
Project No	15187
Version	Final
Signed	
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Date	22 March 2023

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Executive summary

The Warracknabeal Energy Park is situated in a landscape that has a low sensitivity to change. It is a broad-acre rural landscape that has been cleared to create huge areas for farming. The Landscape Assessment Study refers to this landscape character type as '*Big Plains*' and this is illustrative of its character. The flat topography and the extensive clearing has created a large landscape, a landscape which can accommodate the 280 m high wind turbines that are proposed.

The Planning Schemes also reflect the very limited significance given to landscapes within the viewshed. Sensitive landscapes such as the Little Desert National Park, lie just outside or at the edge of the viewshed, whilst the Grampians and Arapiles are more than 50 km distant. Lake Hindmarsh is also just inside the viewshed for the WAEP, however, given the distance to the nearest wind turbine within the WAEP and the slightly dished topography of the lake there would be no visual impact.

Apart from Warracknabeal, urban areas of greater sensitivity are all situated at some distance from the nearest wind turbines. However even when urban areas are closer to the WAEP built form and vegetation will screen views from most locations to the WAEP (refer Chapter 7).

The greatest overall visual impact from publicly accessible locations, whether highways, local roads or from recreation reserves, has been assessed as **low**. Low was defined in the Visual Impact Methodology (Chapter 3) as a "*visual impacts that are noticeable but will not cause any significant adverse impacts*." This describes the impact of wind turbines in this Wimmera landscape.

The visual impact from residential properties has not been assessed in this LVIA. However, landscape mitigation measures which are typically offered as a planning permit condition, to affected residential properties within 6.4 km. This offer can assist in further screening wind turbines if such is the desire of the owner.

The cumulative impact bought about by the presence of other wind farms is also negligible. The nearest wind farm is the Murra Warra Wind Farm to the south and the cumulative impact of the Murra Warra and WAEP has been assessed as low. The Kiata Wind Farm lies to the west and is unlikely to have any cumulative visual impact with the WAEP.

The following preliminary landscape and visual assessment sets out how these conclusions were derived and shows that this is an appropriate location for a wind farm that is entirely consistent with the 'Planning and policy guidelines for Wind Farms in Victoria'.

1. Introduction

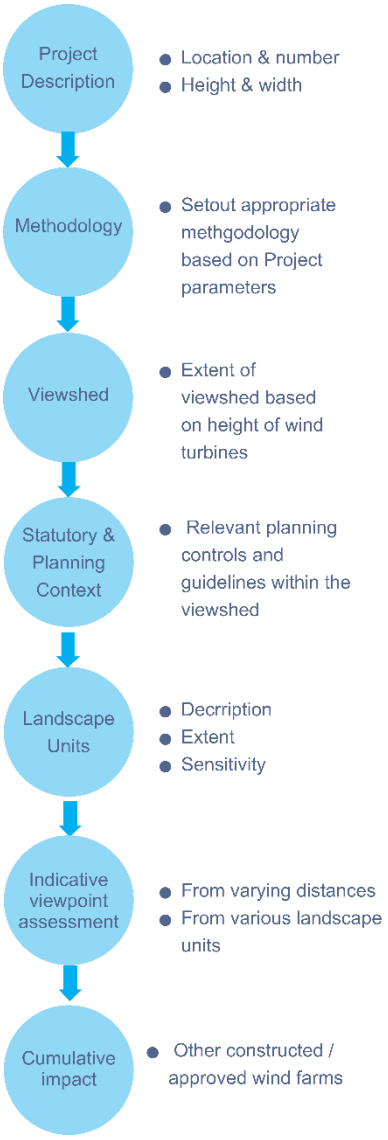
Warracknabeal Energy Park Pty Ltd is seeking a planning permit for the proposed Warracknabeal Energy Park (WAEP) which is to be located to the north and south of Warracknabeal in the Wimmera district of western Victoria.

XURBAN has been engaged by Warracknabeal Energy Park Pty Ltd to undertake this preliminary landscape and visual assessment (PLVIA) of the proposed WAEP to allow the responsible authority to determine if an EES is required.

Report structure

The approach used within this PLVIA is graphically illustrated in **Figure 1**.

Figure 1 *PLVIA report outline*



The PLVIA will firstly describe the visual components of the proposed Warracknabeal Energy Park. The size of the wind turbines and the scale and spread of the wind farm need to be addressed by an appropriate methodology.

The Visual Assessment Methodology is partly determined in response to the project description as well as consideration of best practice examples from other jurisdictions.

The viewshed for the project and the various zones of visual influence are based on the height of the wind turbines and distances at which the wind turbines take up differing percentages of the vertical field of view.

Planning Controls and Guidelines which apply to the land within the viewshed assist in defining the landscape units within the viewshed. For example Significant Landscape Overlays (SLO's) may assist in defining different landscape units.

The landscape character types and their sensitivity to change will be factors considered in assessing the visual impact of the project on selected indicative viewpoints within the viewshed. In this preliminary assessment the indicative viewpoints will be within the public domain.

Assessments of the visual impact from the private domain (ie. from rural and residential properties) will be undertaken as part of the final assessment.

The Statutory Controls also require an assessment of the cumulative landscape and visual impact of the WAEP to this area in the Wimmera.

2. Project description

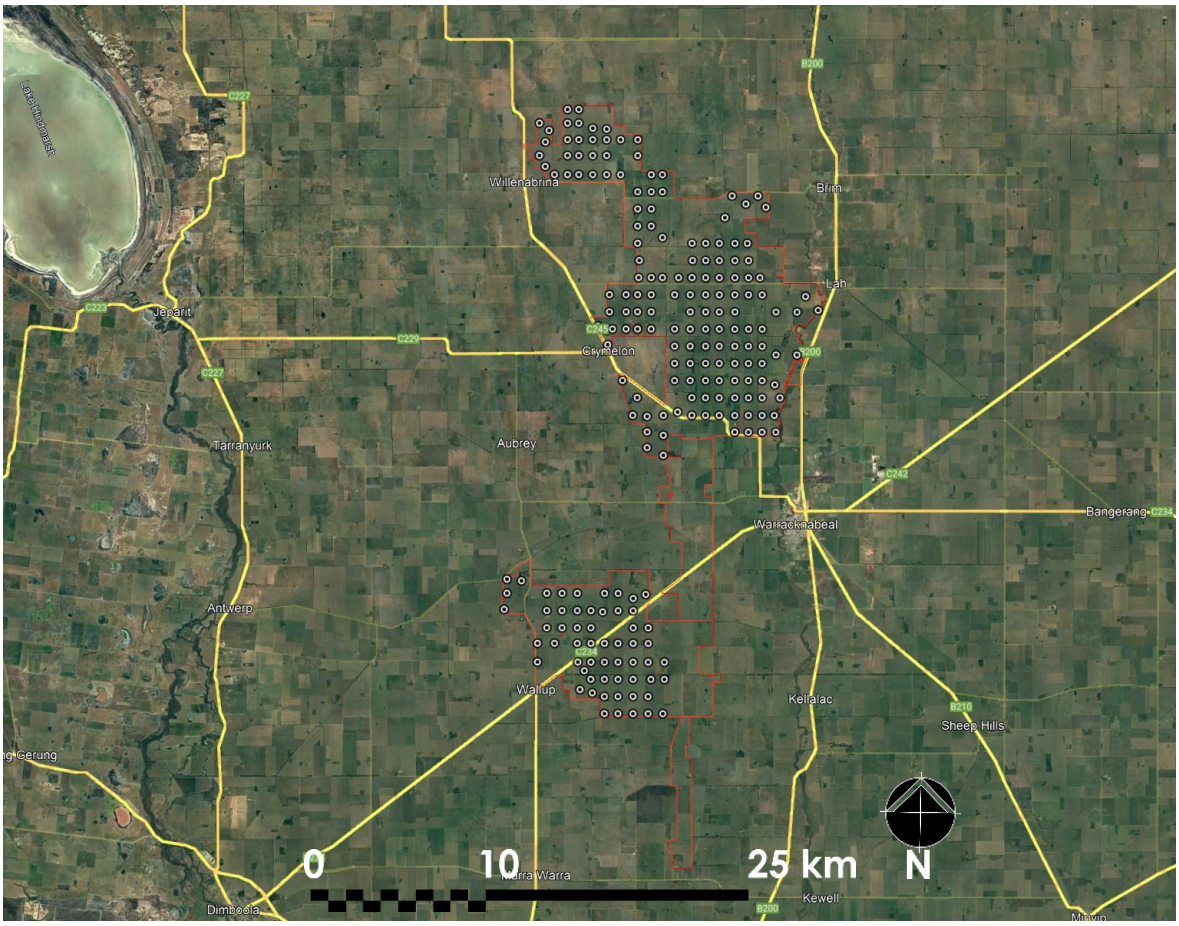
The current layout for the proposed WAEP has 211 wind turbines. Internal and external powerlines, access tracks and substations will form part of the infrastructure for the project.

The primary visual impact of the WAEP will come from the proposed wind turbines, and therefore this preliminary landscape and visual assessment will focus on the 211 wind turbines. Subsequent assessments, if required, will detail the impacts of the proposed infrastructure.

Wind turbines

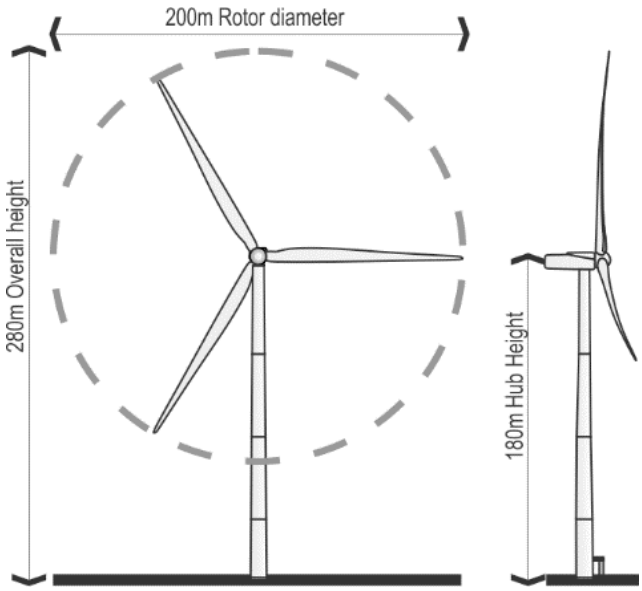
The WAEP project theoretically comprises up to 230 wind turbines, however the indicative layout shown below has 211 wind turbines located to the north west and south west of Warracknabeal. **Figure 2** shows the location of these proposed wind turbines.

Figure 2 *Wind turbine locations (Source: Google Earth)*



The wind turbines will be three bladed wind turbines similar in profile to the wind turbine depicted in **Figure 3**.

Figure 3 *Wind turbine profile*



The wind turbine heights and dimensions are listed in **Table 1.**

Table 1 *Wind turbine parameters*

Number of wind turbines	Hub height	Rotor diameter	Overall height
Up to 230	Up to 180 m	Up to 200 m	Up to 280 m

The wind turbines are proposed to be finished in a light grey colour which is non-reflective.

It is the impact of 211 wind turbines with an overall height of 280 m that will be assessed within this PLVIA.

3. Visual impact methodology

The methodology used within this PLVIA is set out below. The assessment methodology used in this PLVIA is based on previous Landscape and Visual Assessment reports as well as guidelines prepared in Australia and overseas which included:

- *Guideline for landscape character and visual impact assessment, Environmental impact assessment practice note EIA-NO4*, Roads and Maritime Services, NSW, December 2018. This Guideline utilises sensitivity (the qualities of an area) and magnitude (physical scale of the project) in a matrix to derive the level of impact.
- *Guidance Note for Landscape and Visual Assessment*, AILA Queensland, June 2018. This Guidance Note recognises that the "Landscape and Visual Assessment (LVA) should be scoped to reflect the scale of the project".
- *New Zealand Institute of Landscape Architects, NZ (2010) Best Practice Note: Landscape Assessment and Sustainable Management 10.1*.
- *The Guidelines for Landscape and Visual Impact Assessment, Third Edition*, Landscape Institute and Institute of Environmental Management and Assessment (2013). This Guidelines recognises size and scale, duration and reversibility as combining to judge magnitude. Viewer sensitivity and landscape character inform sensitivity. These factors are combined to assess the overall visual impact. This guideline also discusses the use of mapping the area from which wind turbines are visible which is referred to as the Zone of Visual Influence (ZVI) or the Zone of Theoretical Visibility (ZTV). This report will use the Zone of Theoretical Visibility (ZTV) terminology.

The methodology of all these Guidelines and others have overlapping similarities. One point of divergence is the use of matrices, which are still in the NSW Guideline but are not recommended in the British Guidelines. Matrices are not used in this PLVIA.

The methodology used in determining the level of visual impact on publicly accessible and private residential viewpoints is set out below.

Assessment criteria – publicly accessible viewpoints

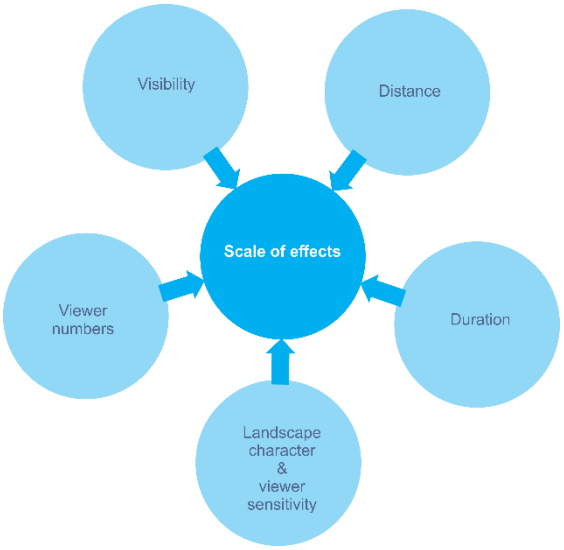
The assessment of the level of visual impact from viewpoints within the public domain is based on five criteria, namely visibility, distance, duration, landscape character & viewer sensitivity and the number of viewers.

The proposed methodology broadly follows the British Guidelines with one area of difference. The British Guidelines combine ratings on viewer sensitivity and landscape character to provide an interim assessment of sensitivity and combine size and scale, duration and reversibility to provide an interim assessment of magnitude. These are then combined to give an overall assessment.

In this LVIA these parameters are evaluated separately and the reversibility factor is not considered appropriate whilst the wind turbines may be removed in the future, the timing of such removal is not relevant to this assessment of wind turbines.

The factors considered appropriate to consider when evaluating the effect of the WAEP on locations within the public domain is graphically shown in **Figure 4.**

Figure 4 *Assessing the visual impact*



- Visibility: The visibility of a wind farm can be affected by intervening topography, vegetation and buildings.
- Distance: The distance of the viewer from the proposed wind farm. The level of visual impact decreases as distance increases.
- Duration: The time duration of a view is also relevant. If a viewing location is static, where people will view the wind farm for some time, or alternatively if the view is momentary then this duration needs to be considered in the overall analysis.
- Landscape character and viewer sensitivity: The character of the surrounding landscape, both around the wind farm and adjacent to the viewing location, must be considered. Generally, a man-modified landscape is considered of low sensitivity and a pristine landscape is considered highly sensitive. A residential townscape would be given a higher sensitivity than an industrial landscape.
- Number of viewers: The level of visual impact increases where there are greater numbers of people able to view the proposed wind farm. The level of visual impact also increases where views are from a recognised vantage point.

These five criteria need to be considered in the assessment of each viewpoint. However, the ratings of each criterion are not numerically based and cannot be simply added together and averaged to arrive at an overall rating which is why matrices are not used in this PLVIA.

Scale of Effects

The scale of effects, for rating the overall visual impact of the proposed wind farm from publicly accessible viewpoints, could range from no impact (**nil**) to a potentially **positive** visual impact. Negative visual impacts are graded from **negligible** to **high**.

Nil – there is no perceptible visual change.

Positive – is a visual change that improves the outlook or view.

Negligible – minute level of effect that is barely discernible over ordinary day-to-day effects. The assessment of a “negligible” level of visual impact is usually based on distance. That is, the proposed wind farm would be at such a distance that, when visible in good weather, the wind turbines would be a minute element in the view within a man-modified landscape or will be predominantly screened by intervening topography and vegetation.

Low – visual impacts that are noticeable but will not cause any significant adverse impacts.

For example, a wind farm in a landscape which is man-modified and which already contains many buildings or other vertical elements may be rated as a low level of visual impact. Similarly, if the distance from which wind turbines are viewed means that their apparent scale is similar to other elements in the landscape, then the visual impact would be assessed as 'low'.

Medium – visual impact occurs when significant effects may be able to be mitigated / remedied.

High adverse effect – extensive adverse effects that cannot be avoided, remedied or mitigated. The assessment of a "high adverse effect" from a publicly accessible viewpoint requires the assessment of all elements to be high. For example, a highly sensitive landscape, viewed by many people from a destination viewpoint, with the proposed wind farm in close proximity and largely visible would lead to an assessment of an 'high' adverse effect.

Residential viewpoints

The assessment of visual impact from residential properties is slightly different to one undertaken from publicly accessible viewpoints. An assessment of viewer numbers is not relevant and the landscape sensitivity is always rated as "high," as it must be recognised that people feel most strongly about the view from their house and from their outdoor living spaces.

The visibility of a wind farm and the distance between the residential location and the development are the two criteria that vary within an assessment of the visual impact from a residential property. Viewer sensitivity is always rated as "high".

In this preliminary assessment the potential landscape and visual impact of the project has not been assessed for any residential viewpoints.

Photomontages

Photomontages can assist in the assessment by illustrating the scale and location of the proposed wind turbines.

This assessment is in part based on photomontages which typically show the changes in a 60^{O} horizontal field of view. This horizontal field of view represents the central cone of view in which symbol recognition and colour discrimination can occur (refer **Figure 7)**. For a wind farm visual assessment, the correct horizontal field of view is important if the photomontage images are to perceptually represent the change in the landscape.

One of the sheets within the photomontage set shows a wireframe view of the computer model to illustrate how the photomontages were derived. Vertical 'poles' or 'cylinders' within this wireframe are merely points on the landscape such as a group of trees, a corner of a planted hedgerow etc., which allow the computer model and the photograph to be accurately aligned. This ensures that the proposed wind turbines are accurately located within the photograph and then the rest of the model is removed and the visible portions of the wind turbines are then rendered into the image.

Seven photomontages have been prepared to assist in the assessment of the visual impact of the proposed WAEP. These viewpoints are discussed later in this report and are appended to this report (Refer Annex A for A3 size photomontages).

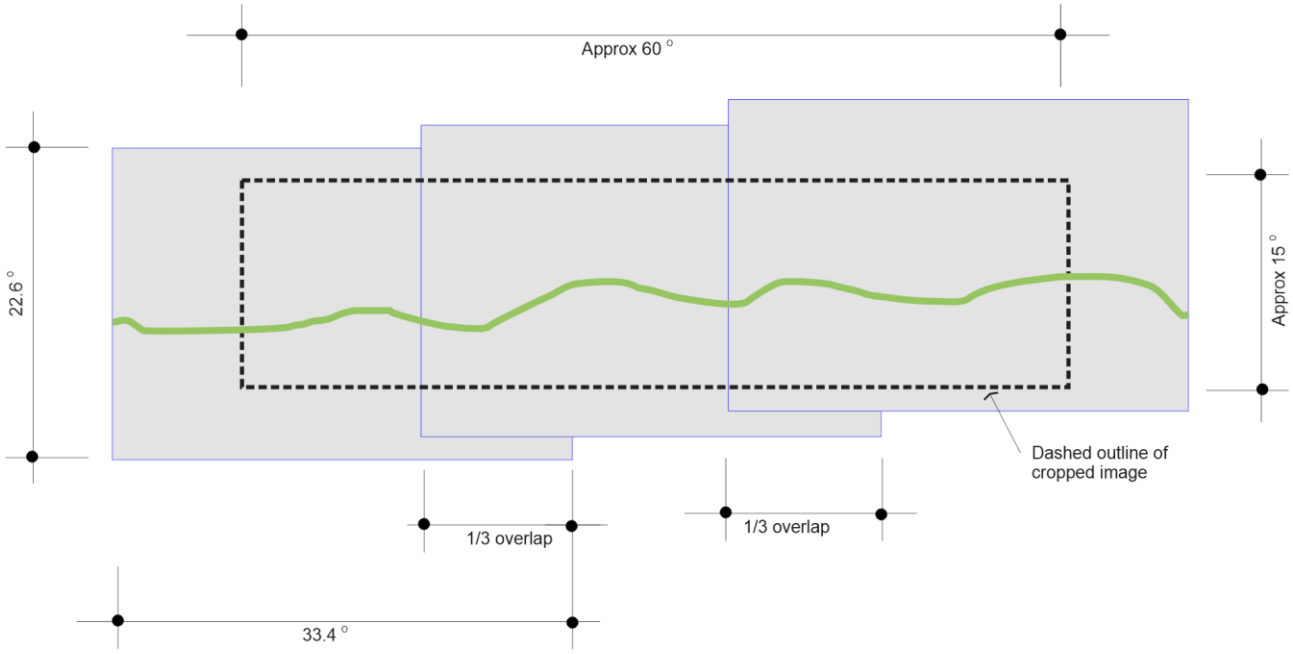
It is recognised that the small photographs and the A3 photomontages included within this assessment whilst technically accurate, are not perceptually accurate. The A3 images, which are annexed to this report (Annex A), are clearer than the smaller images in the text, as these are larger. A0 photomontages will be prepared, if required by the planning authorities, and these provide a clear indication of the actual visual impact – these are perceptually accurate.

Camera data

A 60 mm lens on a Nikon D5 digital camera has a horizontal angle of view of approximately 33^{O} .and a vertical field of view of approximately 22^{O}.
(https://www.bobatkins.com/photography/technical/field_of_view.html)

Figure 5 demonstrates the overlap of the photographs which are used to create the panorama in the 60^{O} FOV photomontages.

Figure 5 *Photomontage construction*



To take the photographs used in the photomontages, the camera is held at eye level, approximately 1.65 m above ground level. Four photographs overlapped 1/3 to create an image approximately the same as the central cone of view of human vision, i.e. 50-70^{O} horizontal and 15^{O} vertical.

Computer modelling and the wireframe model

Cadastral data as well as the proposed development are modelled within a computer program (3D Max). A virtual camera is set up in the model at the GPS coordinates for each of the photographs that are being used within the panorama.

The digital model or wireframe view is then overlaid on the photographic panorama. Known points within survey information such as topography, building locations or other infrastructure are registered into the base photographs (or other predetermined points). For technical accuracy, these points must align. This verifies the location and apparent height and scale of the proposed development.

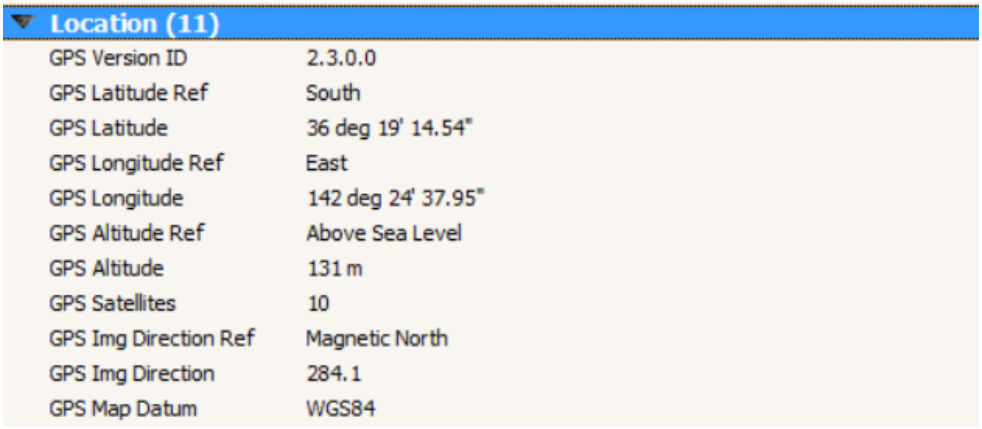
After the background reference points have been aligned, the wireframe is removed, leaving only the wind turbines, which are rendered, either to match the lighting conditions at the time the photographs were taken or, more typically, to maximise the wind turbine's visibility by increasing the contrast against the background sky.

Wider panoramas are used to provide a greater number of reference points for the computer model. These wide-angle views are shown in the wire frame views where reference points were aligned outside of the final 60^{O} view. If the panorama includes a significant number of additional wind turbines, these are also included in the analysis. However, wide angle views, whilst technically correct, do not represent a perceptually accurate representation of the change to a landscape.

GPS Coordinates

The Nikon D5 camera also records the GPS coordinates and bearing as part of the metadata. **Figure 6** shows the Location Meta data for one of the photos used in the photomontage for VP4.

Figure 6 *An example of photography meta data for VP4 (Source: GeoSetter)*



These GPS coordinates are also exported to Google Earth Pro and used within 3D Max where they locate the camera for the model.

Zone of Theoretical Visibility

Typically, mapping the Zone of Theoretical Visibility (ZTV) is undertaken as part of a wind farm visual assessment.

The ZTV mapping delineates those areas from which some or all the wind turbines are screened from view by topography. This analysis does not take into account the screening afforded by vegetation and buildings.

For the WAEP which is located in the Wimmera, the surrounding landscape is exceedingly flat and therefore there is little opportunity for topography to afford screening of the proposed wind turbines.

However, it is recognised that intervening vegetation can screen views to the proposed wind turbines and such screening potential will be discussed later in this report.

Therefore, a ZTV map has not been undertaken as it is assumed that the wind farm is unlikely to be screened by topography.

4. Viewshed and Zones of Visual Influence

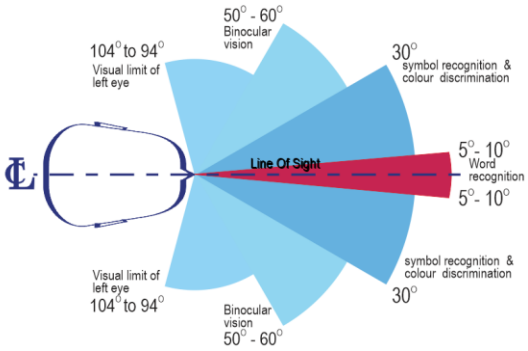
The viewshed is the area that may potentially be visually affected by the wind farm. The viewshed is the study area for visual impact. The viewshed is not the same as the extent of visibility as it may be possible to see the wind turbines from areas outside the viewshed. The viewshed is rather, the area within which the proposed development could create a recognisable impact.

Viewshed calculations

The parameters of human vision include the vertical and horizontal fields of views as shown in **Figure 7** and **Figure 8.** These figures are based on data from '*Human Dimension and Interior Space'*, *Julius Panero & Martin Zellnik, Witney Library of Design,1979*. Similar data can be found in the more recent publication entitled '*The Measure of Man and Woman, Revised Edition', Henry Dreyfuss Associates, John Whiley & Sons, 2012*.

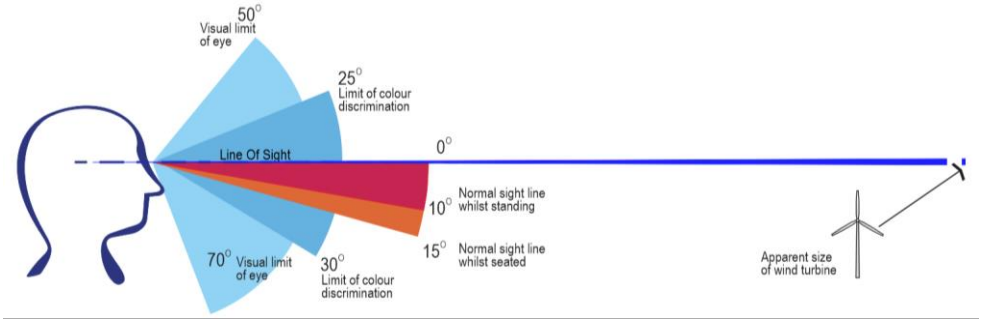
This anthropometric data will form the basis for determining the viewshed for the Warracknabeal Energy Park. **Figure 7** shows the horizontal field of view.

Figure 7 *Horizontal field of view*



The vertical field of view is shown in **Figure 8**.

Figure 8 *Vertical field of view*



The height of the proposed wind turbines is up to 280 m. The viewshed can be considered to extend to a distance at which a 280 m high wind turbine will take up less than 5% of the full vertical field of view. Typically, the field of view of a person is 10°; therefore 0.5° is 5% of the vertical field of view.

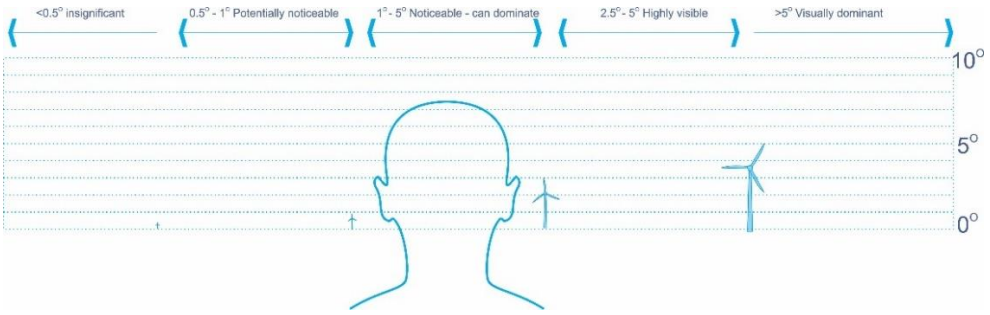
A wind turbine, 280 m high, viewed from a distance of 32 km will take up 5% of the vertical field of view. This assessment therefore uses 32 km as the extent of the viewshed.

Zones of Visual Influence

Similar calculations can also form the basis for determining the Zones of Visual Influence (ZVI) for the proposed wind turbines.

The visual impact of a wind turbine is not equal across the entire viewshed. When a viewer is closer to a wind turbine, the visual impact is greater as the wind turbine takes up a greater percentage of the vertical field of view. The vertical field of view is 10^{O} and **Figure 9** shows how the various zones of visual influence are derived from the proportion that a wind turbine, fully visible, will occupy in the vertical field of view.

Figure 9 *Zones of visual impact*



When a vertical object takes up half the vertical field of view (5^{O}) an object is visually dominant. For a 280 m high wind turbine this occurs at approximately 3.2 km.

This dominant zone and intervening zones of visual impact that will be used within this assessment are set out in **Table 2**.

Table 2 *Zones of visual impact*

Visual Impact	Vertical view angle	Distance
Visually insignificant A very small element in the viewshed, which is difficult to discern and will be invisible in some lighting or weather circumstances.	$< 0.5^{O}$	> 32 km
Potentially noticeable, but will not dominate the landscape The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer, however the wind turbines do not dominate the landscape.	$0.5^{O} – 1^{O}$	16 - 32 km
Potentially noticeable and can dominate the landscape The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer	$1^{O} – 2.5^{O}$	6.4 – 16 km
Highly visible and will usually dominate the landscape The degree of visual intrusion will depend on the wind turbines' placement within the landscape and factors such as foreground screening.	$2.5^{O} – 5^{O}$	3.2 – 6.4 km
Will be visually dominant in the landscape from most viewing locations Unless screened by topography or vegetation, wind turbines will dominate the landscape in which they are sited.	$> 5^{O}$	<3.2 km

The extent of viewshed and the various zones of visual influence are graphically illustrated in **Figure 10**.

Figure 10 Viewshed and zones of visual influence (Source: Google Earth)

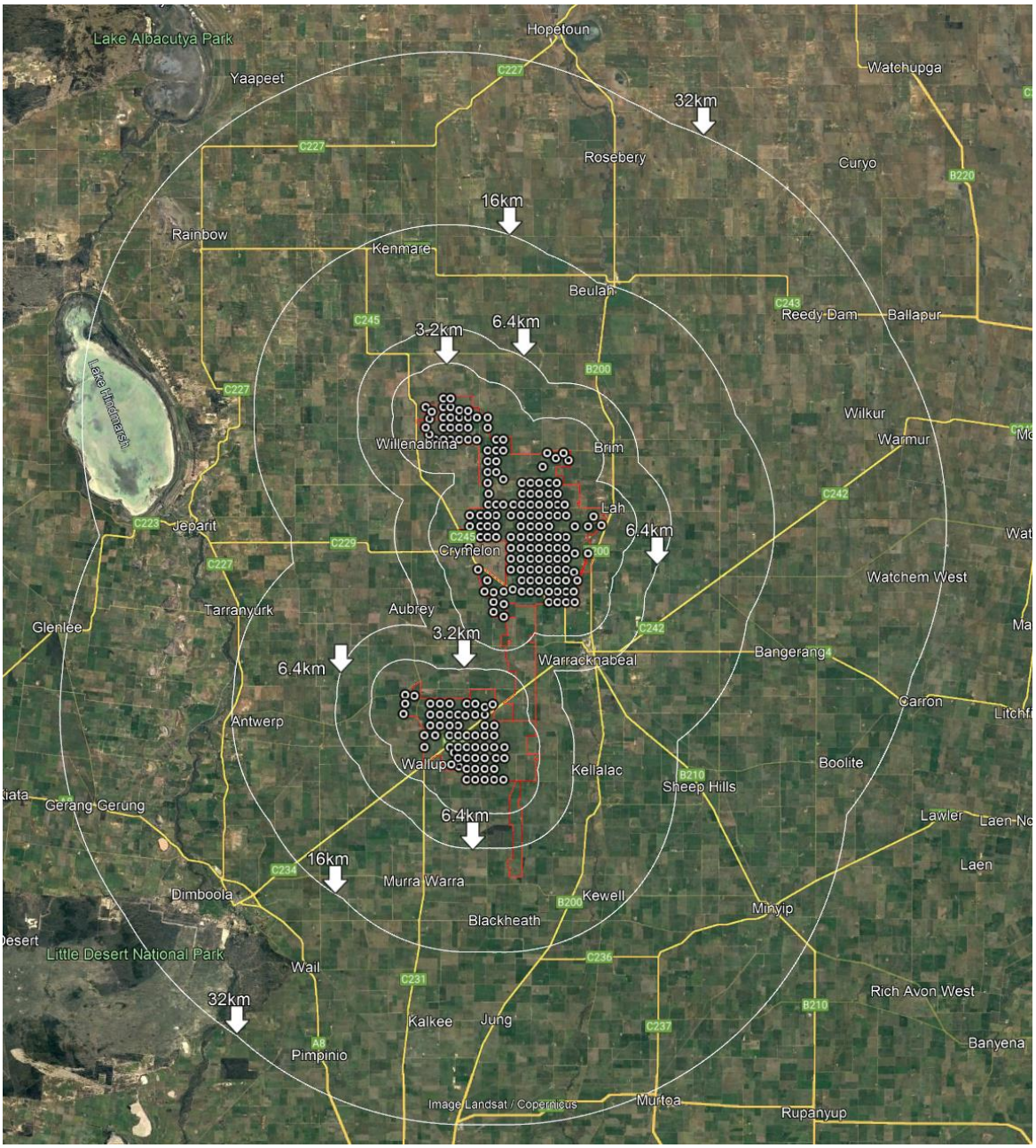


Figure 10 shows the viewshed out to 32 km and the zones of visual influence based on a wind turbine height of 280 m.

This 32 km viewshed and the zones of visual influence, mapped in **Figure 10** will be used as the study area for this PLVIA.

5. Planning policy

The following Planning Policies and Guidelines were considered as part of this assessment.

- The State Planning Policy Framework.
- Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (Department of Environment, Land, Water and Planning, November 2021).
- The site of the proposed WAEP is within the boundaries of the Yarriambiack Planning Scheme. The Yarriambiack Planning Scheme, Horsham Planning Scheme, Buloke Planning Scheme and the Hindmarsh Planning Scheme cover the area within the viewshed.

The implications of these studies are discussed in the following sections.

State Planning Policy Framework

Clause *19.01* of the State Planning Policy Framework sets out the planning policies for Renewable Energy. The objective of the policy is to "*support the provision and use of renewable energy in a manner that ensures appropriate siting and design considerations are met*".

The strategies set out in Clause 19.01 are:

- *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.*

The strategy for the Wimmera Southern Mallee gives policy support for "*the development of locally generated renewable energy, including bioenergy clusters*".

The revised *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria,* DELWP, November 2021 (referred to as the Victorian Guidelines) are also referenced in Clause 19.01. The provisions in the Victorian Guidelines are discussed below.

Victorian Guidelines

Section 2.1 outlines the key objectives in identifying locations for wind energy development.

> *Wind energy facilities should not lead to unacceptable impacts on critical environmental, cultural or landscape values. Critical values are those protected under Commonwealth and Victorian legislation and assets of state or regional significance, mapped and recognised through planning schemes, including the Planning Policy Framework (PPF). To determine suitable locations for new wind energy development, the following matters need to be taken into consideration.*

The Victorian Guidelines, identify the features of the landscape which are:

- *the topography of the land*
- *the amount and type of vegetation*
- *natural features such as waterways, cliffs, escarpments, hills, gullies and valleys*
- *visual boundaries between major landscape types*
- *the type, pattern, built form, scale and character of development, including roads and walking tracks*
- *flora and fauna habitat*
- *cultural heritage sites*
- *the skyline.*

The degree of landscape and visual impact of a wind energy facility depends on the extent of the change to the landscape caused by the development, taking into account:

- *the visibility of the development (including all components: turbines, office compound, construction compound(s), substation(s) and power lines to connect to the electricity network)*
- *the locations and distances from which the development can be viewed*
- *the significance of the landscape as described in the planning scheme (including in an overlay, a relevant strategic study or landscape features referenced in the planning scheme)*
- *landscape values associated with nearby parks described in a schedule to the National Parks Act 1975 or Ramsar wetlands*
- *landscape values associated with nearby land included in the schedule to Clause 52.32-2 of the planning scheme, such as specified areas of landscape and environmental significance, specified coastal locations and areas identified to accommodate future population growth of regional cities and centres*
- *the sensitivity of the landscape features to change.*

Suggested impact reduction *measures*

- *siting and design to minimise impacts on views from areas used for recreation and from dwellings;*
- *locating arrays of turbines to reflect dominant topographical and/or cultural features, such as ridgelines, the coastline, watercourses, windbreaks or transmission lines;*
- *using turbine colour to reduce visual impacts from key public view points;*
- *limiting night lighting to that required for safe operation of a wind energy facility and for aviation safety;*
- *reducing the number of wind turbines with obstacle lights while not compromising aviation safety;*
- *mitigating light glare from obstacle lighting through measures such as baffling; • selecting turbines that are consistent in height, appearance and rotate the same way;*
- *spacing turbines to respond to landscape characteristics;*
- *undergrounding electricity lines wherever practicable;*
- *minimising earthworks and providing measures to protect drainage lines and waterways;*
- *minimising removal of vegetation;*
- *avoiding additional clutter on turbines, such as unrelated advertising and telecommunications apparatus.*

Planning Schemes

These planning scheme zones the land upon which the wind turbines are to be installed and much of the surrounding area within the viewshed, as a Farm Zone (FZ). There is a strip of land along the Yarriambiack Creek and at the Barrat Conservation Reserve that is zoned Public Park and Recreation (PPRZ) and Public Conservation and Resource Zone (PCRZ).

There are no schedules to the PPRZ and the PCRZ within the Yarriambiack or Horsham Planning Schemes.

There are no Significant Landscape Overlays within the 6.4 km band in any of the planning schemes. This is significant as typically visual impact on SLO areas are caused by development in close proximity to the SLO. Beyond 6.4 km the wind turbines are a small component in the vertical field of view. Therefore, the impact on landscape values when the wind turbines are viewed from even greater distances, is not likely to be significant.

This is even more apparent when the significant landscapes are well outside the viewshed. The northern edge of the Grampians is approximately 55 km to the south and the Little Desert National Park is approximately 25 km to the south west. Neither of these landscapes will be impacted by the proposed wind farm.

There is an Environmental Significance Overlay (Schedule 2) within the Yarriambiack Planning Scheme.

Schedule 3 to the Environmental Significance Overlay (ESO3)

The Highways Environs Protection overlay applies to a section of the Borung Highway and the Horsham Kalkee Road in the south west of the viewshed.

The environmental objectives include:

- *To maintain and enhance the safety and amenity of main roads.*
- *To preserve and enhance the tree lined character of the roadsides along the approaches to the urban townships and along main roads.*
- *To preserve and improve scenic views from Road Zones and to preserve and enhance the visual character of the areas adjacent to the Road Zones approaching and within the townships.*
- *To discourage the intensification of development in undesirable locations.*
- *To protect the Wimmera River watercourse and its environs as a significant natural landscape.*

The amenity and safety of these roads will not be impacted by the proposed Warracknabeal Energy Park. There are no identified scenic views along either road corridor and the presence of wind turbines would not be a disconcerting element in this landscape. The visual impacts are assessed in greater detail later in this report.

Schedule 3 to the Environmental Significance Overlay (ESO2)

There are overlays applicable to areas around Dimboola which is in the Hindmarsh Planning Scheme. Designated areas include the Wimmera River (which flows through Dimboola) and the Little Desert National Park. The Wimmera River is within Schedule 3 to the Environmental Significance Overlay (ESO3).

The environmental objectives are:

- *To maintain and enhance the quality and supply of irrigation and domestic water throughout the Wimmera region.*
- *To protect water reservoirs and channels from potential sources of pollution.*
- *To control the development of land in the vicinity of water supply reservoirs and supply channels.*
- *To prevent the unauthorised diversion of water into or from water channels.*

The Wimmera River is at the edge of the viewshed. There will be no impact on the environmental qualities protected by this overlay as a result of the proposed WAEP.

Areas apart from the Farm Zone (FZ) other small areas within the viewshed include ‘Public Conservation and recreation Zones’ (PCRZ). The potential visual impact on the PCRZ land will be assessed later in this report.

It is noted that both the Grampians and the Arapiles are outside the viewshed.

The Western Victoria Landscape Assessment Study

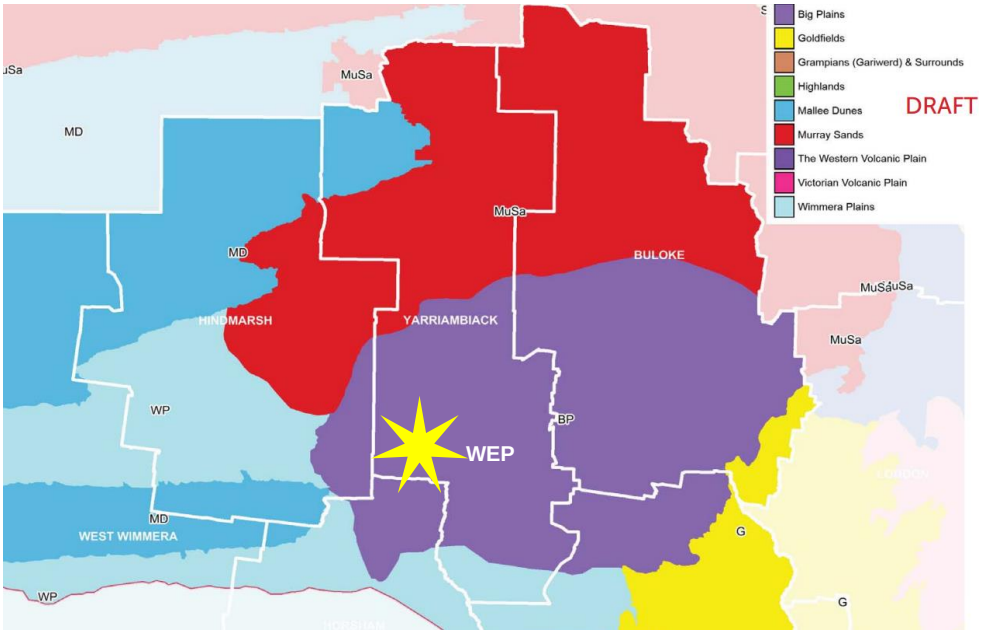
A draft of the Western Victoria Landscape Assessment Study (WVLAS) has been released. It is not a referral document as it is not referenced in either the *Horsham Planning Scheme*, , *Buloke Planning Scheme*, *Hindmarsh Planning Scheme* nor the *Yarriambiack Planning Scheme*.

The Draft WVLAS identifies the area of the WAEP as within the Big Plains Landscape Character Type which is described as:

> *The Big Plains (BP) is a highly productive landscape with a flat landform. There is limited remnant vegetation and boundless views are available across the plains to broad horizons that meet an even bigger sky."*

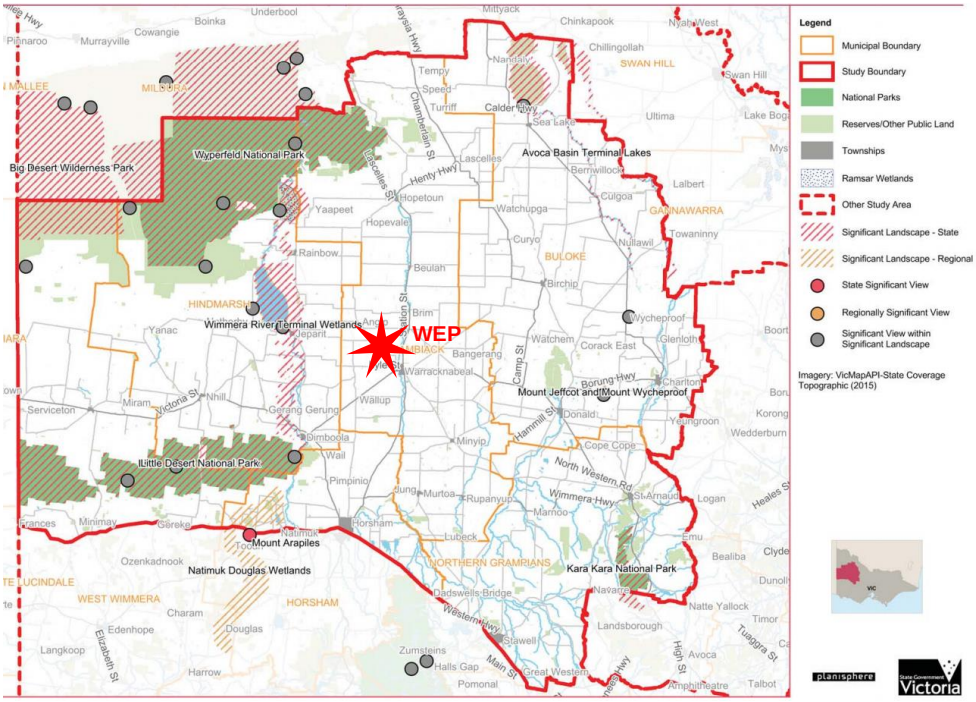
The location of the WAEP (designated with a yellow star) and the surrounding character types are shown in Figure **11**.

Figure 11 *Wind farm location within WVLAS (Draft)*



The WVLAS (Draft) also identifies significant views and significant landscapes. These are shown in Figure **12**.

Figure 12 *Significant views & significant landscapes (WVLAS)*



The location of the WAEP is designated by a red star in **Figure 12**. There is a "*Significant Landscape – State*" identified along the Wimmera River running north from Dimboola where a small section lies just outside the viewshed.

The WVLAS does not identify any significant view in the areas within 16 km of the wind farm. The '*Significant View within Significant Landscape'* identified are:

- to the south west near Dimboola; and
- Mount Jeffcot and Mount Wycheproof which lie more than 50 km to the east of the wind farm.

The WAEP would have no impact on these significant landscapes or significant views identified within the WVLAS.

6. Landscape units

Landscape units are areas with similar visual characteristics in terms of topography geological features, soils, vegetation and land use.

The areas surrounding the Warracknabeal Energy Park are predominately cleared flat farmland, with existing infrastructure including roads, transmission lines, telecommunications towers, power lines as well as typical agricultural infrastructure including silos, farm sheds and houses.

Topography

The WAEP is located within the Wimmera district 40 km north of Horsham to the north and south of Warracknabeal.

The area within the viewshed is very flat. Murtoa, on the southern side of the viewshed is at approximately 138 AHD. At Dimboola to the west the land is at approximately 125 AHD. Warracknabeal in the centre of the WEWP is at 115 AHD and Minyip to the east is at approximately 129 AHD.

Given that the viewshed spans more than 100 km, the overall fall across this landscape is approximately 60 metres in 100 km, a resultant fall of less than 1:1500. The land however does not fall evenly and there are areas in which the fall is greater, for example the entry into Dimboola.

The disjointed drainage pattern visible within the viewshed (see Figure **9**) and the presence of an extensive channel system underline just how flat are the areas within the viewshed.

Vegetation

The majority of the area within the viewshed is broad acre rural farmland with little remnant vegetation.

There is some vegetation along road reserves and drainage lines such as the Yarriambiack Creek, which runs parallel to and on the east side of the Henty Highway.

The Barrat Fauna and Fauna Reserve (Barrat FFR) is a Nature Conservation Reservation (2.2 km^2) to the south of the WAEP. It is not a tourism destination, although there are 4WD tracks in an area of bushland between the reserve and Barrat Road to the north.

Figure 13 *Barrat FFR (Map source: Protected Planet, UN mapping)*

Land use

The dominant land use throughout the viewshed is farming. The land is predominately cleared for agricultural uses.

Horsham lies beyond the southern edge of the viewshed. There are small townships within the viewshed, they include:

- Warracknabeal
- Dimboola
- Minyip
- Murtoa
- Jeparit
- Beulah
- Antwerp
- Brim
- Arkona

Landscape Units

Based on this analysist, three landscape units have been identified within the viewshed of the WAEP. These are:

- Townships
- Agricultural land
- Reserves, recreation & conservation areas

Landscape Unit 1 – Townships

'Landscape Unit 1 – Townships' describe the urban areas within the viewshed. These range from the large country town of Warracknabeal to the small village of Minyip. Within the catchment there are also small villages associated with silos on the rail line which have been pained by artists and are a tourist attraction (Brim and Arkona).

Landscape Unit 2 - Agricultural land

'Landscape Unit 2 - Agricultural land' describes the farmland areas within the viewshed. This landscape unit may include some vegetation along roadsides and within drainage lines such as the Yarriambiack Creek. These areas of vegetation are typical, although infrequent, within this farming landscape in the Wimmera.

Landscape Unit 3 – Reserves, recreation & conservation areas

'Landscape Unit 3 – Reserves, recreation & conservation areas' describes those areas that are set aside for conservation or tourism. They will include the Barrat FFR as well as areas within the Little Desert National Park. They also include the recreation reserves.

Given that the Sailors Road Public Cemetery may have a tourism focus, this has also been included within this Landscape Unit.

Also included within this landscape unit is the Yarriambiack Creek which runs through Warracknabeal in a north south direction. Brim lies on this creek in the north of Warracknabeal and Kellalac is adjacent to the creek on the Henty Highway to the south of Warracknabeal. The Wimmera River is also included. The Wimmera River lies on the western edge of the viewshed and parallels the Dimboola-Rainbow Road between Dimboola and Jeparit.

Landscape & viewer sensitivity

Landscape sensitivity is defined as the ability of a landscape to absorb change and the visual impact such a change may have on a viewer. **Table 3** describes the sensitivity ratings for each of the landscape units.

Table 3 *Landscape sensitivity*

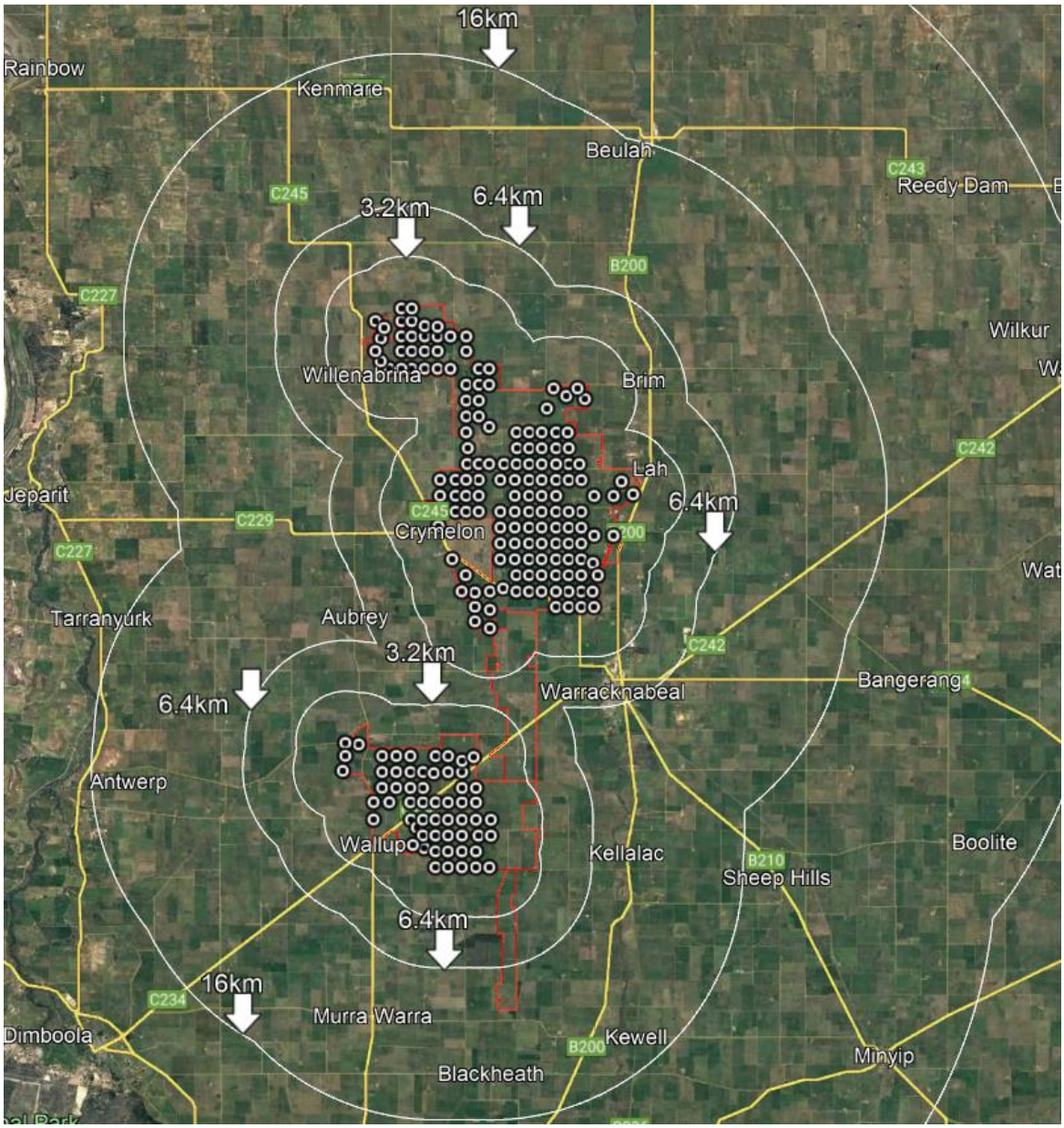
Landscape unit	Sensitivity	Rationale
Unit 1 - Townships	Medium	Townships afford views over the surrounding landscape for a larger group of people. These views from urban areas are appreciated and changes are of a concern to residents.
Unit 2 – Agricultural land	Low	Agricultural land undergoes regular seasonal change (cropping, ploughing etc) and contains other large scale vertical elements such as grain silos and transmission lines.
Unit 3 – Reserves, recreation & conservation areas	High	Reserves, especially when they are valued for their scenic qualities, are sensitive to nearby changes which may impact on these qualities and values.

These sensitivity ratings will form part of the assessment in the following chapters of this report.

7. Townships and urban areas

Figure 14 shows the urban areas within the 16 km of the WAEP. Apart from Warracknabeal, these are very small townships.

Figure 14 *Urban areas within the viewshed*



The mapping in **Figure 14** makes it clear that there are few townships the 16 km of the nearest wind turbine. That is, a wind turbine at this distance, will at most be "**Potentially noticeable, but will not dominate the landscape"** (Refer **Table 2**).

Warracknabeal, Beulah, Brim, Antwerp, Lah, Kellalac and Kewell are located between 6.4 km to 16 km from the nearest wind turbine. Minyip and Jeparit are within the viewshed but are within the 16-32 km viewshed band.

Horsham, the largest town in the Wimmera, is well outside the 32 km viewshed boundary. The following sections will examine a sample of these urban areas to ascertain the likely visual impact of the WAEP from these urban areas which are of greater sensitivity.

Warracknabeal

Warracknabeal lies in the centre of the WAEP with wind turbines proposed both to the north and south of Warracknabeal. The centre of Warracknabeal is approximately 6 km from the northern cluster of wind turbines and approximately 9 km from the southern cluster.

Figure 15 *The town centre of Warracknabeal*

Figure 16 *The outskirts of Warracknabeal*

Figure 15 and **Figure 16** shows some of the infrastructure within Warracknabeal which includes power poles and telecommunications tower. However, there is limited potential for visibility of the proposed wind turbines as these would be screened by intervening built form and vegetation.

Although township areas are considered sensitive locations and the duration for many locations would be considerable, the screening of the turbines by built form and vegetation will mean that the overall visual impact from the township of Warracknabeal is assessed as **negligible** to **nil**.

Beulah

The township of Beulah lies on the Henty Highway approximately 16 km north of the nearest wind turbine.

Figure 17 *Beulah township*

From the township, the existing buildings and vegetation would screen all views to the wind farm except for those properties at the southern edge of the town without intervening vegetation.

Although township areas are considered sensitive locations and the duration for many locations such as the outside areas of the Memorial Hall in **Figure 17** would be considerable, the screening of the turbines by built form and vegetation will mean that the overall visual impact from the township of Beulah is assessed as **negligible** to **nil**.

Brim

Brim is a small urban area adjacent to the rail line on the Henty Highway approximately 20 km north of Warracknabeal. The township is centred on the grain storage silos which have been painted to commemorate local workers. This artwork is shown in **Figure 18**.

Figure 18 *Grain storage silos in Brim looking east from the Henty Highway*

The view from the Henty Highway to the artwork is away from the wind turbines, so their relationship to the surrounding landscape and the significance of the artwork would not be visually impacted by the proposed wind turbines.

The closest wind turbine (T038) is approximately 4km west of Brim. However the Yarriambiack Creek, runs along the western edge of the township and views across the plain to the nearest wind turbines would be screened by intervening vegetation along the creek. Therefore, the overall visual impact from the township of Brim is assessed as **negligible** to **nil**.

Antwerp

Antwerp lies approximately 16 km to the west of the southern cluster of the WAEP. The nearest wind turbine is T154 on the north western corner of the southern cluster of wind turbines.

Figure 19 *Antwerp township*

From the township, the existing buildings, street trees and vegetation in gardens would screen views to the wind farm except for those properties at the eastern edge of the town. Therefore, the overall visual impact from the township of Antwerp is assessed as **negligible** to **nil**.

Minyip

Minyip lies approximately 27 km to the south east of the WAEP. The nearest wind turbine is T211 on the south eastern corner of the southern cluster of wind turbines.

Figure 20 *Minyip township*

From the township, the existing buildings, street trees and vegetation in gardens would screen views to the wind farm except for those properties at the western edge of the town. Therefore, the overall visual impact from the township of Minyip is assessed as **negligible** to **nil**.

Jeparit

Jeparit lies approximately 23 km to the west of the WAEP. The nearest wind turbine is T023 which is in the northern cluster of wind turbines.

Figure 21 *Jeparit township*

The town centre has well established street trees and verandahs and built form to the footpath edge.

The residential areas also have well established street trees and gardens.

Figure 22 *Jeparit residential areas*

From the township, the existing buildings and street trees and vegetation in gardens would screen views to the wind farm except for those properties at the western edge of the town. Therefore, the overall visual impact from the township of Jeparit is assessed as **negligible** to **nil**.

Overall visual impact from townships

As a result of distance to most of the urban areas surrounding the WAEP and the presence of intervening vegetation and built form the wind turbines will not be a dominant visual element and for most locations from within these urban areas the visual impact would be assessed as **negligible** to **nil**.

Warracknabeal is in the centre of the two wind turbine clusters which make up the WAEP and is closer to the WAEP than most of the other urban areas. However, views to the wind turbines from the town would be limited by vegetation and built form and therefore the visual impact would be assessed as **negligible** to **nil**.

The visual impact from properties at the periphery of the town is potentially greater and this potential impact will be assessed from individual viewpoints such as those on the edge of Warracknabeal (VP 5 and VP7).

8. Public domain viewpoints

Viewpoints in the public domain allow for a finer detail in the assessment that that in the previous chapter which examined the likely visual impact of the WAEP from urban areas in the viewshed.

Viewpoints discussed below have been selected as representative of the range of views available to provide a basis to assess the overall visual effects of the proposed wind farm. The selected viewpoint locations are shown in **Figure 23**.

Figure 23 *Viewpoint locations (Map source: Google Earth Pro)*

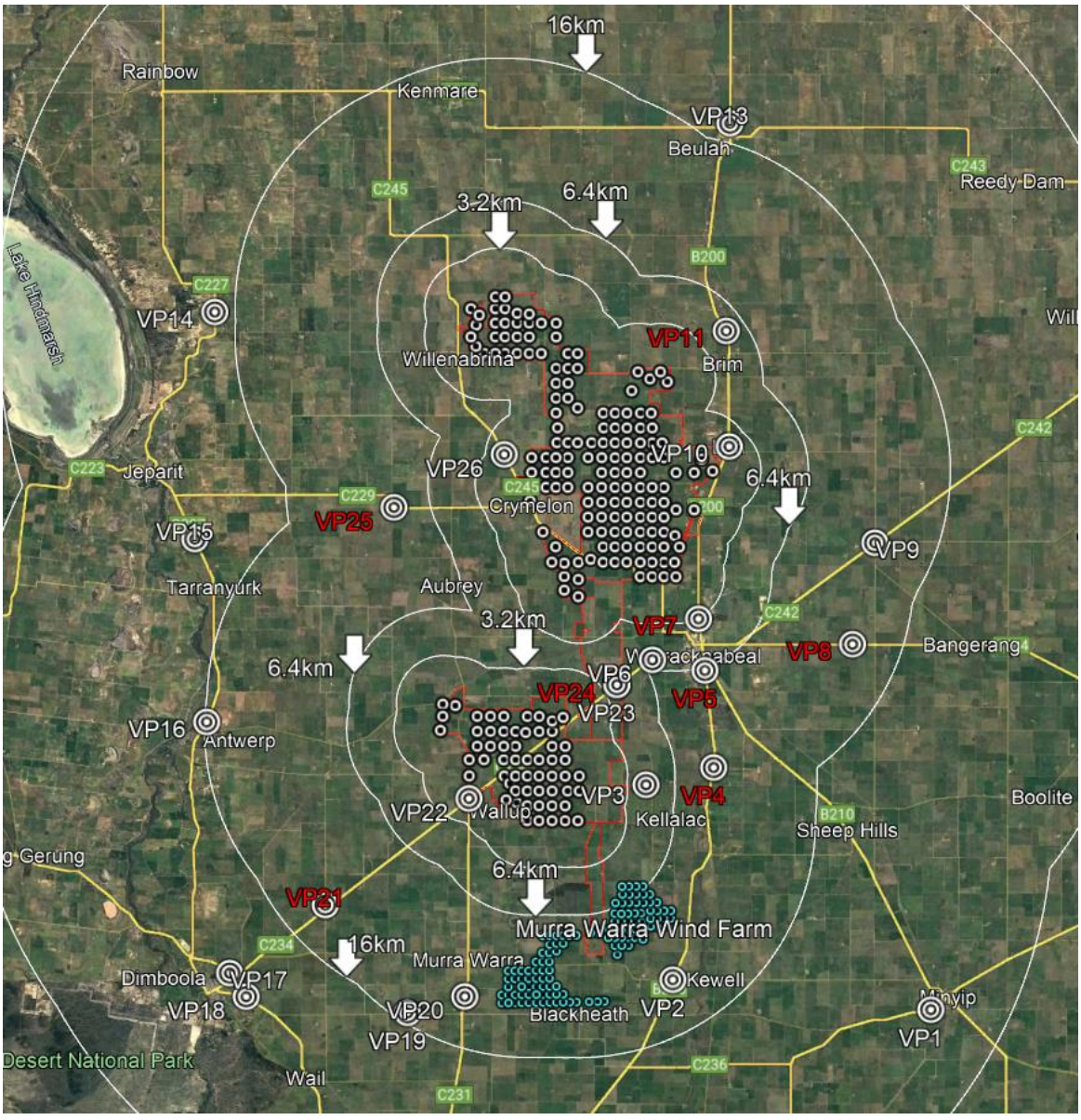


Figure 23 shows the viewpoint locations. Viewpoints for which a photomontage has been prepared are designated by red lettering, whilst other viewpoints are shown in white lettering. The locations of the proposed wind turbines are also shown in **Figure 23**. **Table 4** show the location of each viewpoint and the distance and bearing to the nearest wind turbine.

Table 4 Viewpoint locations

Viewpoint number	Location	Distance to nearest wind turbine	Bearing
VP 1	Donald-Murtoa Road, west of Minyip	27 km (T211)	298^{O}
VP 2	Junction of Henty Highway and Minyip-Dimboola Road	12.5 km (T211)	330^{O}
VP 3	Ailsa Road, west of Inksters Road	4.5 km (T200)	265^{O}
VP 4	**Henty Highway #1, outside Warracknabeal Aerodrome**	9.0 km (T193)	266^{O}
VP 5	**Henty Highway #2, south of Warracknabeal**	10 km (T162)	252^{O}
VP 6	Borung Highway #1, west of Warracknabeal	7.1 km (T162)	237^{O}
VP 7	**Henty Highway #3, north of Warracknabeal**	3.2 km (T150)	332^{O}
VP 8	**Borung Highway #2, east of Warracknabeal**	12.7 km (T150)	291^{O}
VP 9	Warracknabeal-Birchip Road, north east of Warracknabeal	12.3 km (T110)	280^{O}
VP 10	Henty Highway #4, at Lah, north of Warracknabeal	1.8 km (T077)	216^{O}
VP 11	**Henty Highway #5, intersection of Wardles Road West**	5.1 km (T038)	230^{O}
VP 12	Henty Highway #6	10.1 km (T030)	237^{O}
VP 13	Henty Highway #7, at Beulah	17.7 km (T014)	220^{O}
VP 14	Dimboola-Rainbow Road #1, east of Lake Hindmarsh	17.3 km (T003)	90^{O}
VP 15	Dimboola-Rainbow Road #2, south east of Lake Hindmarsh	22.4 km (T089)	80^{O}
VP 16	Dimboola-Rainbow Road #3, at Antwerp	15.8 km (T164)	92^{O}
VP 17	Western Highway #1 – north of Borung Highway intersection at Dimboola	21 km (T186)	51^{O}
VP 18	Western Highway #2 – south of Borung Highway intersection at Dimboola	21.21 km (T186)	45^{O}
VP 19	Old Minyip Road, east of Dimboola	15.3 km (T207)	32^{O}
VP 20	Blue Ribbon Road, north of Old Minyip Road and the Sailors Home Hall	12.6 km (T207)	20^{O}
VP 21	**Borung Highway #3, intersection with Katyil-Wail Road**	14.2 km (T201)	59^{O}
VP 22	Borung Highway #4, intersection with Blue Ribbon Road	1.6 km (T186)	3^{O}
VP 23	Borung Highway #5 looking north	6.5 km (T153)	336^{O}
VP 24	**Borung Highway #6 looking south west towards Murra Warra Wind Farm**	4 km (T162)	240^{O}
VP 25	**Jeparit-Warracknabeal Road, north west of Warracknabeal**	8.8 km (T089)	80^{O}
VP 26	Rainbow Road, north west of Warracknabeal	1.9 km (T066)	94^{O}

The viewpoints that are bolded are those viewpoints for which a photomontage has been prepared. The Photomontages taken from publicly accessible viewpoints were selected at distances ranging from 3.2 km (VP 7) to 14.2 km (VP21). This gives a range of distances from which the visual impact of the proposed WAEP can be assessed. As well as different distances, the photomontages have also been prepared at different bearings.

VP1 - Donald-Murtoa Road, west of Minyip

VP 1 is located on the western edge of Minyip and is approximately 27 km from the nearest wind turbine (T211). In **Figure 24 t**he WAEP would be located behind the trees to the right of the Donald-Murtoa Road.

Figure 24 *VP1 looking north west*

At this distance the wind turbines would be just visible behind the trees for drivers leaving Minyip. The duration of the view would be limited and therefore the overall visual impact is assessed as **negligible**.

VP2 – Junction Henty Highway & Minyip-Dimboola Road

VP2 is approximately 12.5 km from the nearest wind turbine (T211). The wind turbines visible in **Figure 25** are the constructed wind turbines which are part of the Murra Warra Wind Farm. The closest wind turbine in the Murra Warra Wind Farm is approximately 3.2 km from VP2.

Figure 25 *VP2 looking north west*

The wind turbines of the WAEP will be visible in the background behind the Murra Warra wind turbines. Given the distance of 12.5 km to the nearest WAEP wind turbine and the presence of the Murra Warra wind turbines in the foreground the overall visual impact is assessed as **negligible**.

VP3 – Ailsa Road, west of Inksters Road

VP3 is approximately 4.5 km from the nearest wind turbine (T200). **Figure 26** shows the view looking westward along Ailsa Road.

Figure 26 *VP3 looking west*

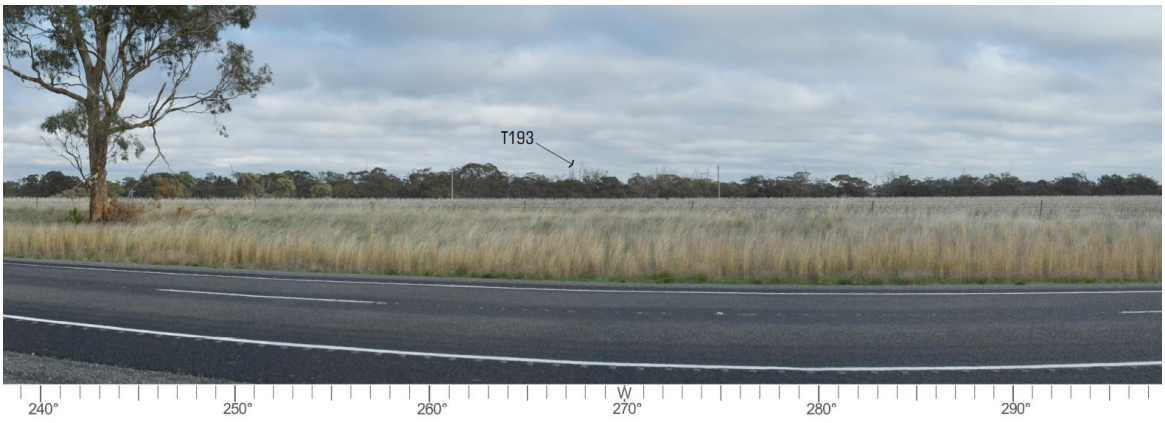
The rural landscape is flat with some scattered vegetation, but no vegetation that would screen the wind turbines. At this distance the wind turbines will be a conspicuous element in the landscape. Viewer numbers would be low as this is a local road. For these reasons the overall visual impact is assessed as **low** to **negligible**.

VP4 – Henty Highway#1, outside Warracknabeal aerodrome

VP4 is approximately 9 km from the nearest wind turbine (T193) and is located at the entry to the aerodrome. The Yarriambiack Creek runs parallel to the Highway between this viewpoint and the wind turbines.

Figure 27 is a photomontage that shows the impact at this distance and to also illustrates the screening impact of the narrow band of intervening vegetation which runs along the creek.

Figure 27 *VP4 photomontage looking west*



At this distance, without intervening vegetation, the wind turbines would be apparent in the landscape. However, the intervening creek side vegetation screens all but the top of the blades, which are visible above the tree canopies. The movement of the blades will attract the eye and because of this movement these will be more apparent than shown in the photomontage, but they will still be a relatively small element in this landscape. Therefore the overall visual impact is assessed as **negligible**.

VP5 – Henty Highway#2, south of Warracknabeal

VP5 is approximately 10 km from the nearest wind turbine (T162) just at the entry into Warracknabeal and at a location that is approximately midway between the norther and southern clusters of wind turbines.

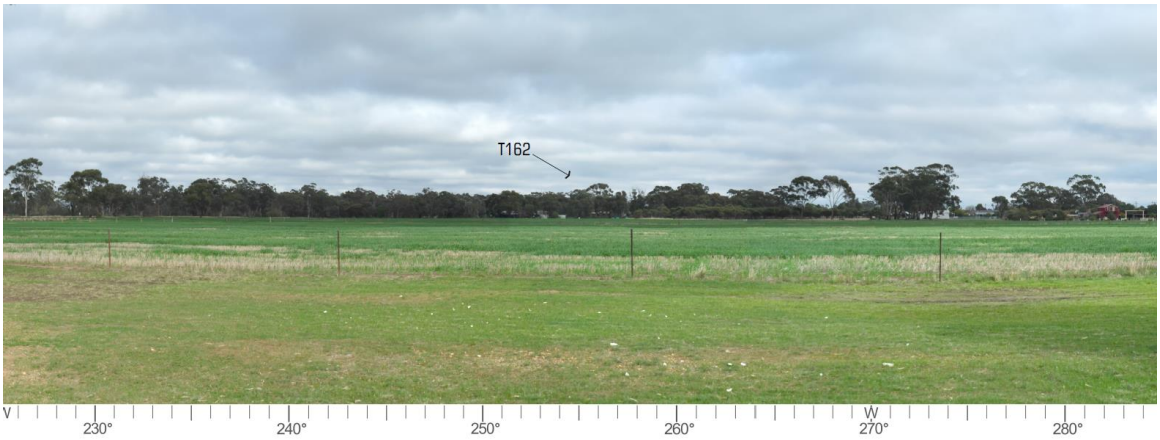
Vegetation along the Yarriambiack Creek is visible in **Figure 28** as well as other vegetation in the Warracknabeal township.

Figure 28 *VP5 looking north east to the northern cluster*

Views to the south west will be orientated to the southern cluster. The vegetation in this view on **Figure 29** is that along the Yarriambiack Creek.

Figure 29 *VP5 looking south west to the southern cluster*

Figure 30 *VP5 photomontage*



At this distance the wind turbines would be a noticeable element in the landscape, discernible in most lighting conditions if there was no intervening vegetation. However, the vegetation along the Yarriambiack Creek will screen the majority of the wind turbines as shown in the photomontage in **Figure 30**. Although the distance from VP5 to the nearest wind turbine is slightly greater that that for VP4, the visibility of the blades above the vegetation is likely to be similar and therefore the overall visual impact is assessed as **negligible**.

VP6 – Borung Highway #1 – west of Warracknabeal

VP6 is approximately 7.1 km from the nearest wind turbine (T162) and is located on the Borung Highway at the outskirts of Warracknabeal. **Figure 31** shows the view looking south west with the Borung Highway in the centre. Wind turbines are proposed on either side of the Borung Highway.

Figure 31 VP6 looking south west

At this distance the wind turbines will be a visible element in the landscape, discernible in most lighting conditions. Vegetation may screen parts of the wind farm from views on the southern side of the Borung Highway, but wind turbines on the north side will have no intervening vegetation. The wind turbines are visible and the Borung Highway has a medium level of use and therefore the overall visual impact is assessed as **low**.

VP7 – Henty Highway #3 – north of Warracknabeal

Viewpoint H7 is approximately 3.2 km south east of the nearest wind turbine (T150) at the intersection of Tarrant Road. The Henty Highway is visible on the right of **Figure 32**.

Figure 32 VP7 - Photomontage

At a distance of 3.2 km the wind turbines will be a dominant element in the landscape. There is no intervening vegetation and the user numbers on the Henty Highway would be high. However, the landscape sensitivity is low and the wind farm is viewed from travellers on the Highway, not from a location where people would stop. The duration of the view would be low. Therefore, the overall visual impact would be assessed as **low**.

VP8 – Borung Highway #2 – east of Warracknabeal

VP8 is located approximately 12.7 km east of the nearest wind turbine (T150). The tips of the blades of the northern and southern clusters would be visible on either side of the highway above the linear band of vegetation along the Yarriambiack Creek. **Figure 33** shows a photomontage of the view looking north west where wind turbines will be visible to the right of the Borung Highway.

Figure 33 VP8 photomontage looking north west

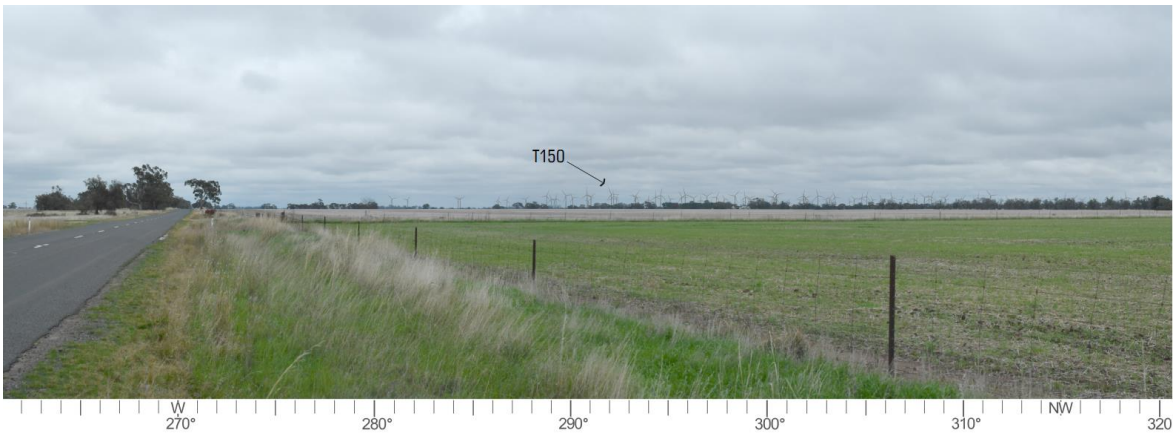


Figure 34 shows the wind turbines visible in the distance on the left hand side of the Borung Highway.

Figure 34 VP8 photomontage looking south west

At this distance the wind turbines will be a discernible element in the landscape, although views to the base of the wind turbines will be screened by existing vegetation. Although visible above the tree line created by Yarriambiack Creek, this landscape has a low sensitivity to change and for these reasons the overall visual impact is assessed as **negligible**.

VP9 – Warracknabeal–Birchip Road, north east of Warracknabeal

VP9 is located is approximately 12.3 km east of the nearest wind turbine (T110).

Figure 35 *VP9 looking west*

At this distance the wind turbines largely screened by existing vegetation along the Yarriambiack Creek in the middle distance. The tips of the wind turbines will just be visible. This is illustrated in the photomontage in Error! Reference source not found. For these reasons the overall visual impact is assessed as **negligible**.

VP10 – Henty Highway #4, at Lah, north of Warracknabeal

VP10 is approximately 1.8 km north east of the nearest wind turbine (T077). Lah is approximately 14 km north of Warracknabeal on the Henty Highway.

Figure 36 *VP10 looking west*

At this distance the wind turbines will dominate the landscape although they will be partially screened by existing vegetation along the Yarriambiack Creek which is visible in foreground of **Figure 36**. The overall visual impact is assessed as **low**.

VP11 – Henty Highway #5, intersection of Wardles Road West

VP11 is north of Brim on the Henty Highway at the intersection of Wardles Road. VP11 is approximately 5.1 km west of the nearest wind turbine (T038).

Figure 37 VP11 photomontage

At this distance the wind turbines are visible but are a small element in the landscape. The overall visual impact is assessed as **low**

VP12 - Henty Highway #6

VP12 is on the Henty Highway north of VP11 and is approximately 10.1 km north east of the nearest wind turbine (T030). At this viewpoint location the Yarriambiack Creek is on the eastern side of the Henty Highway, behind the viewer and visible on the left hand side of **Figure 38**.

Figure 38 VP12 looking south

Figure 39 VP12 looking west

At this distance the wind turbines would be a small element in the landscape, although at this location they would not be screened by existing vegetation. The overall visual impact is assessed as **negligible**.

VP13 – Henty Highway #7, at Beulah

VP13 is on the Henty Highway approximately 17.7 km north west of the nearest wind turbine (T014). The vegetation in the background of **Figure 40** is that along the Yarriambiack Creek.

Figure 40 *VP13 looking south west*

At this distance the wind turbines would be a small element in the landscape, and at this location they would be partially screened by existing vegetation. The overall visual impact is assessed as **negligible**.

VP14 – Dimboola Rainbow Road # 1, east of Lake Hindmarsh

VP14 is on the Dimboola Rainbow Road and is approximately 17.3 km west of the nearest wind turbine (T003).

Figure 41 *VP14 looking east*

At this distance the wind turbines would be a small element in the landscape, and at this location they would be partially screened by existing vegetation. The overall visual impact is assessed as **negligible**.

VP15 – Dimboola Rainbow Road # 2, south east of Lake Hindmarsh

VP15 is on the Dimboola Rainbow Road 9 km south east of Lake Hindmarsh. VP15 is approximately 22.4 km west of the nearest wind turbine (T089). This photo is taken from the rail line which parallels the Dimboola Rainbow Road and allows panoramic views across to the WAEP which would otherwise be partially screened by existing vegetation along the Dimboola Rainbow Road.

Figure 42 *VP15 looking east*

At this distance the wind turbines would be a small element in the landscape and this impact would further reduce as a viewer travelled south. The overall visual impact is assessed as **negligible**.

VP16 – Dimboola Rainbow Road # 3, at Antwerp

VP16 approximately 15.8 km from the nearest wind turbine (T164) looking across the rail line which parallels the Dimboola Rainbow Road..

Figure 43 *VP16 looking east*

At a distance of more than 15 km and the line of existing vegetation in the middle distance the visual impact is assessed as **negligible**.

VP17 – Western Highway #1, north of the Borung Highway intersection at Dimboola

VP17 is approximately 21 km from the nearest wind turbine (T186) and is located on the Western Highway just to the east of Dimboola.

Figure 44 *VP17 looking west towards the Murra Warra Wind Farm*

In **Figure 44** the existing wind turbines of the Murra Warra Wind Farm are just visible on the ridge in the distance. The closest wind turbine in the Murra Warra Wind Farm is approximately 18.2 km from VP17. At this distance the existing Murra Warra wind turbines are perceptible, but their visual impact would be assessed as **negligible**.

Figure 45 *VP17 looking north west towards the WAEP*

Figure 45 is the north west continuation of the view from VP17. Similarly, to the view to the Murra Warra turbines, the visual impact from this location of the WAEP, would be assessed as **negligible**.

VP18 – Western Highway #2, south of the Borung Highway intersection at Dimboola

VP18 is approximately 21.2 km from the nearest wind turbine (T186). The existing wind turbines at Murra Warra Wind Farm are approximately 17.1 km from VP18.

Figure 46 *VP18 looking west towards the Murra Warra Wind Farm*

The Murra Warra wind turbines are just visible on the ridge in **Figure 46**. The WAEP wind turbines would be further away and the visual impact from this location is assessed as **negligible**.

VP19 – Old Minyip Road, east of Dimboola

VP19 is approximately 15.3 km from the nearest wind turbine (T207). Sailors Home Hall is behind the trees on the right of **Figure 47**.

Figure 47 *VP19 looking east towards the Murra Warra Wind Farm*

Figure 48 *VP19 looking north towards the Murra Warra Wind Farm*

The Murra Warra wind turbines are visible in the background of **Figure 47** and the closest Murra Warra wind turbine is approximately 6.5 km from VP19. The closest wind turbines in the WAEP is much further away and therefore the visual impact of the WAEP from VP19 is assessed as **negligible**.

VP20 – Blue Ribbon Road, north of Old Minyip Road and the Sailors Home Hall

VP20 is approximately 12.6 km from the nearest wind turbine (T207).

Figure 49 *VP20 - looking east to the Murra Warra Wind Farm*

Figure 50 *VP20 -looking north along Blue Ribbon Road*

The WAEP would be located on the right of Blue Ribbon Road in Figure 50. The WAEP wind turbines are much further away that the Murra Warra wind turbines and would be largely screened by existing vegetation on the right of Blue Ribbon Road. Therefore, the visual impact is assessed as **negligible**.

VP21 – Borung Highway #3, intersection with Katyil-Wail Road

VP21 is approximately 14.2 km from the nearest wind turbine (T201). Although the WAEP is on both sides of the Borung Highway, vegetation would screen views to the wind turbines on the left of the highway in **Figure 51**.

Figure 51 VP21 looking north east along the Borung Highway

The closest wind turbine in the Murra Warra Wind Farm is approximately 13.1 km from VP21. Figure 52 shows the these wind turbines which are just visible between breaks in the intervening vegetation.

Figure 52 VP21 looking south east towards the Murra Warra Wind Farm

Figure 53 VP21 photomontage

The overall visual impact of the wind turbines in the Murra Warra Wind Farm would be assessed as negligible, and similarly the assessment of the visual impact of the WAEP would also be assessed as **negligible** as illustrated in the photomontage in **Figure 53** .

VP22 – Borung Highway #4, intersection with Blue Ribbon Road

VP22 is on the Borung Highway at the intersection with Blue Ribbon Road. The nearest WAEP wind turbine (T186) is 1.6 km from VP22. **Figure 54** shows the view to the right (east) of the Borung Highway where the proposed wind turbines would be close (1.6 km) and would not be screened by vegetation.

Figure 54 *VP22 looking east*

The wind turbines would dominate the landscape; however this is a rural landscape which is not sensitive to change. The viewer numbers using the highway would be rated as medium and the duration would be low as there is no roadside stop and the wind turbines would be viewed from passing vehicles on the highway. For these reasons the visual impact would be assessed as **low**.

VP23 – Borung Highway #5, looking north

VP23 is located on the Borung Highway and shows the view looking north towards the northern cluster. VP23 is 6.5 km from the nearest wind turbine of the northern cluster (T153). The view to the southern cluster will be address in VP24.

Figure 55 *VP23 looking north*

Figure 56 *VP23 looking north west*

The WAEP would be located to the left of the existing vegetation along the Borung Highway visible on the right in **Figure 55**. Sheds and other rural infrastructure are visible as a viewer looks towards the north west and these are evident in **Figure 56**.

At this distance and for reasons which are similar to those set out in the discussion of the previous viewpoint. the visual impact would be assessed as **low**.

VP24 – Borung Highway #6, looking south west towards the Murra Warra Wind Farm

VP24 is approximately 4 km from the nearest wind turbine (T162) and is taken from the opposite side of the road from VP23 to show the view looking south west along the Borung Highway towards the southern cluster. The proposed wind turbines are shown in the photomontage in **Figure 57**.

Figure 57 *VP24 photomontage looking south west along the Borung Highway*

The wind turbines are visible above vegetation but although visible the wind turbines would be a minor element in this landscape. The overall visual impact would be assessed as **low**.

VP25 – Jeparit-Warracknabeal Road, north west of Warracknabeal

VP25 is approximately 8.8 km from the nearest wind turbine (T089). This is shown in the photomontage in **Figure 58**.

Figure 58 *VP25 photomontage looking east east*

The wind turbines are visible on either side of the vegetation in the road reserve and the wind turbines are visually apparent in this landscape. However, the landscape is a rural landscape, the road is a low use road and the duration of view would be fleeting, limited to views from passing vehicles. For these reasons the visual impact would be assessed as **low**.

VP26 – Rainbow Road, north west of Warracknabeal

VP26 is approximately 1.9 km from the nearest wind turbine (T066). **Figure 59** shows the view down Rainbow Road looking south east. The WAEP is located to the left of Ribbon Road.

Figure 59 *VP26 looking south east*

The wind turbines would dominate the landscape; however this is a rural landscape which is not sensitive to change. The viewer numbers using Rainbow Road would be rated as low and the duration would be low as there is no roadside stop and the wind turbines would be viewed from passing vehicles on the highway. For these reasons the visual impact would be assessed as **low - negligible**.

Overall assessment of the visual impact from the public domain

In this rural landscape roads are spaced at considerable distances which means that there are limited viewing opportunities where roads are immediately adjacent to the WAEP.

In most cases, say for the Western Highway, Borung Highway and Henty Highway, viewpoints are at considerable distances from the WEEP. Where viewpoints are close, especially along the Henty Highway in the vicinity of Warracknabeal, the wind turbines are often screened by vegetation along the Yarriambiack Creek (refer the photomontage in **Figure 27**).

Local roads have low usage or viewer numbers and on both the highways and along the local roads there were no tourist locations or stopping points apart from the silo at Brim (refer **Figure 18**).

For these reasons the visual impact from viewpoints in the public domain was often assessed as **negligible**, and for those locations where wind turbines were closer to the viewer and unscreened by vegetation the assessment of visual impact was **low**.

9. Landscape mitigation

This PLVIA has not assessed the visual impact from residential properties. However, even though houses within the viewshed of the WAEP have not been individually assessed, there are recommendations that can be made on the basis of the viewshed and the zones of visual influence.

This viewshed and the zones of visual influence set out in Chapter 3, has implications for the requirement to offer landscape mitigation to residential properties. In past planning approvals the major visual impact for residential properties occurs where houses are located within the zones where wind turbines will be "**Highly visible and will usually dominate the landscape"** and **"Will be visually dominant in the landscape from most viewing locations".**

It is within these zone that landscape mitigation for residential properties is typically offered by the proponent.

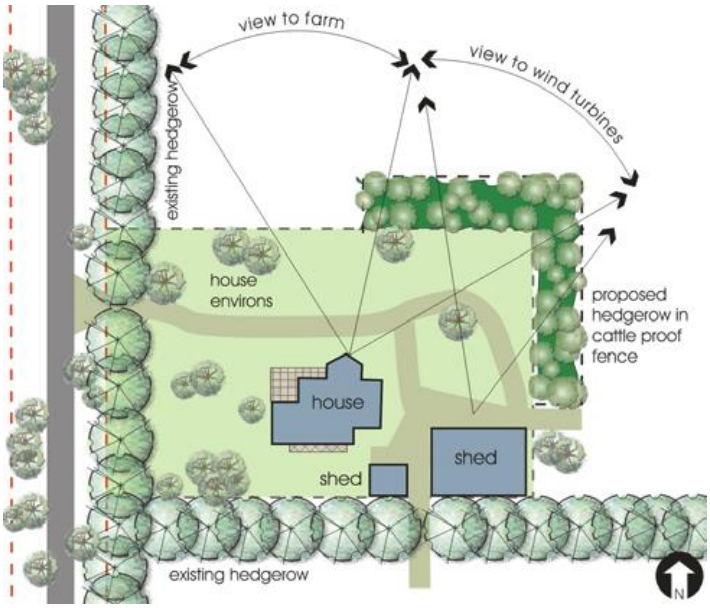
The extent of landscape mitigation

Existing permits for wind farms with wind turbines up to 110 m generally required proponents to offer landscape mitigation to the most affected landowners, which were those houses within 2.5 km of a wind turbine. When wind turbines reached 130 m, landscape mitigation was offered to land owners with houses within 3 km of the nearest wind turbine, where a wind turbine was visible. Recently when wind turbines have been around 160 m in height, landscape mitigation has been offered to residences able to view wind turbines that are within 4 km of the house.

In the case of the Warracknabeal Energy Park, utilising 280 m high wind turbines, these zones extend out to 6.4 km from the nearest wind turbine. Therefore, it is recommended that residential properties, which can view a wind turbine within 6.4 km, are offered landscape mitigation.

An example of a landscape mitigation that was offered for a landowner near a previous wind farm is shown in ***Figure 60.*** This is an extract of a drawing prepared by ERM and referenced in the *Lal Lal Wind Farm LVIA, Figure 9.35, ERM 3 March 2008*.

Figure 60 *Landscape mitigation*



10. Aviation lighting

The Warracknabeal Aerodrome is located east of the Henty Highway, generally to the east of the southern cluster of turbines.

Should it be necessary to provide aviation lighting then CASA's current requirements for Aviation lighting are:

> *CASA recommends that the wind farm is lit with steady red low intensity lighting at night as per Section 9.4 of the CASA Manual of Standards Part 139. Characteristics of low intensity lights are stated in subsection 9.4.7.*

This removes the earlier requirement for flashing lights, however from observations of past completed projects, there is also a strobing effect as the blades pass through the light. Although there is a slight benefit in having lights permanently on rather than flashing, this would not significantly change the level of visual impact. The lights would still be visible and some strobing will be apparent, especially from closer distances.

It is anticipated that night lighting will be required at the Warracknabeal Energy Park. If required, Aviation Lighting will be installed on a limited number (<10%) of wind turbines and linked to the pilot activated lighting (PAL) system at the Warracknabeal Aerodrome.

The aerodrome operator, Yarriambiack Shire Council, has advised that Warracknabeal Aerodrome PAL system is used 3 nights a week for aviation training. During training at night the PAL system could be activated over a 3-hour period. Occasional ad-hoc take-offs and landings can also occur during night hours but these are on an infrequent and irregular basis.

Therefore, currently the aviation lighting proposed for the Warracknabeal Energy Park would be activated for approximately 9 hours per week.

The area around the Warracknabeal Energy Park does contain night lights from road users, silos and other agricultural lighting. The proposed aviation lighting will be a minor component in the landscape, similar to other lights in the area and as discussed previously will only be operational for a limited time.

Therefore, the overall visual impact of the aviation lighting on the landscape surrounding the WAEP is assessed as **negligible**.

11. Cumulative impacts

Cumulative visual impact can occur either by:

- Sequential views to multiple wind farms; and
- Simultaneous views to wind turbines from publicly accessible viewpoints or from private viewing locations; or

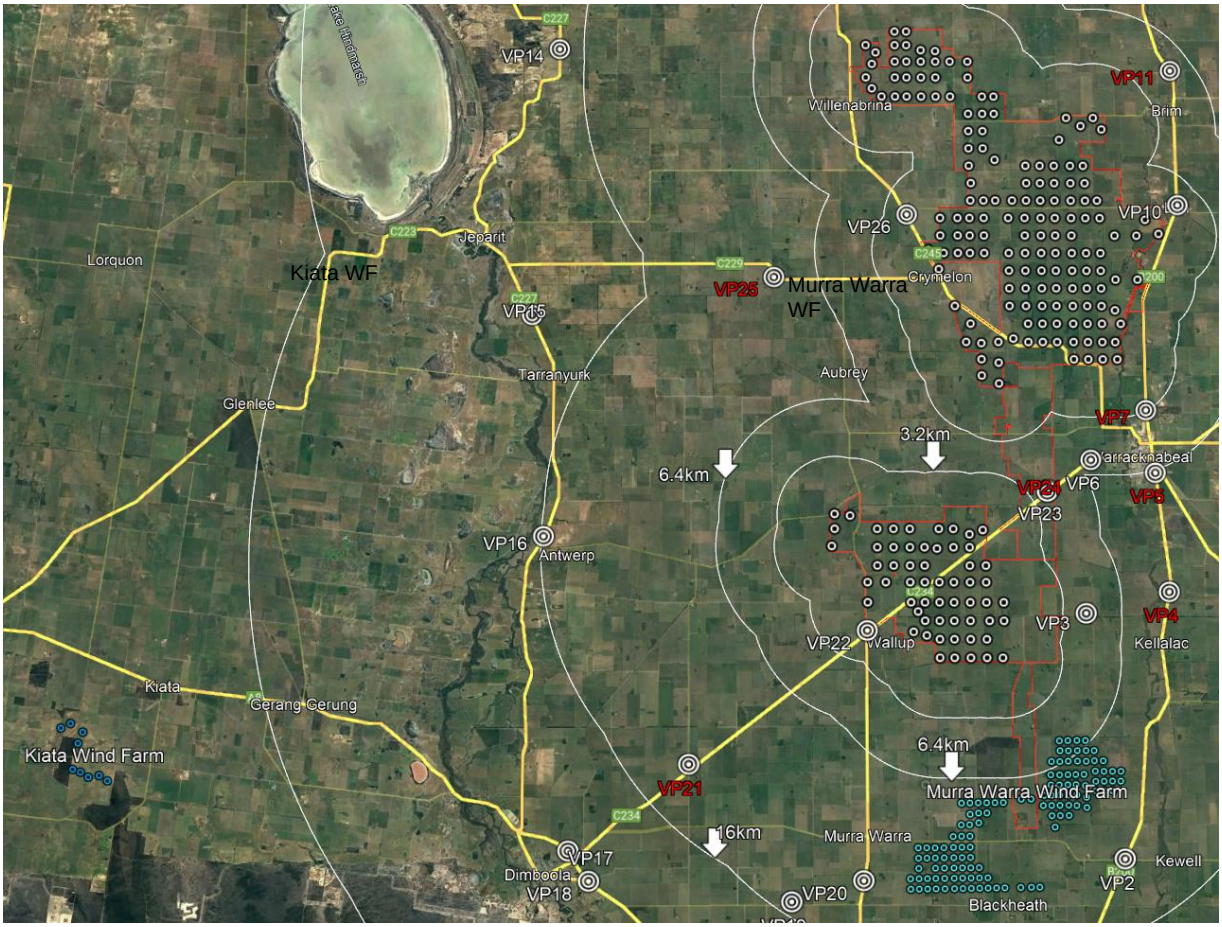
Either sequential of simultaneous views to multiple wind farms may change a community's or visitor's perception of a region.

There are two wind farms approved within 50 km of the Warracknabeal Energy Park, which are:

- Murra Warra Wind Farm consists of 116 wind turbines with an overall height to the tip of the blade of 220 m.
- Kiata Wind Farm consists of 9 wind turbines with an overall height to the tip of the blade of 210 m.

The location of the wind turbines within the Murra Warra and Kiata Wind Farm is shown in by the blue dots in **Figure 61**. The wind turbines proposed in the WAEP are shown by the white dots

Figure 61 *Location plan of the WAEP and the Kiata and Murra Warra Wind Farms*



Sequential visual impact

The development of wind farms may lead to a change in people's perception of a region and will be evident as they travel through the road network. Alteration to the perception of a landscape will occur when a visitor is able to view two or more wind farms.

Highways

The Western Highway is a major east west route through western Victoria. The Western Highway is located at the periphery of the viewshed to the south west of the Warracknabeal Energy Park. A visitor utilising the highway would see the Murra Warra Wind Farm and then the Kiata Wind Farm. The WAEP would be behind the Murra Warra Wind Farm and would have a **negligible** impact on sequential views from the Western Highway

It would not be possible to see the Kiata Wind Farm from the Wimmera Highway and the Murra Warra may just be visible. The addition of the wind turbines in the WAEP would have no additional visual impact.

The main sequential visual impact would be on views from the Henty Highway and the Borung Highway where sequential vies of the Murra Warra Wind Farm and the WAEP would be possible. Kiata Wind Farm would not be visible. The Murra Warra wind turbines are more than 9 km from the Henty Highway and the wind turbines in the WAEP are much closer, less than 2 km at Lah (refer VP10). The expansiveness of this Wimmera landscape mitigates the sequential impact and the sequential visual impact would be assessed as **low**.

Local & regional roads

There are no sequential views to the Warracknabeal Energy Park and the Kiata Wind Fam from the local road network. There are some locations within the local road network with views to the WAEP and views to the Murra Warra Wind Farm. The sequential visual impact of these views would be assessed as **negligible**.

The cumulative visual impact brought about by sequential views to wind farms from these local roads is assessed as **negligible**.

Simultaneous visual impact

Simultaneous visual impact occurs where the viewshed of two or more wind farms would overlap. This overlap may include a small section of the Henty Highway, the Borung Highway and some short lengths of a limited number of local roads. This has been illustrated in Viewpoints such as VP24 where the visual impact of the WAEP would be **low** and the simultaneous visual impact would be assessed as **negligible**.

12. Conclusion

The preceding analysis illustrates that the Warracknabeal Energy Park is situated in a landscape that has a low sensitivity to change. It is a broad-acre rural landscape that has been cleared to create huge areas for farming. The Landscape Assessment Study refers to this landscape character type as '*Big Plains*' and this is illustrative of its character. The flat topography and the extensive clearing has created a large landscape, a landscape which can accommodate the 280 m high wind turbines that are proposed.

The Planning Schemes also reflect the very limited significance given to landscapes within the viewshed. Sensitive landscapes such as the Little Desert National Park, lie just outside or at the edge of the viewshed, whilst the Grampians and Arapiles are more than 50 km distant. Lake Hindmarsh is also just inside the viewshed for the WAEP, however, given the distance to the nearest wind turbine within the WAEP and the slightly dished topography of the lake there would be no visual impact.

Apart from Warracknabeal, urban areas of greater sensitivity are all situated at some distance from the nearest wind turbines. However even when urban areas are closer to the WAEP built form and vegetation will screen views from most locations to the WAEP (refer Chapter 7).

The greatest overall visual impact from publicly accessible locations, whether highways, local roads or from recreation reserves, has been assessed as **low**. Low was defined in the Visual Impact Methodology (Chapter 3) as a "*visual impacts that are noticeable but will not cause any significant adverse impacts*." This describes the impact of wind turbines in this Wimmera landscape.

The visual impact from residential properties has not been assessed in this LVIA. However, landscape mitigation measures which are typically offered as a planning permit condition, to affected residential properties within 6.4 km. This offer can assist in further screening wind turbines if such is the desire of the owner.

The cumulative impact bought about by the presence of other wind farms is also negligible. The nearest wind farm is the Murra Warra Wind Farm to the south and the cumulative impact of the Murra Warra and WAEP has been assessed as low. The Kiata Wind Farm lies to the west and is unlikely to have any cumulative visual impact with the WAEP.