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*Lal Lal Wind Farm*

*Landscape & Visual Assessment Review  
Allan Wyatt – Expert Evidence Statement*

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For: WestWind Energy Pty Ltd


October 2016 | Final

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Client	WestWind Energy Pty Ltd
Project No	15040
Version	Final
Signed	
Approved by	Allan Wyatt
Date	30 October 2016

**XURBAN**

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# 1. Introduction

Allan Wyatt undertook the landscape and visual assessment of the Lal Lal Wind Farm whilst a partner at ERM.

ERM prepared the following reports pertaining to landscape and visual impacts as part of the assessment of the original planning permit application.

- Preliminary Landscape and Visual Impact Assessment as part of the Notification to the Minister of Planning.
- Final Landscape and Visual Impact Assessment (LVIA) dated February 2008 as part of the Planning Permit Application.
- Presentation of expert evidence at Panel hearing in 2008;
- ERM Letter of advice to WestWind dated 18 August 2014; and
- ERM letter of advice to WestWind dated 21 April 2015.

The Panel Report dated February 2009 recommended that a Planning Permit be issued for 64 wind turbines, 40 in the Yendon Section and 24 in the Elaine Section. The approved wind turbines were 130 m high.

WestWind Energy Pty Ltd is proposing to increase the overall wind turbine height from 130 m (approved) to 161 m (amended) and to increase the rotor diameter from 82 m (approved) to 140 m (amended). It is also proposed to reduce the number of wind turbines.

## Summary of changes

- Overall wind turbine height – 130 m (2008) to 161 m (2016);
- Wind turbine diameter – 82 m diameter (modelled in 2008) however the approval was for a turbine diameter up to 95 m and this amendment seeks to increase the diameter to 140 m diameter (2016).

Wind turbines locations/ siting

- YSWT - 02, 07, 14, 17, 18, 40, 24, 27, 26, 28.
- ESWT – ESWT02, now moved approximately 150 m south. Turbine ESWT02 is now located at Easting 233852.97, Northing 5818217.42 and at an elevation of 396.8 m.

Four wind turbines have been deleted

- YSWT – 04, 37.
- ESWT – 09, 22.

Following these changes, I prepared a short letter of advice (dated 11 August 2016) in which I concluded that:

*Therefore, the alteration of the rotor diameter (to either 126 m, 130 m, 136 m or 140 m) is considered to have a negligible visual impact above that of the approved wind farm.*

This letter also reiterated my view that:

*With the proposed amendment increasing the heights of the proposed wind turbines to 161 m, it would be appropriate if the distance within which landscape mitigation was offered was increased. Mathematically that increase would be to 3.6 km, however it is my recommendation that landscape mitigation be offered to residential properties within 4 km of the nearest visible wind turbine.*

As well as this assessment of three viewpoints mentioned previously, I have since prepared comparative photomontages for viewpoints VPA, VPB, VPC, VPE, VPG, N31AB, F12AA and F30AA, which show the differences between the:

- 2009 Photomontage (130m high, 82m diameter);
- Amendment 2015 (161m high, 122m diameter); and
- Variation 2016 (161m high, 140m diameter).

These photomontages will be discussed later in this report, when reviewing the claims made by objectors that such changes are a major alteration to the approved wind farm. A3 versions of these photomontages are appended to this report and the panel will be provided a0 copies.

## Further information

The following report seeks to discuss the visual impact implications of this Planning Permit Amendment (PPA) and comment on the appropriateness of such a facility within the landscape Elaine and Yendon. This report will examine:

- Summarise the proposed changes to the permitted wind farm that are the subject of this PPA;
- Re-state the visual assessment methodology and address any changes to the generally accepted methodology since 2008;
- Discuss any changes to the Policies and Guidelines including the South West Victoria Landscape Assessment Study (SWVLAS);
- Respond to submissions received regarding the proposed amendment;
- Viewpoint assessment utilising the photomontages already prepared and also addressing:
  - Narmbool;
  - Lal Lal Falls Reserve, and
  - St Sava Monastery.
- Assess the change to potential visual impact of the approved aviation safety lighting with the amended wind farm specifications.

## Expert Evidence – Practice Note

I acknowledge that I have read and complied with the Guide to Expert Evidence (dated April 2015). In compliance with this Guide, I provide the following information.

### Name & address

Allan Wyatt – Landscape Architect  
 XURBAN  
 Suite 1103, 408 Lonsdale Street  
 Melbourne, Victoria, 3000.

### Qualifications & experience

I am a registered Landscape Architect with over 30 years' experience and I have a Grad.Dip.L.D. from RMIT (1980) and I am a member of the Australian Institute of Landscape Architects.

I have given expert evidence on landscape, urban design and visual impact assessment at the former Administrative Appeals Tribunal (AAT) and VCAT and provided expert evidence before panel hearings in Victoria. I have also given expert evidence before Planning Appeal bodies in NSW, South Australia, Tasmania, Queensland and New Zealand.

A Curriculum Vitae is attached as Annexure A to this report.

#### Instructions

Allan Wyatt of XURBAN has been engaged, following the lodgement of the Application for Review, by Herbert Smith Freehills acting on behalf of WestWind Energy Pty Ltd to prepare an Expert Witness Statement which comments on the proposed amendment and variation as well as responding to submissions which raise issues concerning landscape and / or visual impact.

#### Facts, matters and assumptions

The facts, matters and assumptions, on which the opinions expressed in this report are based, include the turbine dimensions, locations and deletions as set out above. These were provided by WestWind.

I have also received a copy of the submissions received to the proposed amendment in height.

#### People assisting with this report

The original photomontages (2008) were prepared under my direction while I was a Partner at ERM. The photomontages of the amended proposal (2016) were prepared by XURBAN. No other person assisted in the preparation of this Expert Witness Statement.

#### Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Panel.

## 2. Proposed changes

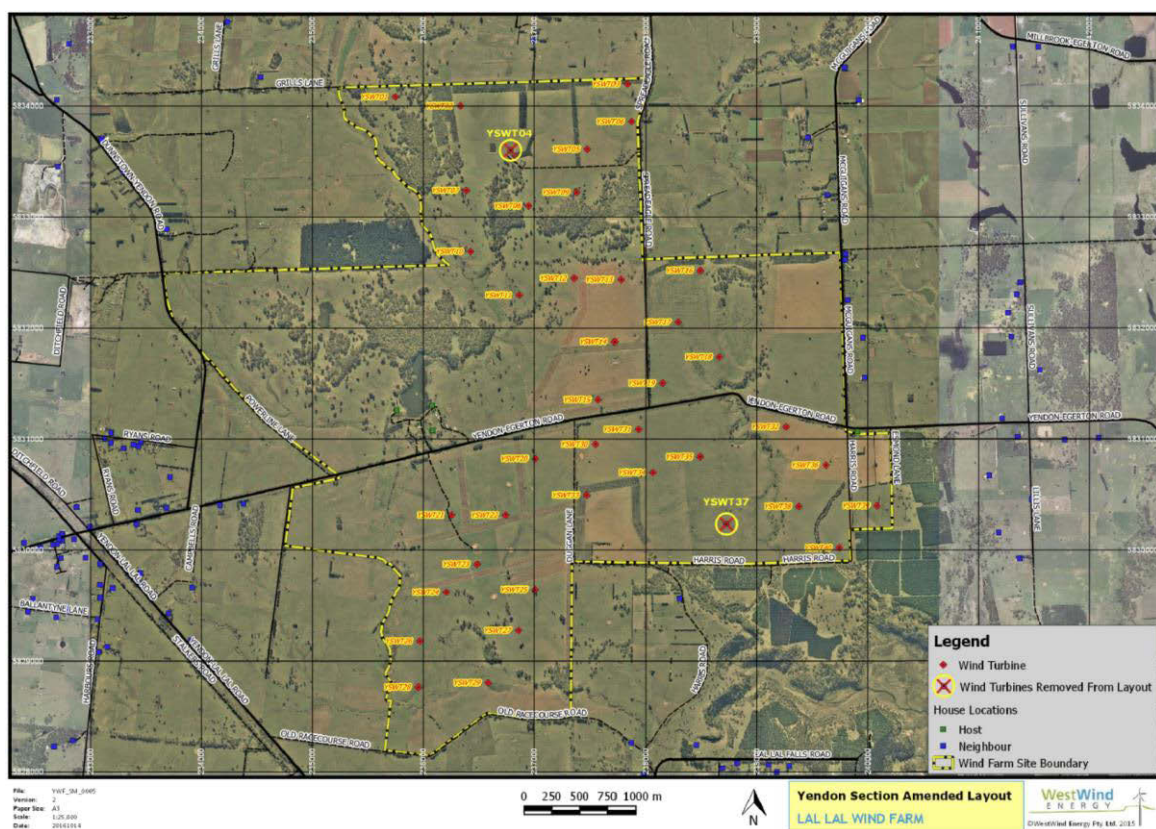
The Approved Planning Permit was for 64 wind turbines, 40 in the Yendon Section and 24 in the Elaine Section. The wind turbines were approved at 130 m high.

As part of this permit amendment process, the numbers of wind turbines are proposed to be reduced by four to a total of 60 wind turbines and the height of the wind turbines increased from 130 m to 161 m.

### Changes to the wind turbine numbers

**Figure 1** shows the approved and amended site layout for the Yendon Section.

Figure 1 Yendon Section (Source: WestWind Energy, 14 October 2016)

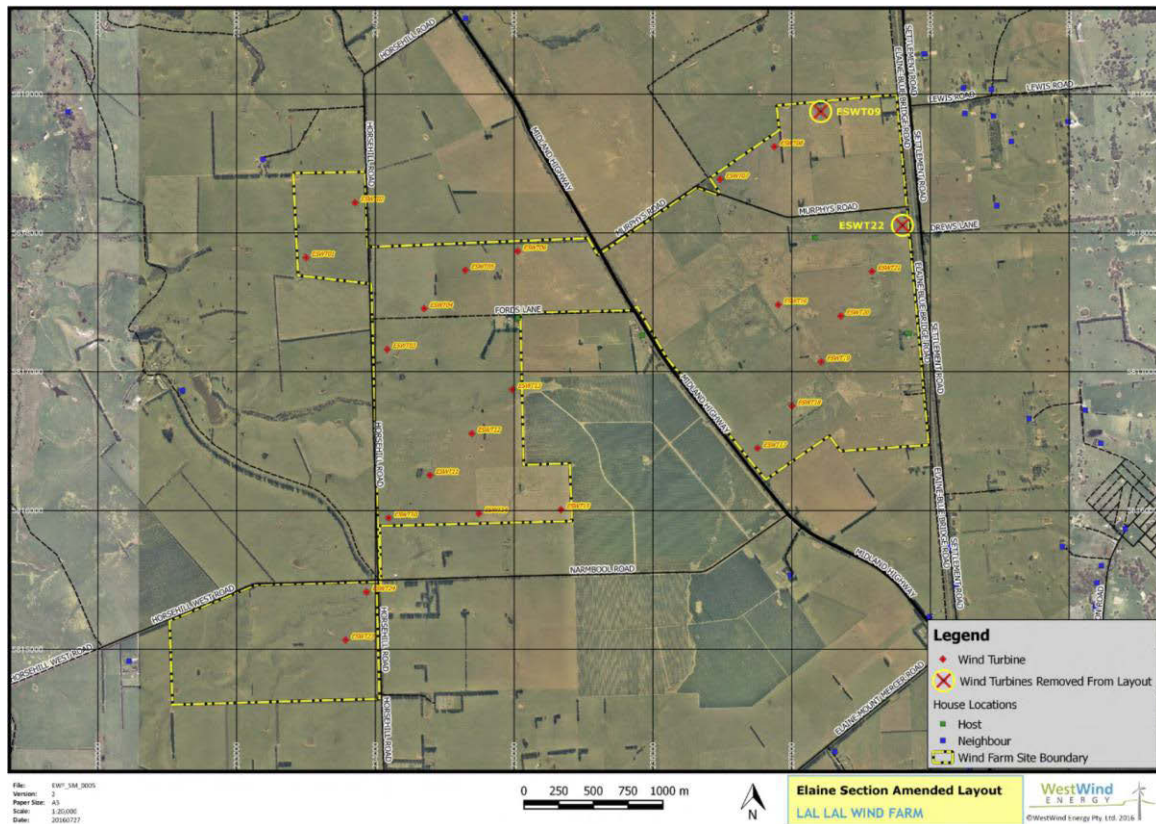


The two wind turbines that are circled in **Figure 1** are approved and will be removed if the PPA is approved. These are wind turbines numbered YSWT04 and YSWT37. There will be no significant reduction in the level of visual impact as a result of the deletion of these wind turbines.



Figure 2 shows the approved and amended site layout for the Elaine Section.

Figure 2 Elaine Section (Source: WestWind, 27 July 2016)



Turbines numbered ESWT09 and ESWT22 are the two wind turbines closest to the residential properties adjacent to the Lewis Road / Settlement Road intersection. These two wind turbines will be removed as part of the PPA.

This will mean that for these residential properties adjacent to the north west corner of the Lal Lal Wind Farm, the nearest wind turbine will be approximately 1.5 km from the nearest residence, rather than the 1.2 km for the approved wind farm.

The reduction in turbine numbers may result in a slight reduction in visual impact, especially from those residences located near the north east corner of the Elaine Section. However, this slight reduction in visual impact is not considered significant for these particular residences.

On a broader perspective, the reduction of four wind turbines will have no significant impact on the level of visual impact that was assessed previously.

### Changes to the wind turbine dimensions

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

Figure 3 Wind turbine profile

The dimension of the wind turbines which were used in the original assessment and amended wind turbine heights and dimensions are listed in **Table 1**.

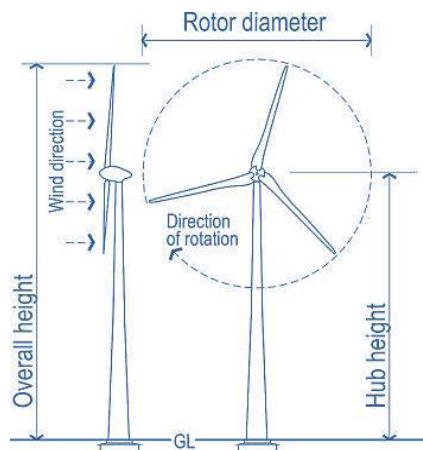


Table 1 Wind turbine dimensions

	Hub (m)	Rotor dia. (m)	Overall height (m)
Approved Layout	Up to 85 m	95 m (82 m modelled)	Up to 130 (131 modelled)
Amended Layout	Up to 105 m	Up to 140 m	Up to 161

The chord of the blades for a 140 m rotor, that is the width of the blade, is the same for blades for 82 m rotors and for 122 m rotors. This is simply because the blade chord is designed such that blades still fit under bridges and it is typically in the order of 4.2m.

It is the impact of the increased height and width of the proposed wind turbines that will be assessed in more detail within this report.

### Resultant changes to the viewshed

The LVIA defined viewshed as “The area that may potentially be visually affected by the wind turbines is called the viewshed. This viewshed may be broadly based on the characteristics of human vision” (LVIA Section 4, Viewshed, ERM, 3 March 2008). The LVIA then calculated a range of ‘Zones of Visual Impact’ based on a turbine height of 131 m.

*Given that the overall height of the wind turbines is 131 m, the viewshed can be considered to extend to a distance at which the 131m wind turbines 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 less than 5% of the vertical field of view. Therefore, a wind turbine 131 m high viewed from a distance of 15.1 km will take up 5% of the vertical field of view. This report will use 15 km as the extent of the viewshed.*

With the proposed increase in height the viewshed will change. This is graphically shown in **Figure 4** and **Figure 5**.

**Figure 4** shows the viewshed out to 15 km and the zones of visual influence based on a wind turbine height of 130 m.

Figure 4 Viewshed of the approved wind farm (Source: Figure 2.1, LVIA, ERM dated 3 March 2008)

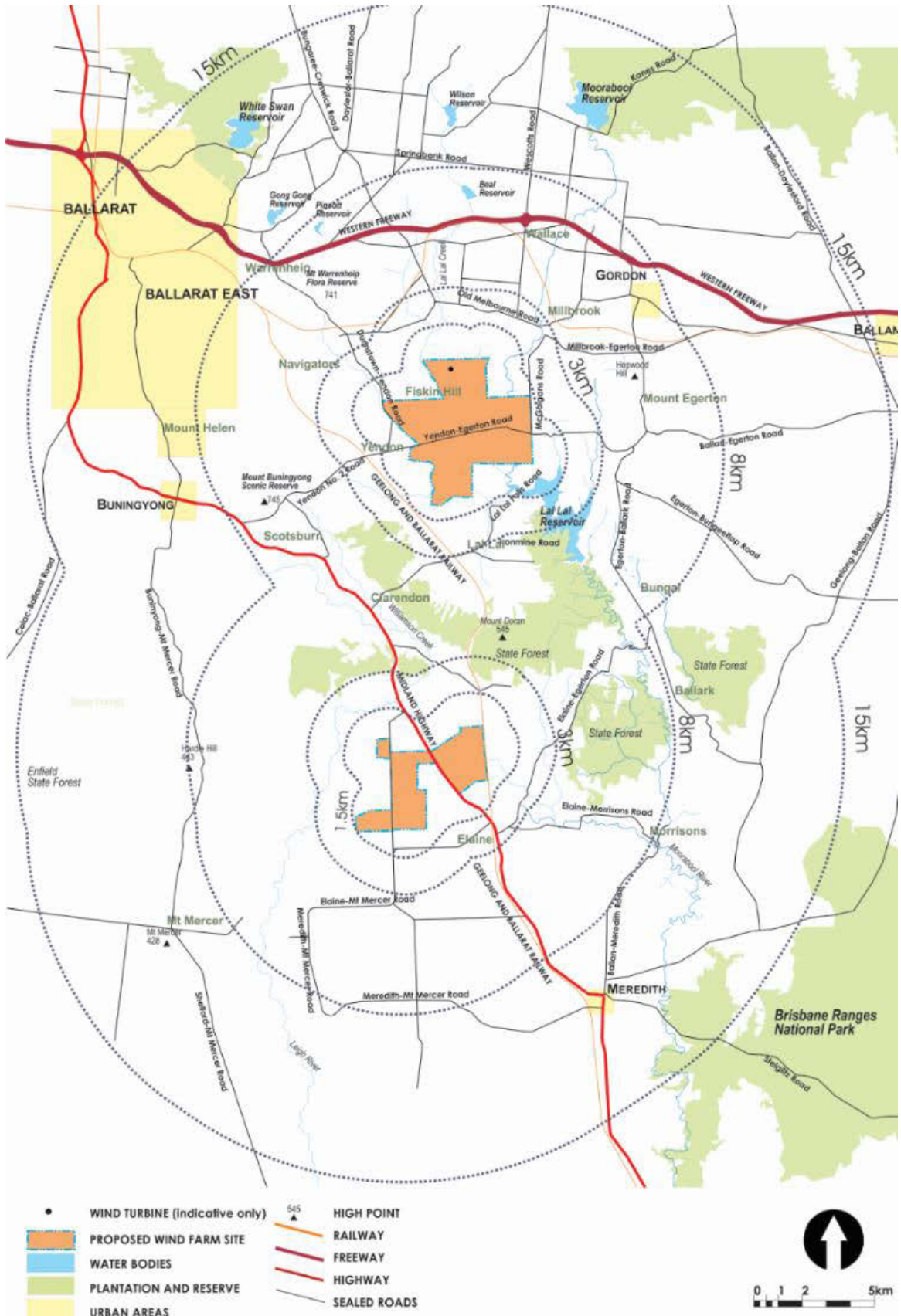
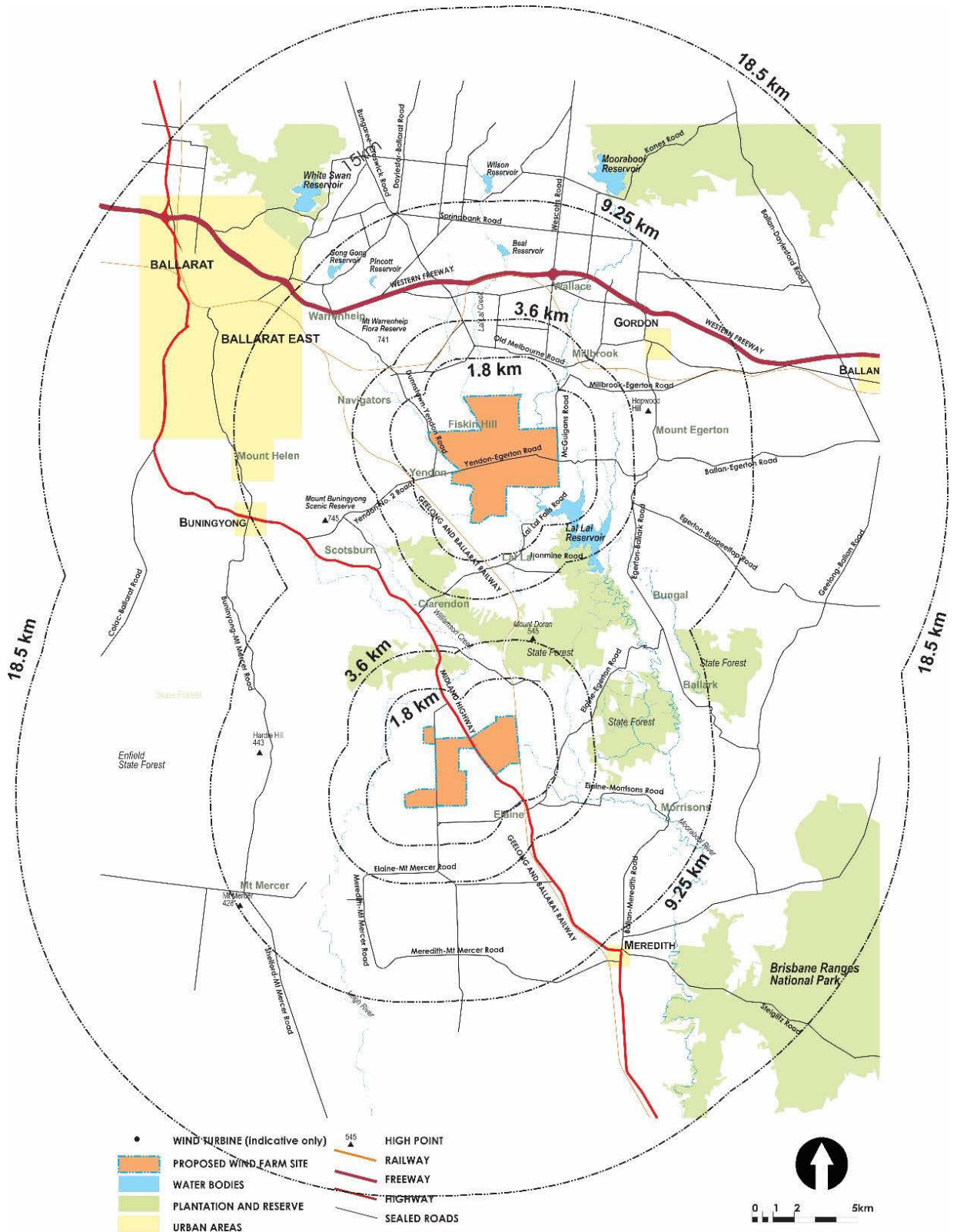


Figure 5 shows the viewshed based upon a wind turbine height of 161 m.

Figure 5 Viewshed – proposed amendment



A summary of these changes to the viewshed are summarised in the following table.

Table 2 Zones of visual impact

Visual Impact	Approved layout	Amended layout
<p><b>Visually insignificant</b></p> <p>A very small element in the viewshed, which is difficult to discern and will be invisible in some lighting or weather circumstances.</p>	>15 km	>18.5 km
<p><b>Potentially noticeable, but will not dominate the landscape.</b></p> <p>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.</p>	8 - 15 km	9.25 - 18.5 km
<p><b>Potentially noticeable and can dominate the landscape.</b></p> <p>The degree of visual intrusion will depend on the landscape sensitivity and the sensitivity of the viewer</p>	3 - 8 km	3.6 – 9.25 km
<p><b>Highly visible and will usually dominate the landscape</b></p> <p>The degree of visual intrusion will depend on the wind turbines’ placement within the landscape and factors such as foreground screening.</p>	1.5 - 3 km	1.8 - 3.6 km
<p><b>Will be visually dominant in the landscape from most viewing locations.</b></p> <p>Dominates the landscape in which they are sited.</p>	<1.5 km	<1.8 km

It was recognised in the LVIA that the major impact occurred to a distance of approximately 3 km, in the zones where the wind turbines will be highly visible and will usually dominate the landscape.

It was in this zone that the Panel recommended landscape mitigation be provided by WestWind Energy Pty Ltd.

*We believe that landscape mitigation should be offered to all properties within 3km of the WEF from which one or more turbines will be visible to further limit and in some cases completely block views to turbines. (Panel report, February 2009, p57)*

In the proposed amended layout, the increased height of the wind turbines, has increased these zones from 3 km to 3.6 km.

## Recommendation

It is recommended that in line with the Panel report, that landscape mitigation be offered to all residential properties that have a wind turbine within 4 km of their residence and where wind turbines are visible from the dwelling or external courtyard spaces. This distance is

greater than the 3.6km band but recognises that the area around the house or farm sheds may extend the sensitive areas on a property.

### 3. Planning policy implications

Since the initial Planning Approval, the following studies / changes have been released.

- Wind Farm Guidelines for Victoria, amended January 2016;
- The South West Victoria Landscape Assessment Study – Landscape Character of South West Victoria (DPCD & Planisphere, June 2013), (SWVLAS); and
- Kanawinka Geopark.

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

#### Wind Farm Guidelines for Victoria

The Victorian Guidelines (Amended in January 2016) states that:

*“Wind energy facilities will have a degree of impact on the landscape.*

*A responsible authority needs to determine whether or not the visual impact of a wind energy facility in the landscape is acceptable. In doing so, they should consider planning scheme objectives for the landscape, including whether the land is subject to an Environmental Significance Overlay, Vegetation Protection Overlay, Significant Landscape Overlay or a relevant strategic study that is part of the relevant planning scheme.” (Page 32).*

The current Guidelines (2016) recognise other strategic landscape studies. These were not included within the 2003 Guidelines. The relevant strategic landscape studies are discussed below.

The Wind Farm Guidelines do not specifically advise on the methodology for assessing an amendment or variation. However, in order to assess the change in the visual impact of the Amended Layout in comparison to the Approved layout, a comparative assessment of the visual impact can be undertaken by:

- preparing comparative photomontages of Approved and Amended Layouts to illustrate the change and discuss the associated impacts; and
- reviewing public and residential viewpoints discussed within the LVIA based on assessment criteria and scale of effects.

This has been undertaken as part of the application for the amendment and is discussed further in Chapter 6 of this report.

#### The South West Victoria Landscape Assessment Study

The South West Victoria Landscape Assessment Study (SWVLAS) is not a referral document as it is not referenced in the Moorabool Planning Scheme. However, the Guidelines acknowledge that a number of strategic landscape studies have been completed.

*A responsible authority and proponents must consider (as relevant) Clause 12.04 (Significant environments and landscapes) of the SPPF.*

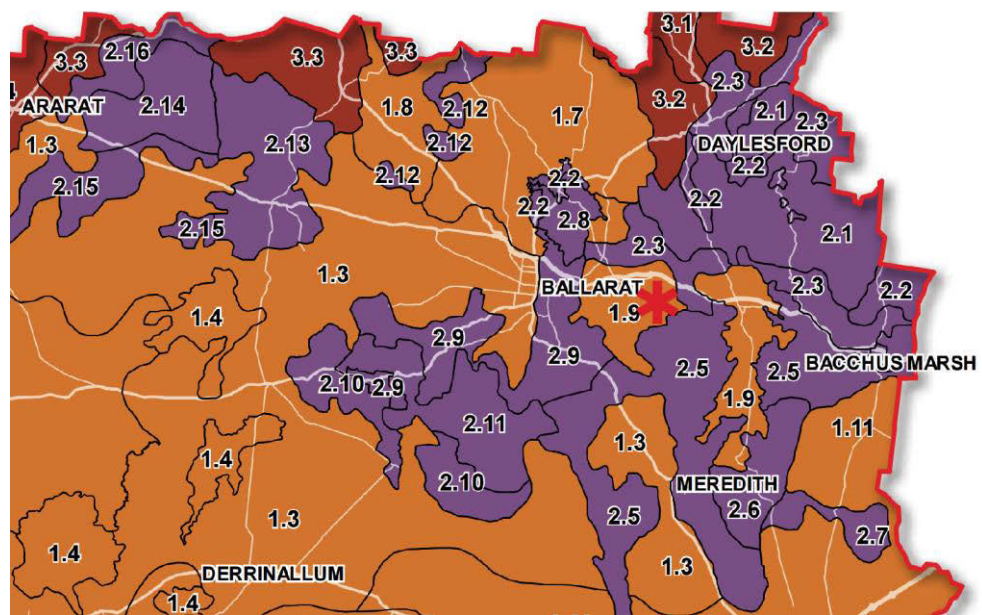
*In addition, strategic landscape studies have been completed for a number of regions across Victoria, including the Great Ocean Road Region Landscape Assessment Study (2004) and the Coastal Spaces Landscape Assessment Study (2006). These studies identify visually significant landscapes and provide appropriate recommendations for improved planning scheme guidance. Clause 12.02 (Coastal areas) of the SPPF requires these studies to be considered by a decision maker.*

*In planning schemes relevant local strategic studies may also be referenced in the Local Planning Policy Framework, and significant landscapes may be recognised in overlays, such as the Environmental Significance Overlay (the Guidelines, section 2.2.2)*

The SWVLAS recognises and values the geological formations that occur within the landscape of the Western Volcanic Plains and therefore increasing the landscaping sensitivity. The SWVLAS recognises the change that this landscape has undergone since European settlement and the anticipated increased level of development suggesting lower landscape sensitivity.

The Lal Lal Wind Farm is within the Western Volcanic Plains region (Character Type 1) as identified within the SWVLAS. The location of the wind farm (designated with an asterisk) and the surrounding character types are shown in **Figure 6**.

Figure 6 Wind farm location within SWVLAS



This study recognises the Lal Lal Falls which lies within the viewshed of the Lal Lal Wind Farm is a view of State significance. The SWVLAS has the following description:

*The Falls at the south-western edge of the Gorge provide a visual focus, and the eye is drawn across the sweeping bend of the Gorge as it disappears out of sight around another twist. The flat surface of the surrounding plain is visible to either side of the Gorge. Mount Buninyong is present as a distinctive volcanic cone rising on the horizon.*

*The depth that the Gorge cuts into the surrounding landscape is an impressive feature, which is highlighted by the contrast between the surrounding flat, agricultural plain and the deep, weathered textures of the basalt columns that line the walls and edges of the Gorge. The tumbling waters of the Lal Lal Falls provide a picturesque focus for the view. These are subject to seasonal variation, from powerful flows that are dispersed over the rocky cliff face, to more sedate trickles that flow languidly through pools of water below.*

Lal Lal Falls were one of the viewpoints that were assessed within the LVIA. This will be re-assessed later in this report.

Overall, any evaluation of the change in landscape or visual impact between the approved turbines at 130 m and the proposed wind turbines at 161 m will not change because of the

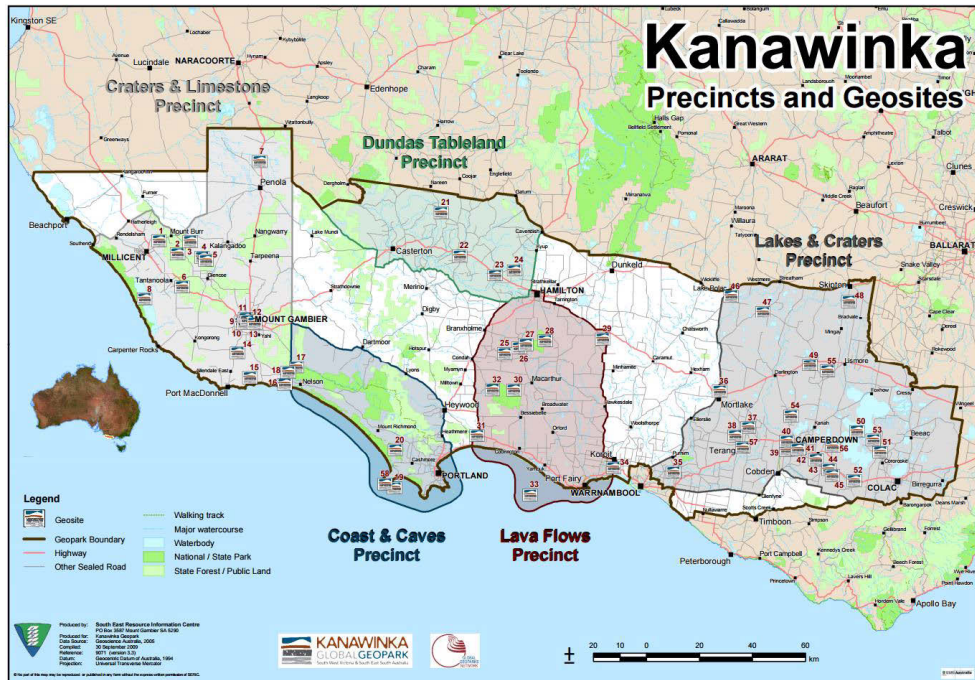


SWVLAS as this feature was recognised as having a high sensitivity ion the original assessment.

### Kanawinka Geopark

The Lal Lal Wind Farm is outside the area that was included within the Kanawinka Geo Park.

Figure 7 Kanawinka Geo Park



Therefore, the Kanawinka Geo Park has no impact on the previous LVIA which was considered by the Panel, nor this proposed amendment, nor is it referenced in the Moorabool Planning Scheme.

## 4. Visual impact methodology

The assessment methodology used to determine the level of visual impact has been slightly modified and refined since the initial LVIA was prepared.

The current methodology is set out below.

The criteria for assessing visual impact are different for publicly accessible and private residential viewpoints.

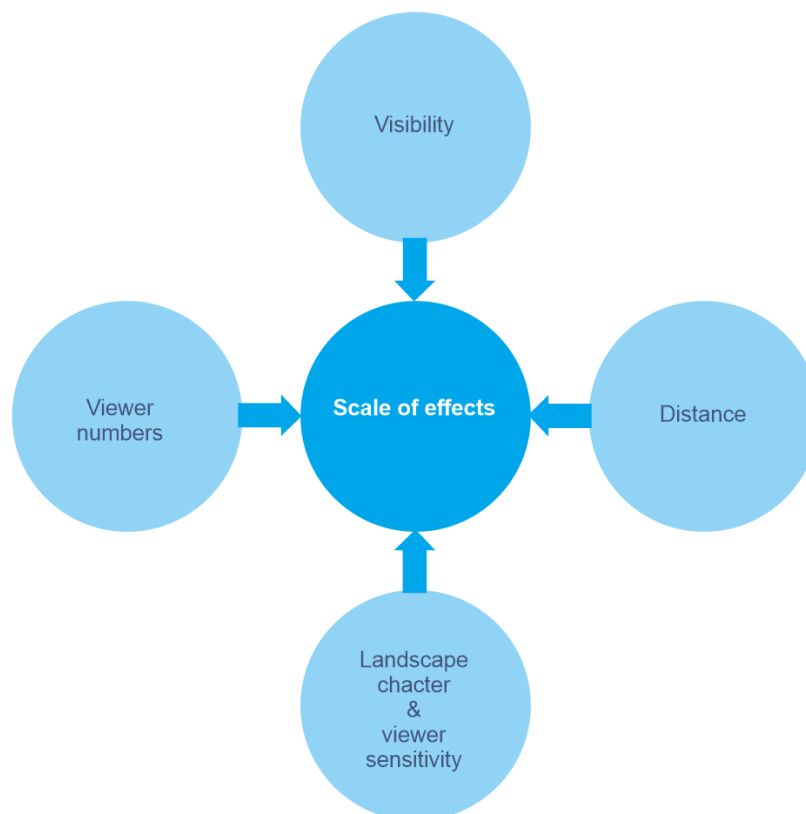
### Assessment criteria – publicly accessible viewpoints

In assessing the visual impact of a wind farm from the public domain the assessment of visual impact is based on four criteria. The resultant scale of effects ranges from Negligible to High and also recognises that a visual change may have a Positive or a Nil impact.

The assessment of the level of visual impact is based on four criteria, namely visibility, distance, landscape character & viewer sensitivity and the number of viewers.

Figure 8

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 nearest wind turbine. The level of visual impact decreases as distance increases.
- **Landscape character and viewer sensitivity:** The character of the surrounding landscape, both around the site 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 decreases where there are fewer people able to view the wind farm. Alternatively, the level of visual impact increases where views are from a recognised vantage point. Viewer numbers from a recognised vantage point would be rated as high.

These four 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.

## 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 that will not cause any significant adverse impacts. The assessment of a “low” level of visual impact can be derived if the rating of any one of four criteria, that is visibility, distance, viewer numbers and landscape sensitivity, is assessed as low.

Therefore, 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 it is viewed means that its scale is similar to other elements in the landscape it would also be assessed as a low level of visual impact.

**Medium** – visual impact occurs when significant effects may be able to be mitigated / remedied. The assessment of a “medium” visual impact will depend upon all four-assessment criteria being assessed as higher than “low.”

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

This methodology is similar to that used within the LVIA in 2008. There are no changes to the assessment of the amendment as a result of the evolution of the methodology over the past eight years.

## Photomontages

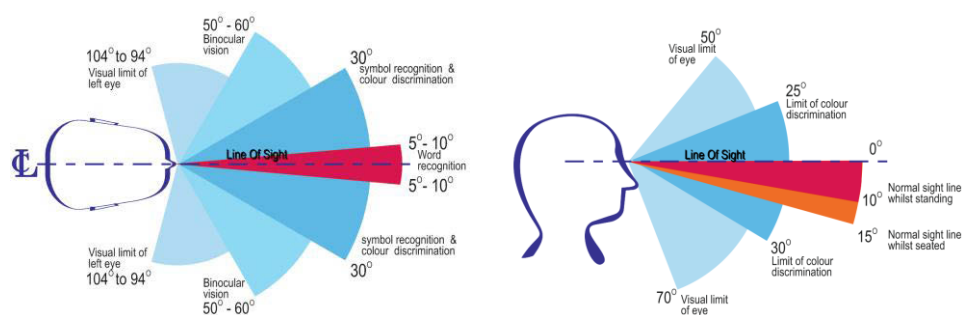
Photomontages can assist in the assessment by illustrating the scale and location of the proposed wind turbines.

This assessment is in part based on photomontages which typically show the changes in a 60° horizontal field of view. This horizontal field of view represents the central cone of view in which symbol recognition and colour discrimination can occur.

The vertical field of view is between 10° - 15°. The field of view of human vision is shown in **Figure 9**.

Figure 9

*Horizontal and Vertical field of view (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 Wiley & Sons, 2012.

In landscapes it is the horizontal field of view that is important if the photomontage images are to represent the change in the landscape.

The photomontages are appended to this report (Refer Annexure B 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 appended to this report (Annex B), are clearer than the smaller images in the text, as these are larger.

A0 photomontages have been prepared and made available to the panel and DELWP and these provide a clear indication of the actual visual impact – these are perceptually accurate.

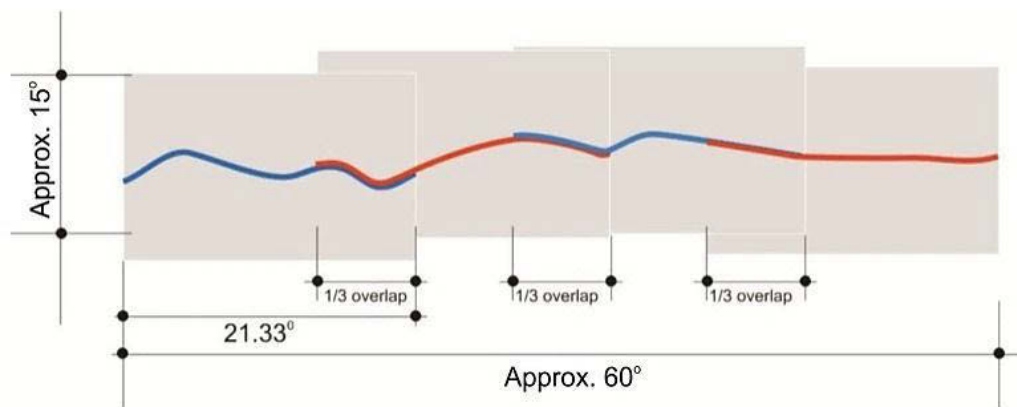
## Camera data

A 70 mm lens on a Nikon D3 digital camera has a picture angle of  $26.5^\circ$  and a horizontal angle of view of approximately  $21.3^\circ$ .

[http://nikonimaging.com/global/products/lens/af/micro/af\\_micro60\\_mmf\\_28d/](http://nikonimaging.com/global/products/lens/af/micro/af_micro60_mmf_28d/).

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.  $50\text{--}70^\circ$  horizontal and  $15^\circ$  vertical. **Figure 10** demonstrates the overlap of the photographs which are used to create the panorama in the photomontages.

Figure 10 Photomontage construction



## 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 wind turbines.

After the background reference points have been aligned, the wireframe is removed, leaving only the wind turbines, which is 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.

## GPS Coordinates

GPS coordinates were also taken based on a separate hand held GPS and the locations from which the photographs were taken is also marked on a digital map within Google Earth Pro.

## 5. Comparative assessment

In order to undertake comparative assessment of the approved layout as against the amended layout photomontages were prepared that were representative of the range of views available and provide a reasonable level of understanding of the effects of increased wind turbine heights for a viewer. The locations are:

- Public viewpoints- A, B, C, D, E and G;
- Residential viewpoints-N31AB, F12AA, G17AA and F30AA.

Photomontages were initially prepared as part of the original Planning Application and indicative viewpoints were selected during that application. Comparative photomontages have been prepared from these selected viewpoints. An A3 version of the comparative photomontages prepared from these viewpoint locations are included in Annex A of this report.

A comparative assessment of the photomontages indicates a negligible increase in the visual impact of the wind turbines from the viewpoints. There will be minimal alteration to the view of the approved wind turbines given the increase in the overall height of the turbines being imperceptible to any viewer. The overall assessment of the visual impacts remains consistent with those discussed in the LVIA.

However, for the sake of clarity, three locations have been re-assessed.

### Lal Lal Falls

A submission was received on the impact of the proposed variation and amendment on Lal Lal Falls.

Lal Lal Falls has been designated as a view of State Significance within the SWVLAS. The impact of the proposed amendment to the heights and diameter of the wind turbines is shown in **Figure 11**.

Figure 11 Lal Lal Falls



Photomontage of approved layout 130m high, 82m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

The change in height is discernible between the two images in **Figure 11**. The wind turbine to the left of the photomontage is wind turbine YSWT27, whose location was changed during the panel hearing to avoid aboriginal heritage areas, but after the initial photomontages were prepared.

The approval was for wind turbines within the landscape viewed from Lal Lal Falls. Although there is a perceptible change when comparing the photomontages between the approved and the amended application, both still show wind turbines in the landscape and the closest is still approximately 2 km from this viewpoint. The change is one of scale not of character nor, without the side by side comparison, one of impact.

The assessment in the LVIA read:

*“At a distance of approximately 2.0 km the wind turbines will be highly visible and will usually dominate the landscape.*

*This location has panoramic and close views to the Yendon Section of the Proposal. It may also lend itself to a wind farm interpretation location similar to the Chalicum Hills Wind Farm. For this wind farm there is a wind farm interpretation panel that informs visitors to the area about the characteristics of the wind farm. An Example of this can be seen in Figure 8.16. The installation of and information panel may be seen as positively contributing to the visual character of the Lal Lal Falls picnic area.*

This assessment still applies and the potential impact to the Lal Lal Falls was also given weight by the Panel, which stated:

*“The Lal Lal Falls Reserve is in our view the most significant public viewpoint as far as potential visual impact is concerned. There are two elements to this reserve, the picnic area itself with a rotunda and the lookout to the falls. The nearest turbine is approximately 2km from the picnic area and Mr Wyatt conceded that the picnic area has panoramic views of the Yendon Section and that a number of turbines will be highly visible and will usually dominate the landscape. This was confirmed by the montages and our site visit. However, we accept Mr Wyatt’s assessment that strategic planting could mitigate impacts on views from the picnic area to the highly modified farming landscape to the north. The view from the falls lookout is more confined as it is at a lower level and focuses on the falls themselves.*

*Nevertheless, some turbines will be visible through the trees to the north. Again we believe that this can be suitably addressed by some strategic planting.” (Panel Report, p48).*

The proposed change in height does not alter the significance or the level of visual impact that was assessed by the LVIA and the Panel.

## Narmbool

A submission to the proposed changes was received on behalf of Narmbool (Submission No. 38).

Sections of the gardens at the Narmbool Reception Centre will have views to the approved and amended wind turbines. Photomontages of a view near a rotunda in the gardens is shown in **Figure 12**.

Figure 12 Narmbool



2009 - Photomontage - 130m high, 82m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

The assessment in the LVIA read:

*“At 1.3 km the wind turbines will be highly visible and with clear views have the potential do dominate the landscape. The most impacted view from this location will be from the Environmental Learning Centre seen in Figure 9.31.*

*Narmbool has many locations that may have views towards the wind turbines. The extensive gardens associated with house have the potential to screen most views to the wind turbines. However, there are locations such as around the gazebo where open views are retained and wind turbines will be visible as seen in Figure 9.30.*

*The visual impact to these areas can be considered high.”*

(Note: The Figure numbers referred to above are to Figures within the LVIA, p95.)

The Panel’s assessment also agreed and stated in part:

*“We have no doubt after our visit, that Narmbool’s extensive gardens are an important asset in its attraction. The impact of the WEF will be different in each of the three components.*

- *The function centre itself is set well back from the garden and is well surrounded by vegetation, and accordingly we do not believe that the manager or guests using the main centre will would be subject to any visual impact from the presence of the WEF.*
- *The nature of the gardens is such that they contain avenues, pathways, low bridges and other features, which provide an interesting and varied route for guests; as a result, views of the WEF will be filtered. The gazebo area is deliberately much more open to provide views to the countryside that often provide a backdrop for photographs. Views to the north-east are somewhat restricted due to existing large trees and the area to the east of the gazebo*



has a number of large pines which also would screen some turbine views. However, we acknowledge that most of the mature pines will need to be felled in the near future, as much for safety reasons as anything else. The turbines to the east and south-east are further away and we find that views of turbines could be limited or filtered by additional landscaping.

- As conceded at the Hearing, we consider visual impacts at the ecocentre will be limited.” (Panel Report, p59).

The impact shown on the photomontages is very similar to what was considered by the Panel and presented in the LVIA. There is no significant alteration in the level of visual impact between the approved wind turbines and the proposed wind turbines.

### St Sava Monastery

A submission was received from St Sava Monastery (Submission 185). The St Sava Serbian Monastery is on the corner of Elaine Mt Mercer Road and Horsehill North Road and is shown in **Figure 13**.

Figure 13 Serbian monastery (Source: Nearmap, imagery 26 February 2010)



The St Sava Serbian Monastery is one that has a well-established garden with a formal layout including cypress hedge rows. The Elaine Section of the Lal Lal Wind Farm is to the north and there are several bands of existing vegetation which would screen views from the Monastery Gardens to the proposed wind farm.

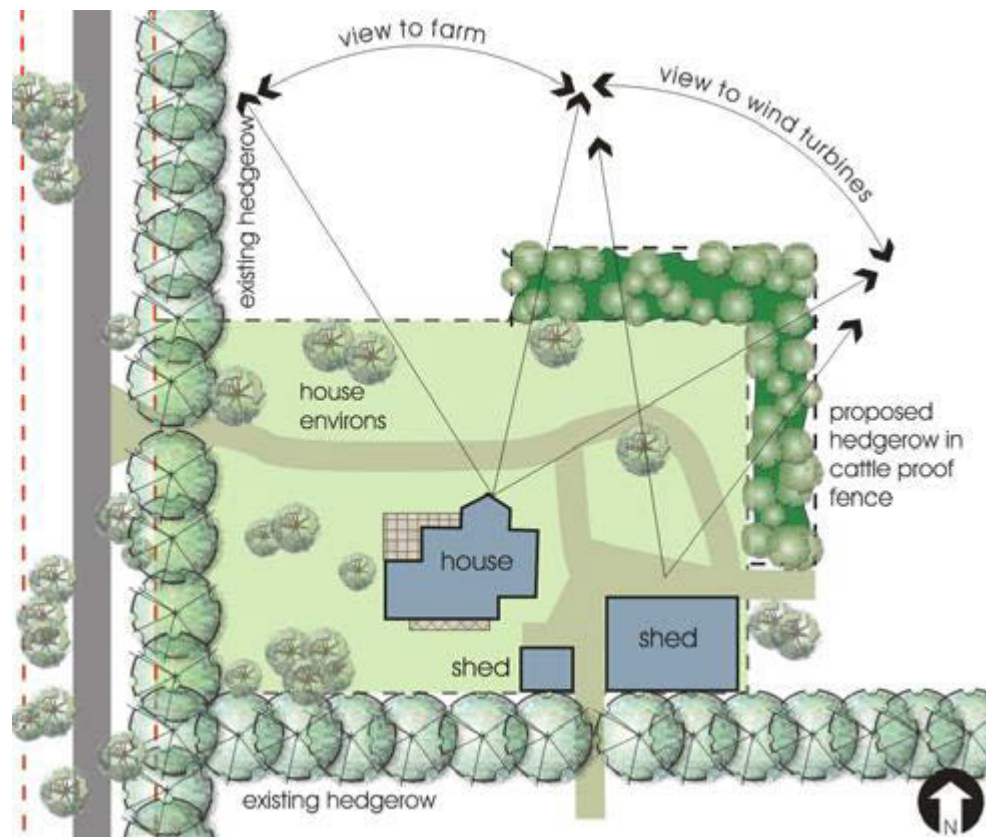
The impact without any landscape mitigation was assessed as low in the Panel report. The proposed amendment to the heights of the wind turbines would not, by itself, change this assessment.

## 6. Landscape mitigation

The existing permit requires landscape mitigation to be offered to land owners with houses within 3 km of the nearest wind turbine, where a wind turbine is visible. This distance is recommended to be increased to 4 km as a result of the higher wind turbines proposed as part of this amendment.

An example of landscape mitigation measures was given in the LVIA and this is replicated in **Figure 14**.

Figure 14 Potential landscape mitigation measures (Source: LVIA, Figure 9.35, ERM 3 March 2008)

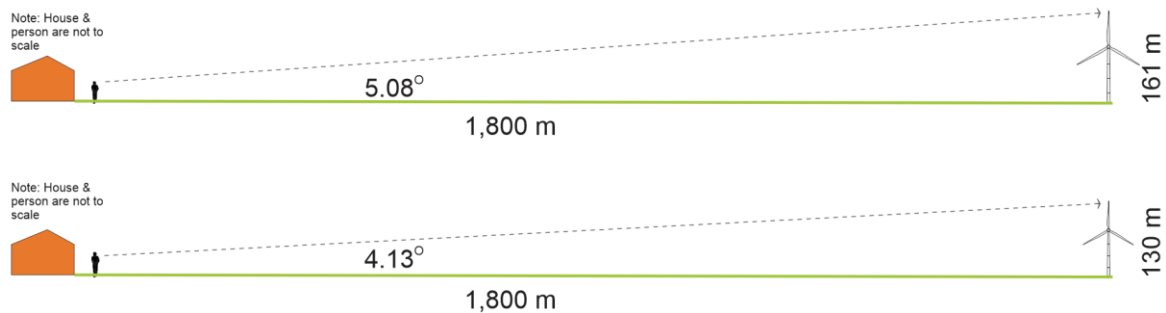


Of potential concern is the effectiveness of the proposed landscaping given the increased height of the wind turbines.

The question that needs to be addressed is whether the proposed landscaping can be effective with wind turbines that are proposed to be 161 m high?

**Figure 15** shows the sightlines calculated for a wind turbine at 130 m in height and a wind turbine 161 m in height.

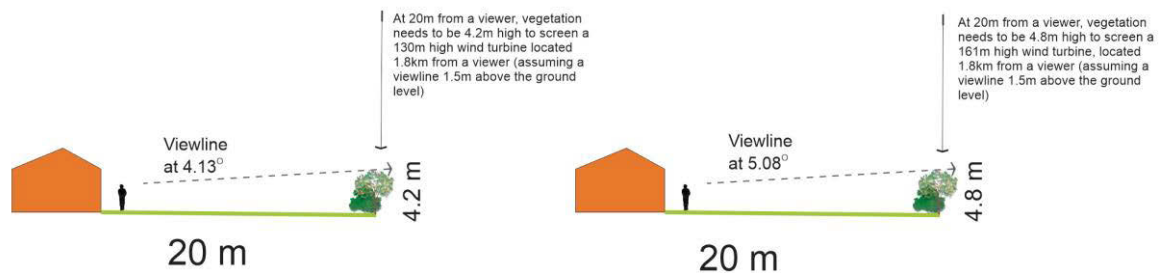
Figure 15 Sight lines to a wind turbine at 1.8km



**Figure 15** demonstrates that the angle of view to a wind turbine of 130 m compared to the angle of view for a turbine that is 161 m high is similar. The viewing angle increases from 4.13° to 5.08°, an increase of less than 1° in the vertical field of view.

This slight increase in viewing angle does not impact significantly on the effective height of vegetation that is required to screen or filter views to the proposed wind turbines.

Figure 16 Vegetation heights to achieve effective screening



**Figure 16** shows planting some 20 m from a viewing location or house. A distance of 20 m was considered adequate for fire setback and to ensure that the house perimeter was uncluttered.

The height of the planting needs to reach 4.2 m in height to screen a 130 m high wind turbine for a viewer with an eye level approximately 1.5 m above the ground line. This vegetative height needs to be 4.8 m to screen a 161 m high wind turbine.

Planting would be more effective if planted closer to the house. If owners wished planting closer to the house, then this would be more effective and conversely if planting was located further away, then it would take longer to reach the greater height required to screen the view to wind turbines. The difference in height of the vegetation to achieve screening is not dissimilar, whether the vegetation is screening a 130 m high wind turbine or a 161 m high wind turbine.

### Findings based on this analysis

The offer of landscape mitigation to residences up to 4 km from the nearest wind turbine is an effective solution to screening wind turbines, if such is the desire of the owner of the affected property.

The impact with and without any landscape mitigation was assessed in the LVIA and the Panel report. This assessment would not change with the proposed amendment to the heights of the wind turbines.

This analysis shows that the increase in height and blade diameter makes little difference to the effectiveness of screening for residential properties. As this is the case there is no further need to further analyse the visual impact from residential properties.

## 7. Aviation lighting

The proposed night lighting in the initial assessment was for:

*It is proposed to installed medium intensity (~2000cd) hazard beacons in pairs on the top of nacelles approximately 88m above ground level. The beacons will be 'capped' to minimise vertical beam spread to 3 degrees and have a flash frequency of 20 flashes per minute with a "flash" sequence of 1 second followed by 2 seconds. A luminance sensor will trigger the beacons and all beacons within each section will be synchronised to flash simultaneously to minimise visual impact. The proposals are in line with CASA specifications. (Panel report, page 71).*

The panel assessed the night lighting initially proposed and found:

*We do not accord much weight to the potential visual impact of obstacle lighting in relation to vehicle traffic as the level of distraction is not so great as to cause a safety hazard. The potential for driver distraction may well be reduced as more WEFs are developed in the region and the expectation of drivers will include the siting of obstacle lighting.*

*We find that the impact from the night lighting of turbines at the Lal Lal WEF in the form proposed can be managed so that there will be no unreasonable impacts and that the condition included in the Draft Permit is satisfactory. (Panel report, page 73).*

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 requirement for flashing light, 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.

Night lighting was considered in the initial application (Refer Chapter 11, Final LVIA, ERM, dated 31 May 2007). This level of night lighting was found acceptable by the Panel in the original Permit Application.

## 8. Submissions received

Submissions that were received mentioned visual amenity as an issue. A number of submissions were also received in support of the proposed amendment.

Generally, in the submissions there was a belief that the presence of the wind farm in the landscape was unacceptable and a sense of disappointment in the initial Panel decision.

### Increased visual impact

The submissions state that the proposal to amend the height and width of the wind turbines will exacerbate the level of visual impact that was approved in the initial panel decision.

A comparative assessment of the approved and amended wind turbines has been undertaken in Chapter 6 of this Expert Witness Statement. As well as this assessment of three viewpoints, I have prepared photomontages for viewpoints VPA, VPB, VPC, VPE, VPG, N31AB, F12AA and F30AA, which show the differences between the:

- 2009 Photomontage (130m high, 82m diameter);
- Amendment 2015 (161m high, 122m diameter); and
- Variation 2016 ((161m high, 140m diameter).

These comparative photomontages further support the conclusion that there is not a significant degree of difference between the level of visual impact approved by the panel and the level of visual impact created by the proposed amendment or variation. The level of difference is negligible. The changes in height and width do not make a quantum change.

### Landscape limitations

Other submissions were concerned that *“due to the increased height of the proposed turbines, we will be unable to plant trees tall enough to screen them from our view”*. (Submission 105).

In Submission 182 - St Stava Monastery, it is stated that the increased height *“will bring the wind turbines above the tree line”*. This is addressed in Chapters 6 and 7 of this Expert Witness Statement.

A comparative assessment of the landscape screening impact of the approved and amended wind turbines will be undertaken in Chapter 7 of this Expert Witness Statement.

### Visual simulations & viewpoint selection

It is asserted that *“The visual simulations are inadequate and cannot be relied upon”* (Submission 183). Information on the rationale behind the photomontages and their construction is given in Chapter 5.

Submission 220 is critical of the sky colours in the photomontages. They were not selected to minimise the impact, in fact often the wind turbines are rendered in shadow (dark grey) to increase the visual contrast with a paler sky, or rendered in sun (white) where the sky is darker. However, it is recognised that the small scale images are not as clear and the photomontages will be presented on A0 sheets for the Panel hearing.

A further submission mentioned that photographs may have been taken in a depression or at low points (Submission 198). The selection of viewpoint locations was consciously at locations where the visual impact would be the greatest. Viewpoints were not deliberately selected to minimise the visual impact.

## Industrialised landscape

A submission asserted that wind farms can industrialise a rural landscape (Submission 131). This is not an accurate description as wind turbines with on-going rural activities (cropping, pasture, sheep or cattle) underneath the wind turbines, is not an industrial landscape. The presence of wind turbines does create a wind farm / rural landscape and this change is recognised in the original assessment.

The proposed amendments or variation does not change the landscape further.

## Cumulative impact

Submissions have raised the possibility that there would be a change to the level of cumulative impact brought about by the proposed amendment or variation. The location of approved and permitted wind farms in the original LVIA prepared by ERM has changed since 2008.

I have considered the cumulative impact of new and approved wind farms since this time and I do not believe that this variation or amendment will change my initial assessment. variation and the conclusion would remain the same as stated in the original LVIA *“Therefore the Proposal will have a low cumulative visual impact on the surrounding landscape, both at a regional and at a local level.”* (ERM, LVIA, Clause 10.2).

## 9. Conclusion

The preceding analysis illustrates that whilst there is a change to the height and diameter of the proposed wind turbines, such a change has a negligible impact on views.

Negligible was defined in the Visual Impact Methodology (Chapter 3) as a “*minute level of effect that is barely discernible over ordinary day-to-day effects.*”

Looking at the difference between the photomontages depicting wind turbines at 130 m and at 161 m high and with rotor diameters that vary from 82 m (approved) to 122 m and then 140 m with the same background and lighting, the difference in visual impact is negligible. Similar differences will occur in different light situations with no change in the height or rotor diameter. Similar variation in the scale will also be apparent if a viewer moved forward or backward from the viewpoint locations.

The real visual impact of the wind farm is the presence of tall vertical structures with sweeping blades in a landscape that is typically a rural landscape. This impact was assessed by the Panel and the impact was, on balance, found to be acceptable.

The level of impact shown in the photomontages would not alter the impact levels that were assessed in the LVIA and considered by the Panel. There is a slight change in the degree of impact, but one which does not alter the quantum of the impact, that is the impact would not change from low to medium, or from medium to high.

Therefore, the alteration of height and rotor diameter is considered to have a negligible visual impact above that of the approved wind farm.

### Potential residential impact

The approval was also subject to landscape mitigation measures being offered to affected residential properties within 3 km.

With the proposed amendment increasing the heights of the proposed wind turbines to 161 m, it would be appropriate if the distance within which landscape mitigation was offered was increased. Mathematically that increase would be to 3.6 km, however it is my recommendation that landscape mitigation be offered to residential properties within 4 km of the nearest visible wind turbine.



## Annexure A

Allan Wyatt – Curriculum vitae

## Annexure B

### Photomontages

# Allan Wyatt - Curriculum Vitae

Allan has extensive experience in assessing the landscape and visual impacts of wind energy developments to assist in the management of environmental and related risks.

Allan also has the capabilities to prepare and present evidence in legal hearings in all states and territories with regard to landscape and visual impacts. Allan regularly appears before independent panel hearings, the Victorian Civil and Administrative Tribunal (VCAT) and other appellant bodies as an expert witness in the areas of urban design, visual assessment and landscape architecture.

More recently, Allan has specialised in large scale masterplanning and urban design work with major projects being undertaken for local government, boards of management as well as for private developers both in Australia and in China, Hong Kong, India and Malaysia

## 2015 to present

Landscape Architect - XURBAN

## 1997 to 2015

Environmental Resources Management Pty Ltd  
Partner & Practice Leader - Urban Design and  
Landscape Architecture - Asia Pacific

## 1989 to 1996

Ratio Consultants Pty Ltd Partner

## 1980 to 1989

Allan Wyatt Pty Ltd - Principal

## 1976 to 1979

Public Works Department, Victoria - Landscape  
Architect

## 1974 to 1976

Peter Jones Architect & Landscape Consultant -  
Landscape Architect

## Professional Affiliations and Registrations

Associate, Australian Institute of Landscape  
Architects

Fellow, Victorian Planning and Environmental Law  
Association

## Fields of Competence

Urban Design

Landscape Architecture

Visual Assessments.

## Education

Graduate Diploma Landscape Design (RMIT) 1979

## Languages

English

## Publications

*Community perception studies as a means of  
evaluating landscape quality*, NZ Wind Energy  
Conference.

*Photomontages and perceptual accuracy*, NZ WE  
Conference paper.

*Visual assessment and environmental restoration of  
mine and quarry operations*, paper presented to the  
joint VPELA and Victorian Chamber of Mines

*Trees in the urban jungle and other Neighbourhood  
conflicts*, paper represented to joint  
AILA/VPELA/RAPI Seminar.

*Concerns regarding statutory control on tree planting  
in our cities*, published in Victorian Planning and  
Environmental Law Association Newsletter.

## Key Projects

Some examples of key projects are listed below.

### Windfarm projects

Allan Wyatt has provided advice and visual assessments for more than 30 wind farms in Australia and New Zealand. These include:

#### *Mount Mercer Wind Farm (WestWind Energy Pty Ltd)*

Allan Wyatt provided advice as part of the Notification to the Minister for Planning (Vic) under the Environment Effects Act 1978 and preparation and lodgement of the Planning Application material for the proposed Mount Mercer Wind Farm. This project was granted planning approvals in April 2007.

#### *Ryan Corner Wind Farm (TME Australia Pty Ltd)*

ERM was engaged to prepare the Environment Effects Statement (EES), subject to the provisions of the Environment Effects Act 1978. Allan Wyatt was commissioned to prepare and present evidence on Landscape and Visual Assessment at the hearing before Planning Panels Victoria.

#### *Lal Lal Wind Farm (WestWind Energy Pty Ltd)*

Allan Wyatt managed a research project to determine the attitudes of the community to wind farm developments in Victoria, and in particular in relation to the proposed Lal Lal Wind Farm. This research is designed to provide a quantitative and defensible data as to the level of community support or opposition for the project. The data was utilised in the application material.

#### *Other wind farm projects*

Other wind farm projects on which Allan Wyatt prepared visual and landscape assessments include:

- Dundonnell Wind Farm, Victoria
- Stockyard Hill Wind Farm;
- Turitea Wind Farm, New Zealand;
- Waubra Wind Farm;
- Darlington & Berrybank Wind Farm;
- Newfield Wind Farm;
- Mount Mercer Wind Farm;
- Hawkesdale Wind Farm;
- Oaklands Hill Wind Farm;
- Newfield Wind Farm;
- Sidonia Hills Wind Farm;
- Gullen Range Wind Farm;
- Mortlake Wind Farm;
- Macarthur Wind Farm;

- Dollar Wind Farm;
- Bald Hills Wind Farm;
- Ararat Wind Farm;
- Crowlands Wind Farm;
- Portland Wind Energy Project;
- Yass Wind farm, NSW
- Taralga Wind Farm, NSW;
- Nirranda South Wind Farm;
- Black Springs Wind Farm, NSW;
- Berrybank Wind Farm;
- Yoloak Estate Wind Farm; and
- Waubra Wind Farm.

## Urban design, masterplanning & golf courses

### *Dalingshan, Dongguan Province, China*

Urban design for a city expected to grow to 3 million. As a central component of the urban planning for the revitalisation of this City, open space provided contiguous corridors for both recreational needs, flood management and pollution control.

### *Nanjing Lake and the Purple Mountain*

The masterplanning of this central 44 km<sup>2</sup> area in central Nanjing involved heritage issues as well as ideas to dramatically retreat major freeways that were dividing the historic precinct in central Nanjing.

### *Pukou, Central China*

This 21 km<sup>2</sup> new urban area in central China was designed around LEED ND principles and incorporated a new arterial road network as well as urban planning for a design population of 200,000 along with commercial and employment nodes.

### *Royal Palms, Goregaon, Mumbai, India*

The masterplanning of this 90 ha precipitous quarry site in India encompassed a golf course, a 5 star and a 4 star hotel, luxury housing and condominiums set in a high quality lake and parkland setting.

### *Integrated Tourism Resort, Powai, India - Stage 2*

Preparation of a site masterplan for a golf course, hotels, convention centre, time share and residential apartments, golf lodges, aquarium, butterfly house and cultural village. The site was on a steeply sloping volcanic ridge.

### *Pearl Island Golf & Country Club, Penang, Malaysia*

Following the masterplanning of this site and the subsequent documentation of the golf course, ERM has been engaged to create the extensive landscape

spaces which are to be an integral part of this major facility

#### *PPH Resorts, Penang, Malaysia*

Landscape and masterplanning options as well as on-going documentation and contract administration of a major 18 hole golf course and associated facilities in a mountainous region of Malaysia.

#### *Queenscliff Coastal Action Plan*

Undertake a study of future land use options, pedestrian and vehicular strategies for the on-going development of one of Victoria's premier coastal resorts for the Central Coastal Board. Community and stakeholder consultation was a key component of the study.

#### *City of Casey Planning and Urban Design*

Various structure plan reviews and urban design works examining built form, streetscape, traffic and landscape improvements to increase the identity, character and pedestrian amenity of the City of Casey.

#### *Victoria Racing Club (VRC), Melbourne, Victoria, Australia*

Flood wall treatments along the Maribyrnong River were followed with the masterplanning, documentation and contract administration for the new wetlands at Flemington Racecourse, Melbourne. The entries on Flemington Road were also part of this project.

#### *Eli Waters, Hervey Bay, Queensland*

Landscape Masterplan for this large residential estate in Queensland, which focuses on an 18-hole golf course and an extensive wetlands and lakes system.

#### *Dalian Waterfront, Dalian, China*

Design team for a new waterfront including parklands and commercial facilities.

#### *Clifton Park, Victoria*

Project coordination and contract administration for the construction of a large community park in Brunswick.

#### *HK University Ideas Competition, Hong Kong*

Preparation of landscape masterplan for the existing university campus and the proposed western expansion.

#### *Residential project, Wo Shang Wai, Hong Kong*

Preparation of a Landscape Master Plan and Sustainable Landscape Design Guidelines for a confidential project near a sensitive wetland environment in Hong Kong.

## Open space planning

### *Karkarook Lake and Wetlands*

The masterplanning & documentation of the lake and wetlands of the largest man-made wetlands in Melbourne and treats urban run-off as well as providing a substantial recreation resource.

### *Confidential project, Taiwan*

Preparation of a Landscape Master Plan and Sustainable Landscape Design Guidelines for a confidential new city development in Taiwan.

### *Croydon Open Space Study*

The City of Croydon contained many areas of open space derived from residential contributions. This study examined their ecological value and made recommendations for future development.

### *Tarneit Wetlands, Victoria, Australia*

Masterplanning of a large new wetlands system at the head of the Werribee River to deal with stormwater retention, habitat creation and is to create community open space for the surrounding residential developments.

### *Botanica Springs, Melbourne, Australia*

Concept and detailed design of an ornamental wetlands system associated with a large residential development.

## Infrastructure

### *Urban Design Framework, East West Link, Melbourne*

Undertake a study to inform tenderers on this project of the standard expected in the final urban design outcomes. These included key objectives for new 'gateways' to Melbourne, as well as for open space and wetland redesign as well as future bike and pedestrian linkages.

### *Melbourne Desalination Plant*

Landscape and visual assessment for this major infrastructure project that also involved the assessment of a 220kV transmission line and a pipeline easement cutting through residential and rural landscapes.

### *Yarra Pedestrian Bridge*

Urban design and landscape involvement on this major pedestrian link between the MCG and Birrarung Marr.

***LNG Terminal, South Soko, Hong Kong***

Landscape and Visual Assessment components within an EES that also included a fly through model of the proposed development on South Soko Island.

***Channel Deepening Project, Port of Melbourne (POMC)***

Visual assessment of this major piece of Victorian infrastructure which included an examination of the visual impacts of the plume created by dredging activities in Port Philip Bay.

***Basslink***

Visual assessment of proposed transmission line options and associated components for major inter-connector between Tasmania and Victoria.

***Parramatta Rail***

Visual assessment and the development of subsequent site design and documentation for key nodal areas on this railway line upgrade.

***Wind Farm Visual Assessments***

Undertake the visual assessment and the preparation of photomontages for more than 30 wind farms in Victoria, South Australia, NSW and New Zealand.

***Bass Link***

Strategic siting as well as detailed visual assessment of the selected route as well as landscape mitigation for this major interconnection between the electrical grids of Tasmania and Victoria.

***Various Road projects***

Allan has been the Project Director within ERM for various road projects which have included highway bridge duplication in NSW as well as more recently providing visual assessment input and providing the photomontages for the Geelong Bypass and working on the Urban Design Framework for East West Link.

***Airports at Cairns, Broken Hill, Alice Springs and Devonport***

Site and landscape design of pedestrian and entry treatments. Typically these projects involved extensive external landscape treatment for visual amelioration and, in the case of Broken Hill, the landscape treatment was critical for dust control.

***Mallacoota Boat Launching Ramp & foreshore masterplan***

Responsible for the revised Masterplanning in response to a visual assessment for this foreshore redevelopment project.

**Mines and quarries**

Preparation of end use masterplans as well as staged rehabilitation plans for large long term mining and quarrying projects. Many of these projects have also involved a visual assessment of the proposal and integrated this visual assessment with proposed staging and rehabilitation works.

***Quarries as part of the Dundonnell Wind Farm***

Two quarries were proposed as part of the infrastructure to construct the Dundonnell Wind Farm.

***Chiltern Quarry***

Visual assessment as well as a landscape proposal which sought to replicated the landscape pattern of the surrounding countryside.

***Mount Shamrock Quarry, Pakenham***

Visual and Landscape assessment for proposed Works Authority extension to existing quarry. The work involved Landscape Rehabilitation and Mitigation Planting to address environment and visual issues.

***Uranium Mine, Northern Territory, Australia***

Preparation of 3D modelling, photomontages based on a conceptual site layout and landscape plans for a confidential client in Australia.

***Montrose Quarry***

Development of end use guidelines and rehabilitation recommendations for Montrose Quarry.

***Gold mine, WA***

Preparation of confidential end use plans for mining tenements that were reaching completion.

***Grantville Sand Quarry***

Staged rehabilitation plans for this sand quarry, particularly the slimes storage areas.

***Yea Sand & Gravel Quarry***

Quarry rehabilitation of an area subject to flooding and adjacent to the Yea River.

***Sunshine Quarry***

The rehabilitation of this quarry involved the creation of a nine-hole golf course as well as special landscape treatments for the extensive battered slopes on the Maribyrnong River.

***Niddrie Quarry redevelopment masterplan***

Residential and recreational land use planning of the quarry.



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**

Urban Design  
Landscape Architecture  
Visual Assessment

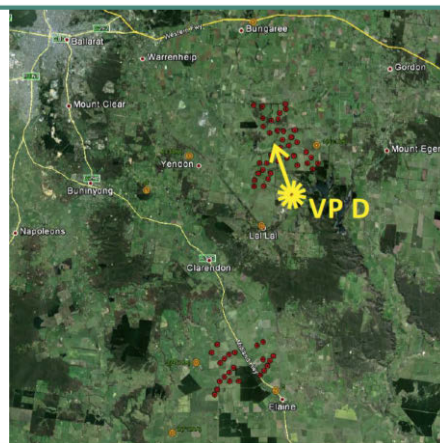
Suite 1103, 408 Lonsdale Street,  
Melbourne Victoria 3000  
P: 61 3 9642 8040  
E: allan.wyatt@xurban.com.au

**Viewpoint C - (Left)**

Location data reference:  
Grid Datum: GDA94 Zone 55  
  
Easting: 238488  
Northing: 5828213  
Ground level: approximately 469m  
Distance to nearest wind turbine: approximately 1.9 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 3a.



Project:  
**LAL LAL WIND FARM**  
  
Drawing:  
**Lal Lal Falls**  
**Approved & proposed**

**COMPARATIVE VIEW**

Date: 25 August 2016 Project No: 15040  
Drawing No: **VP C - Left** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**

Urban Design  
Landscape Architecture  
Visual Assessment

Suite 1103, 408 Lonsdale Street,  
Melbourne Victoria 3000

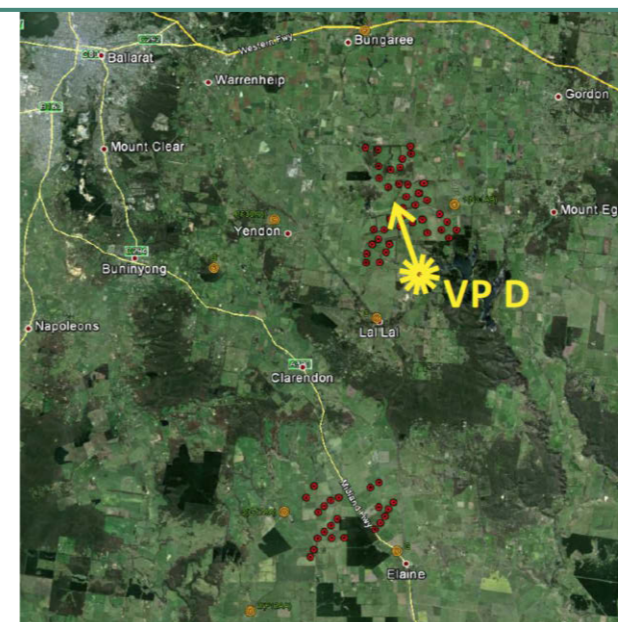
P: 61 3 9642 8040  
E: allan.wyatt@xurban.com.au

### Viewpoint C - Panorama

Location data reference:  
Grid Datum: GDA94 Zone 55  
  
Easting: 238488  
Northing: 5828213  
Ground level: approximately 469m  
Distance to nearest wind turbine: approximately 1.9 km

### Notes:

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 3a.



Project:  
**LAL LAL WIND FARM**

Drawing:  
**Lal Lal Falls  
Approved & proposed**

### PANORAMA COMPARISON

Date: 25 August 2016      Project No: 15040  
Drawing No: **VP C**      Revision No:





2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

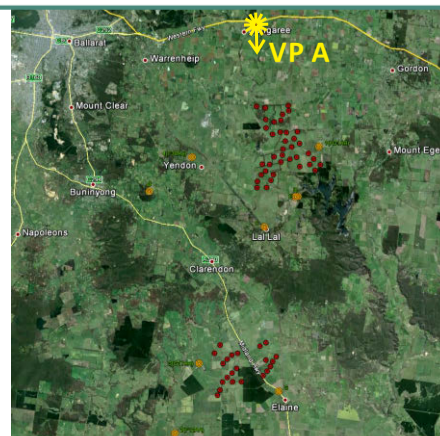
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint A**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 235541  
 Northing: 5839463  
 Ground level: approximately 572m  
 Distance to nearest wind turbine: approximately 5.3 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 1.



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT A**  
 View from west bound weighbridge rest area on Western Highway looking south over Bungaree Township

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
 Drawing No: **VP A** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

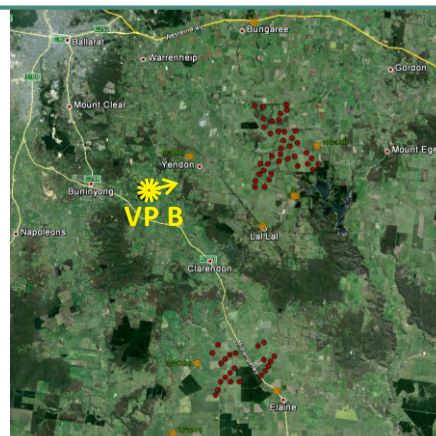
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint B**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 228848  
 Northing: 5828312  
 Ground level: approximately 750m  
 Distance to nearest wind turbine: approximately 7.0 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 6.



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT B**  
 View from Alexander Bell Memorial Tower lookout platform (Mount Buninyong) looking north-east

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
 Drawing No: **VP B** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

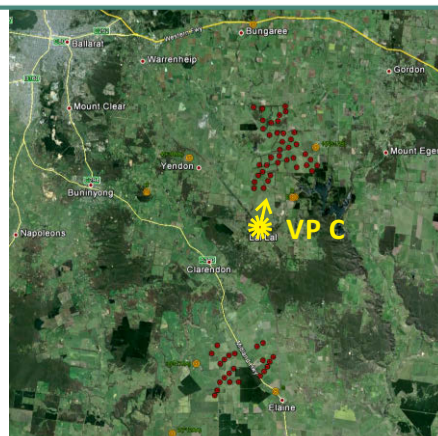
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint C**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 236508  
 Northing: 5826183  
 Ground level: approximately 474m  
 Distance to nearest wind turbine: approximately 2.6 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 5b



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT C - left**  
 From Lal Lal township looking north to north east from edge of town

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
 Drawing No: **VP C - left** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

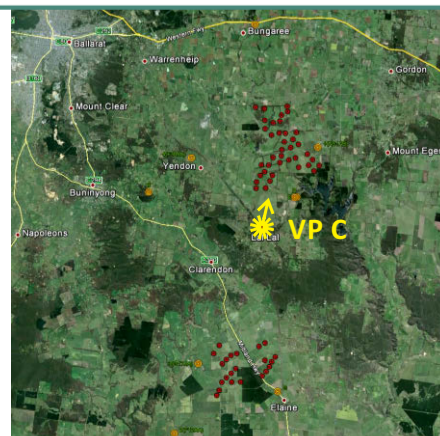
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint C**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 236508  
 Northing: 5826183  
 Ground level: approximately 474m  
 Distance to nearest wind turbine: approximately 2.6 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 5b



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT C - right**  
 From Lal Lal township looking north to north east from edge of town

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
 Drawing No: **VP C - right** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
Urban Design  
Landscape Architecture  
Visual Assessment

Urban Design  
Landscape Architecture  
Visual Assessment

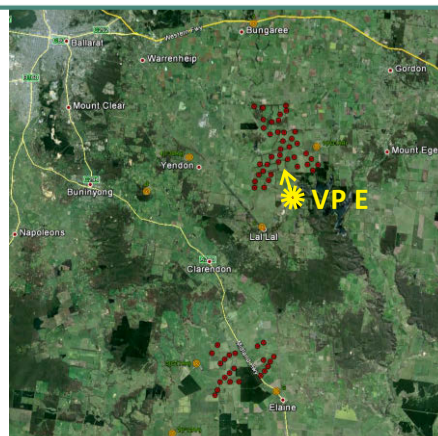
Suite 1103, 408 Lonsdale Street,  
Melbourne Victoria 3000  
P: 61 3 9642 8040  
E: allan.wyatt@xurban.com.au

**Viewpoint E**

Location data reference:  
Grid Datum: GDA94 Zone 55  
  
Easting: 238657  
Northing: 5828247  
Ground level: approximately 445m  
Distance to nearest wind turbine: approximately 1.9 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 4



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT E**  
From Lal Lal Falls Lookout looking towards waterfall

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
Drawing No: **VP E** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

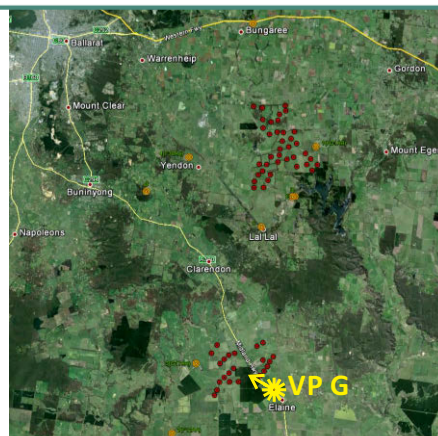
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint G**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 237792  
 Northing: 5815430  
 Ground level: approximately 397m  
 Distance to nearest wind turbine: approximately 1.4 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 2a



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT G - left**

View from north of Elaine on the Midland Highway, north of the level rail crossing

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040

Drawing No: **VP G - left** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

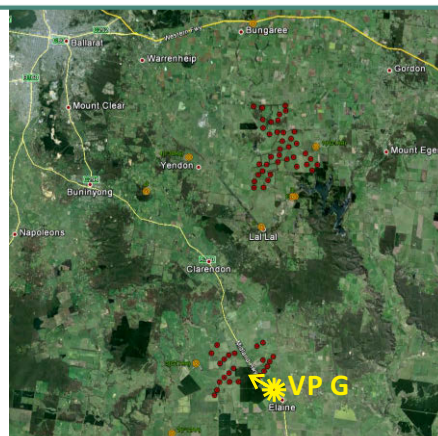
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint G**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 237792  
 Northing: 5815430  
 Ground level: approximately 397m  
 Distance to nearest wind turbine: approximately 1.4 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 2b



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT G - right**

View from north of Elaine on the Midland Highway, north of the level rail crossing

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040

Drawing No: **VP G - right** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**

Urban Design  
Landscape Architecture  
Visual Assessment

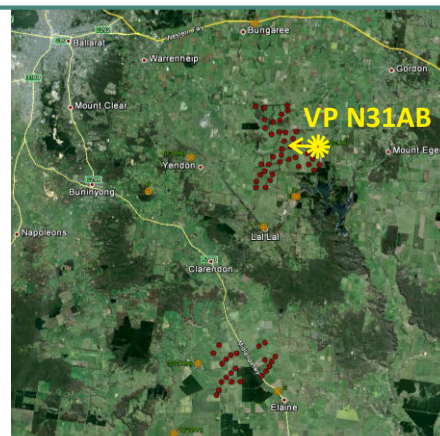
Suite 1103, 408 Lonsdale Street,  
Melbourne Victoria 3000  
P: 61 3 9642 8040  
E: allan.wyatt@xurban.com.au

**Viewpoint N31AB**

Location data reference:  
Grid Datum: GDA94 Zone 55  
  
Easting: 239928  
Northing: 5831550  
Ground level: approximately 515m  
Distance to nearest wind turbine: approximately 1.2 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 7



Project:  
**LAL LAL WIND FARM**  
Drawing:  
**VIEWPOINT N31AB**  
View from house on McGuigan's Road

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
Drawing No: **VP N31AB** Revision No:





2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
Urban Design  
Landscape Architecture  
Visual Assessment

Urban Design  
Landscape Architecture  
Visual Assessment

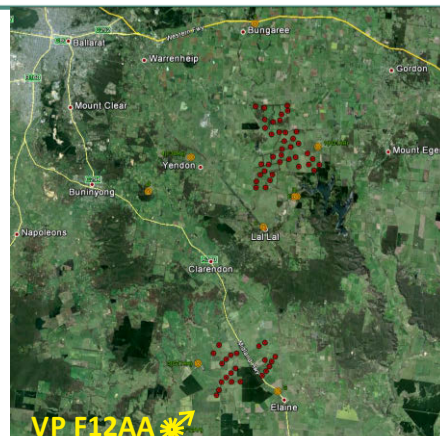
Suite 1103, 408 Lonsdale Street,  
Melbourne Victoria 3000  
P: 61 3 9642 8040  
E: allan.wyatt@xurban.com.au

**Viewpoint F12AA**

Location data reference:  
Grid Datum: GDA94 Zone 55  
  
Easting: 759350  
Northing: 5812680  
Ground level: approximately 411m  
Distance to nearest wind turbine: approximately 3.7 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 7



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT F12AA**

View north-east from peak of Larundel Hill, Orrells Road

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040

Drawing No: **VP F12AA** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**  
 Urban Design  
 Landscape Architecture  
 Visual Assessment

Urban Design  
 Landscape Architecture  
 Visual Assessment

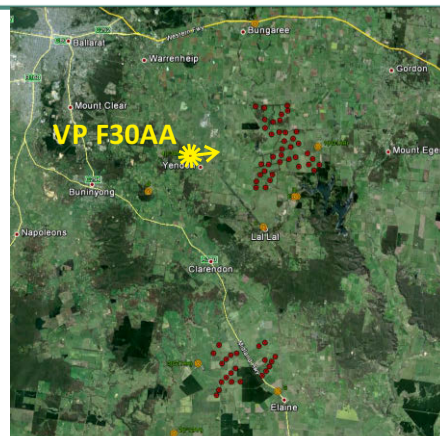
Suite 1103, 408 Lonsdale Street,  
 Melbourne Victoria 3000  
 P: 61 3 9642 8040  
 E: allan.wyatt@xurban.com.au

**Viewpoint F30AA**

Location data reference:  
 Grid Datum: GDA94 Zone 55  
 Easting: 761075  
 Northing: 5830838  
 Ground level: approximately 529m  
 Distance to nearest wind turbine: approximately 4.6 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 7



Project:  
**LAL LAL WIND FARM**

Drawing:  
**VIEWPOINT F30AA**  
 Vieweast from house F30AA, on Buchanans Lane

**COMPARATIVE VIEW**

Date: 5 September 2016 Project No: 15040  
 Drawing No: **VP F30AA** Revision No:



2009 - Photomontage - 130m high, 82m diameter



Amendment 2015 - Photomontage - 161m high, 122m diameter



Variation 2016 - Photomontage - 161m high, 140m diameter

**XURBAN**

Urban Design  
Landscape Architecture  
Visual Assessment

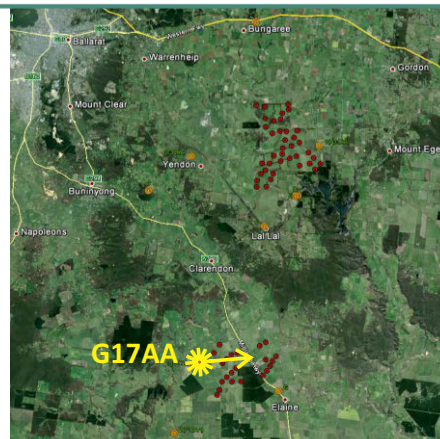
Suite 1103, 408 Lonsdale Street,  
Melbourne Victoria 3000  
P: 61 3 9642 8040  
E: allan.wyatt@xurban.com.au

**Viewpoint 3 - House G17AA**

Location data reference:  
Grid Datum: GDA94 Zone 54  
  
Easting: 761084  
Northing: 5817299  
Ground level: approximately 383m  
Distance to nearest wind turbine: approximately 1.3 km

**Notes:**

Photomontage of 'Approved layout 130m high, 82m diameter' prepared by ERM on the 27/02/08, Project No. 0058176, Drawing No 9



Project:  
**LAL LAL WIND FARM**  
  
Drawing:  
**Narmbool Reception Centre  
Approved & proposed**

**COMPARATIVE VIEW**

Date: 25 August 2016 Project No: 15040  
Drawing No: **VP G17AA** Revision No: