

STOCKYARD HILL WIND FARM AMENDMENT

Landscape and Visual Impact Assessment to accompany an Application to Amend Planning Permit No. PL-SP/05/0548

For: Stockyard Hill Wind Farm Pty Ltd

REFERENCE: 0247503 SHWF RPT4/ FINAL/ April 2016



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For: Stockyard Hill Wind Farm Pty Ltd

0247503 SHWF RPT4/ FINAL/ April 2016

For and on behalf of

Environmental Resources Management Australia

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Date: 21 April 2016

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EXECUTIVE SUMMARY

Stockyard Hill Wind Farm Pty Ltd (SHWFPL) (a subsidiary of Origin Energy) is developing a wind farm project in south-west Victoria, known as the Stockyard Hill Wind Farm (SHWF).

Planning Permit No. PL-SP/05/0548 (the Permit) was issued by the Minister for Planning in October 2010 to enable the use and development of the SHWF Wind Energy Facility (WEF).

SHWFPL has now decided to progress the preparation of an application to amend the Permit to seek approval for an increase to the overall height and width of the wind turbines and to reduce the wind turbine numbers from 157 (permitted) to 149 wind turbines.

This document was prepared with the purpose to accompany an application to amend the Permit. The following report has assessed the change to the landscape and visual impacts to receptors within the viewshed, resulting from the proposed amendment to the SHWF WEF.

Changes to policy and guidelines

Since the Permit was issued for the SHWF WEF on 26 October 2010, planning guidelines and landscape studies have changed and / or new policies and guidelines have been drafted.

This assessment examines the permitted and amended WEF in light of current guidelines and policies and reaches the conclusion that although these may have led to a finer detail in the landscape character descriptions, these changes would have no impact on the evaluation of the visual impacts of the change between the permitted WEF and the amended SHWF WEF.

Physical changes to layout and height

All of the proposed amendments to the Permit are set out within the application to amend the Permit; however, the changes that may have landscape and visual implications relate to the change in numbers of wind turbines and their physical dimensions (and are described in Section 2 of this assessment).

This assessment has found that:

- The numbers of wind turbines have reduced in some views, and that such a reduction in numbers would have a minor or insignificant reduction on the visual impact of the WEF.
- The reduction in the number of wind turbines from 157 (permitted WEF) to 149 wind turbines (amended WEF) is not visually significant.
- The relocation of some wind turbines makes no perceptible difference to the level of visual impact.
- The change between the visual impact of a permitted wind turbine and the amended wind turbine is not significant.

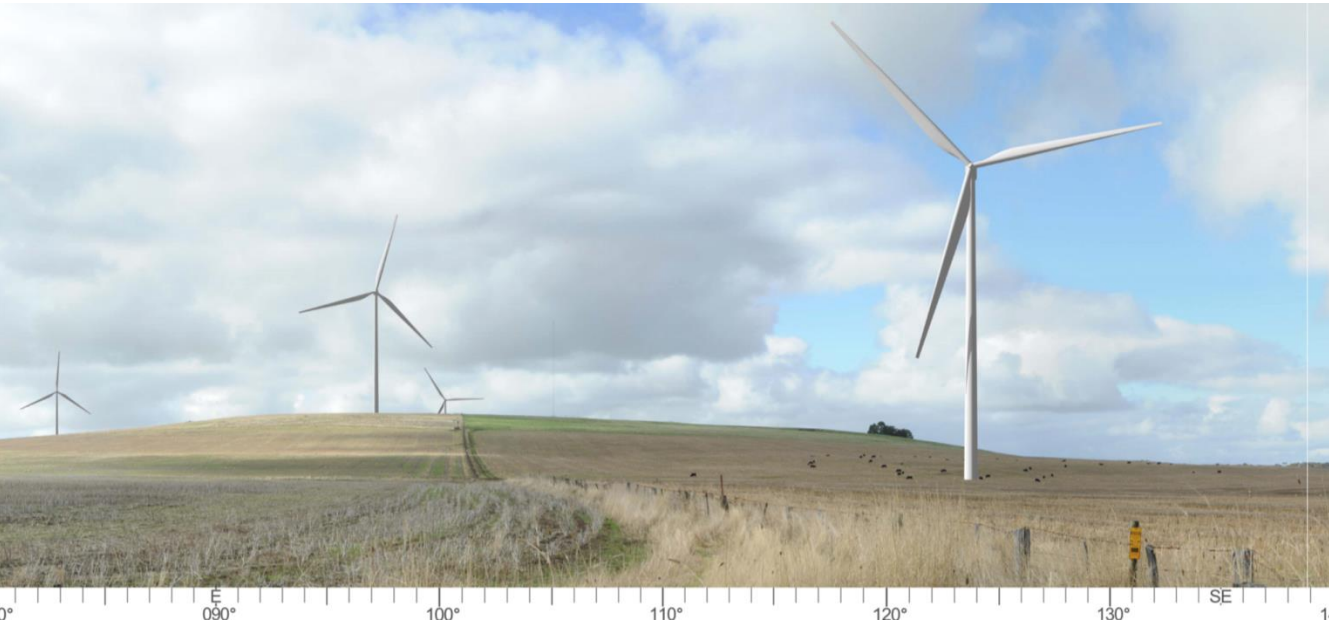
Therefore, it is considered that the visual impact of a permitted wind turbine and the proposed wind turbine is not significant. The visual impacts of the permitted WEF are similar to that of the amended WEF.

This conclusion can be demonstrated by a comparison between Figure 0-1 and Figure 0-2. Comparing this example from a Viewpoint some 200 m from the nearest wind turbine, it is apparent that there is a change to the height and locations. The main change comes about because the nearest wind turbine is now closer to this particular viewpoint. However even if the turbine is closer, the visual impact on this landscape resulted from the presence of wind turbines (Figure 0-1), and this does not alter when the wind turbine is closer and larger (Figure 0-2).

Figure 0-1 Permitted WEF (Wind turbines 132 m height, 104 m wide)



Figure 0-2 Amended WEF (Wind turbines 180 m height, 140 m wide)



This assessment shows that the change between the visual impact of a permitted wind turbine with an overall height of 132 m (Figure 0-1) and a proposed wind turbine with an overall height of 180 m (Figure 0-2) is noticeable, but does not change the level of visual impact. If the level of visual impact was assessed as low or medium for the permitted WEF, the larger wind turbines do not, in this and the other examples within this assessment change the level of impact.

The impacts of the permitted WEF are similar to that of the proposed amended WEF. The overall visual impact remains unchanged and therefore there are no visual reasons why the proposed amendment to the Permit should not be approved.

1. INTRODUCTION

1.1 Background

Stockyard Hill Wind Farm Pty Ltd (SHWFPL) (a subsidiary of Origin Energy) is developing a wind farm project in south-west Victoria, known as the Stockyard Hill Wind Farm (SHWF).

It was determined on 29 September 2008 that no Environment Effects Statement (EES) was required to be prepared, subject to three conditions under the Environment Effects Act 1978 (EE Act) and that the Planning and Environment Act 1987 could adequately assess the Project.

Planning Permit No. PL-SP/05/0548 (Pyrenees Planning Scheme) (the Permit) was issued by the Minister for Planning on 26 October 2010 to enable the use and development of the SHWF WEF.

1.2 Planning Permit Amendment

SHWFPL has now decided to progress the preparation of an application to amend the Permit under Section 97I of the Planning and Environment Act 1987. The amendment application seeks to reduce the number of wind turbines and to increase their size.

However, as a result of the proposed larger turbines and to ensure the Permit reflects current policies, standards and guidelines, there are a number of other amendments proposed as part of the application.

The proposed amendments to the Permit (as relevant to landscape and visual impact) are discussed in Chapter 2 of this document.

1.3 Purpose of Document

This document was prepared with the purpose to accompany an application to amend the Permit.

The following report will review and assess if there is any change to the landscape and visual impacts between the permitted WEF and the proposed amendment to the SHWF WEF.

2. THE PROJECT

The SHWF WEF is located in the South West Victoria approximately 35 km west of Ballarat and 150 km North West of Melbourne.

2.1 Permitted WEF

The Permit was issued by the Minister for Planning in October 2010 to enable the use and development of the SHWF WEF, including up to 157 turbines sites (with a maximum tower height of 80 m, blade length of 52 m and tip height of 132 m).

The Permit is subject to 48 conditions, including the following conditions, which relate to mitigation of landscape and visual impacts:

“ON SITE LANDSCAPING PLAN

33. Before the development starts, on-site landscape plans must be prepared for the substations and maintenance facility to the satisfaction of the Minister for Planning. When approved, the plans will be endorsed and will then form part of this permit. The plans must include:

- a) landscaping to screen the substation, maintenance facility and associated permanent buildings other than the turbines;
- b) details of plant species proposed to be used in the landscaping, including height and spread at maturity;
- c) a timetable for implementation of all landscaping works;
- d) a maintenance and monitoring program; and
- e) surfacing of access tracks in a manner which does not unduly contrast with the landscape.

The landscaping as shown on the endorsed on-site landscaping plan must be completed to the satisfaction of the Minister for Planning in accordance with the implementation timetable.

OFF-SITE LANDSCAPING PLAN

34. Within 6 months of the date of endorsement of the development plan under Condition 1, a program of voluntary landscape mitigation works to the satisfaction of the Minister for Planning must be made available to the owners of dwellings within 3 kilometres of the nearest turbine.

The offer to owners to participate in the program must remain available up until 12 months after the commissioning of the last wind turbine of the development or relevant stage.

If a program of voluntary landscape mitigation works is accepted by one or more owners, as part of that program, an off-site landscaping plan must be prepared in consultation with each landowner participating in the landscaping program for their property at the cost of the operator under this permit and to the satisfaction of the responsible authority.

The plan must:

- a) provide details of planting or other treatments that will be used to reduce the visual impact of the wind turbines at the landowner’s dwelling including plant species to be used and the expected height and spread of plants at maturity;
- b) include the maintenance of the landscaping for a period of two years; and
- c) include a timetable for implementation of the landscaping works.

When approved by the Minister the plans will be endorsed accordingly and will then form part of this permit.

The landscaping as shown on the endorsed off-site landscape plans must be completed to the satisfaction of the Minister for Planning within 12 months of the endorsement of the particular plan unless otherwise agreed by the landowner.”

2.2 Amended WEF

The amendment to the Permit which may have landscape or visual implications include:

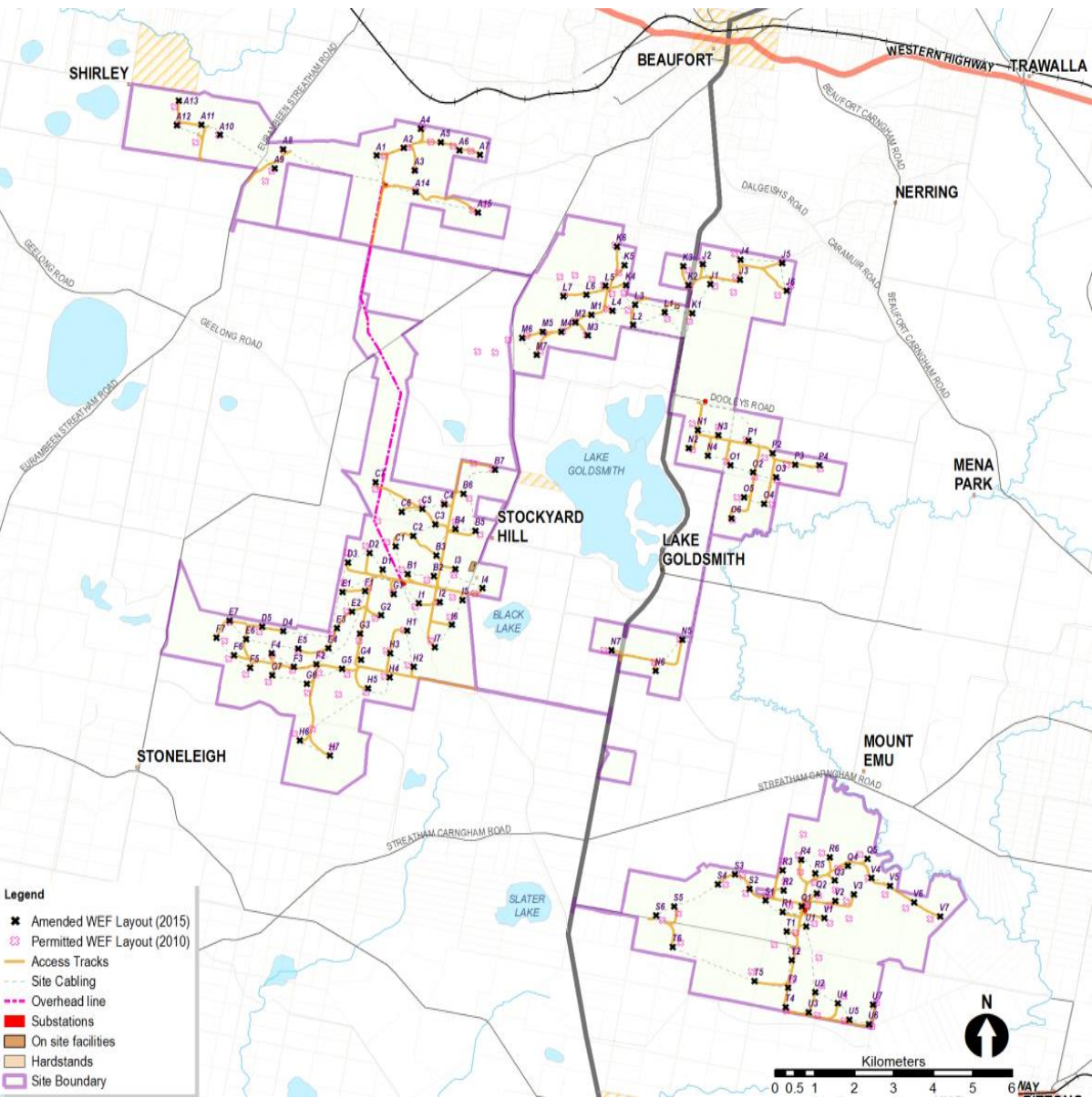
- a change to the permitted layout including the relocation and reduction in the number of wind turbines;
- an increase in the maximum height and width of the permitted wind turbines; and
- a reduction in the length of power lines.

2.3 Changes to the permitted layout

Figure 2-1 illustrates the changes to the permitted layout, which results in a reduction of eight wind turbines (from 157 to 149) including:

- Relocation of 3 turbines onto 3 new titles within the centre of the WEF site (adjoining existing permitted address of lands);
- Addition of 4 new turbine locations within the existing permit address of lands; and
- Deletion of 12 turbine locations.

Figure 2-1 WEF layout

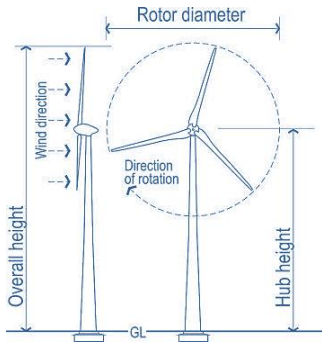


2.4 Change to the dimensions of the proposed wind turbines

For the purposes of this assessment, the permitted and amended wind turbine dimensions are listed in Table 2-1.

Table 2-1 Wind turbine dimensions

	Hub height(m)	Rotor diameter (m)	Overall height (m)	No of wind turbines
Permitted Layout	80	104	132	157
Amended Layout	110	140	180	149



2.5 Changes to the powerlines

This report only relates to the WEF component, not the grid connection.

Overhead power lines were permitted as part of the Permit. The 41.77 km of overhead power lines in the permitted WEF are proposed to be reduced to a total length of 10.79 km in the amended WEF. It is also proposed to remove one permitted substation.

As these changes reduce the extent of electrical infrastructure, there may, from some viewpoints, be a slight diminution in the level of visual impact. However, in the context of the overall WEF, this diminution will not be significant and therefore the landscape and visual impacts of the reduced powerlines are not re-assessed within this report.

3. APPROACH

The approach used within this assessment differs from that used to undertake a landscape and visual assessment for a new WEF. When assessing a new WEF the assessment seeks to measure, the impact the WEF is likely to have on an existing landscape.

When assessing the landscape and visual implications an application to amend an existing planning permit it must be recognised that the landscape is one in which the Responsible Authority (in this instance the Minister for Planning) has decided can accommodate a WEF. Therefore, this assessment seeks to measure the difference between the impact on the landscape from the permitted WEF and the same landscape from the amended WEF.

3.1 Seen area analysis

The starting point in the assessment is to understand if the amended WEF effects a greater area, or areas of landscape sensitivity that were unaffected by the permitted WEF. This is done by using a comparative Seen Area Analysis mapping which is able to graphically depict the difference between the areas from which the WEF was potentially visible, for both the permitted WEF and the amended WEF.

3.2 Viewpoint assessment

An assessment of indicative viewpoints from areas where the permitted WEF was visible, allows a comparison between the landscape and visual character of the permitted WEF and the additional impacts that may occur as a result of the amendment.

Comparative photomontages

As the permitted WEF has not been constructed, photomontages have been used to assist to illustrate the level of visual change due to the amended WEF.

Photomontages have been prepared from four locations to assist in this re-assessment. These photomontages allow a benchmarking of the visual impacts of the amendment and these can form the basis of the assessment for other viewpoints for which no photomontages were prepared.

3.3 Cumulative Visual Impact

There is no change to the number of WEF’s in this area brought about by the amended layout. Therefore, there is no change to be assessed.

3.4 Scale of Effects

The scale of effects used in assessing this change from a landscape with a permitted WEF to one with the amended WEF is set out below.

Negligible visual impact

Negligible – minute level of effect that is barely discernible between the permitted WEF and the amended WEF.

Low visual impact

Low – visual impacts that are markedly noticeable between the permitted WEF and the amended WEF, but that will not cause any significant adverse impacts.

Medium visual impact

Medium – visual impact occurs when a significant difference occurs between the permitted WEF and the amended WEF, but where this difference may be able to be mitigated/remedied.

High visual impact

High or unacceptable adverse effect – extensive adverse effects that cannot be avoided, remedied or mitigated as a result of an increase in visual impact between the permitted WEF and the amended WEF.

4. THE VIEWSHED

The area that may potentially be visually affected by wind turbines is called the viewshed and this can be divided into various zones of visual influence (ZVI).

The extent of the viewshed and the ZVI are determined by the height of the wind turbines. As the height of wind turbines has increased, so too has the viewshed and resultant ZVI would also be modified.

4.1 Change to the Viewshed and Zones of Visual Influence

Given the change to the height of the overall wind turbines, the extent of the viewshed has increased and the ZVI are also modified.

Figure 4-1 shows the viewshed comparison between 132 m high wind turbines and 180 m high wind turbines. Table 4-1 describes the changes to the ZVI.

Table 4-1 Zones of Visual Influence (ZVI)

Distance to nearest turbine		Zones of visual influence (ZVI)
Permitted 132 m high wind turbines	Amended 180 m high wind turbines	
> 17 km	>20 km	Visually insignificant A very small element in the viewshed, which is difficult to discern and will be invisible in some lighting or weather circumstances.
8.5 - 17 km	10 - 20 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.
3 – 8.5 km	4 - 10 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
1.5 - 3 km	2 - 4 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.
< 1.5 km	< 2 km	Will always be visually dominant in the landscape Dominates the landscape in which they are sited.

The most significant change is that the permitted wind turbines would be “**highly visible and will usually dominate the landscape**” at 1.5-3km, whereas the amended wind turbines would extend this ZVI at up to 4 km.

The existing permit requires “a program of voluntary landscape mitigation works to the satisfaction of the Minister for Planning must be made available to the owners of dwellings within 3 kilometres of the nearest turbine” (Condition 34). This condition reflects and was based on the assumption that the most effected residents were within 3 km based on the initial assessment within the LVIA with 132m high turbines.

Figure 4-1 Comparative viewshed and ZVI of Permitted and Amended Layout



4.2 Recommendation

Given that the ZVI has expanded, the application to amend the Permit should to extend the requirement for voluntary landscape mitigation (Condition 34) to residents within 4 km of the nearest wind turbine.

The proposed wording (bold = additions) is as follows:

OFF-SITE LANDSCAPING PLAN

*34. Within 6 months of the date of endorsement of the development plan under Condition 1, a program of voluntary landscape mitigation works to the satisfaction of the Minister for Planning must be made available to the owners of dwellings within **4** kilometres of the nearest turbine.*

The offer to owners to participate in the program must remain available up until 12 months after the commissioning of the last wind turbine of the development or relevant stage.

If a program of voluntary landscape mitigation works is accepted by one or more owners, as part of that program, an off-site landscaping plan must be prepared in consultation with each landowner participating in the landscaping program for their property at the cost of the operator under this permit and to the satisfaction of the responsible authority.

The plan must:

- a) provide details of planting or other treatments that will be used to reduce the visual impact of the wind turbines at the landowner’s dwelling including plant species to be used and the expected height and spread of plants at maturity;*
- b) include the maintenance of the landscaping for a period of two years; and*
- c) include a timetable for implementation of the landscaping works.*

When approved by the Minister the plans will be endorsed accordingly and will then form part of this permit.

The landscaping as shown on the endorsed off-site landscape plans must be completed to the satisfaction of the Minister for Planning within 12 months of the endorsement of the particular plan unless otherwise agreed by the landowner.”

5. POLICIES AND GUIDELINES

Some of the planning policies guidelines have been changed since the issue of the permit and therefore may be relevant to this assessment of the change from the permitted layout to the amended layout.

5.1 The Victorian Guidelines

The Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (the Victorian Guidelines) by the Victorian Department of Environment, Land, Water and Planning (DELWP) was revised in November 2015 and is a reference document in all Victorian Planning Schemes.

Section 5 of the Victorian Guidelines set out those matters to be considered by a responsible authority in assessing permit applications for wind energy facilities. The Victorian Guidelines in Section 5.1.3 state:

The degree of 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
- 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.

The visual impact of the development relates to:

- the number, height, scale, spacing, colour and surface reflectivity of the wind turbines
- the quantity and characteristics of lighting, including aviation obstacle lighting (subject to CASA requirements and advice)
- avoidance of visual clutter caused by turbine layout and ability to view through a cluster or array (visually well ordered series) of turbines in an orderly manner
- the removal or planting of vegetation
- the location and scale of other buildings and works including transmission lines and associated access roads
- proximity to sensitive areas
- proximity to an existing or proposed wind energy facility, having regard to cumulative visual effects.

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

There have been no substantive changes to these Guidelines, since the Permit was issued, which would change the assessment of the permitted WEF.

Additionally, the Victorian Guidelines do not specifically address modifications to an existing permit.

However, it is understood that this assessment must determine if the amended WEF would result in a change (from the permitted WEF) that would be acceptable, in accordance with the requirements of the current Victorian Guidelines.

5.2 The Draft National Guidelines

The Draft National Wind Farm Development Guidelines (The Draft National Guidelines) by EPHC Environment Protection and Heritage Council was released in July 2010. The Draft National Guidelines have not been finalised nor adopted. While the Draft National Guidelines are mentioned as further guidance in the Victorian Guidelines they are not a reference document within Victorian Planning Schemes.

The Draft National Guidelines do not provide a framework for the assessment of impacts when seeking to modify an existing permit. There is no specific guidance on the planning amendment process within the Draft National Guidelines. However, generally the methodology used within the original LVIA is consistent with the Draft National Guidelines.

5.3 Landscape Guidelines & Character Studies

Since the preparation of the LVIA, the following studies have been released:

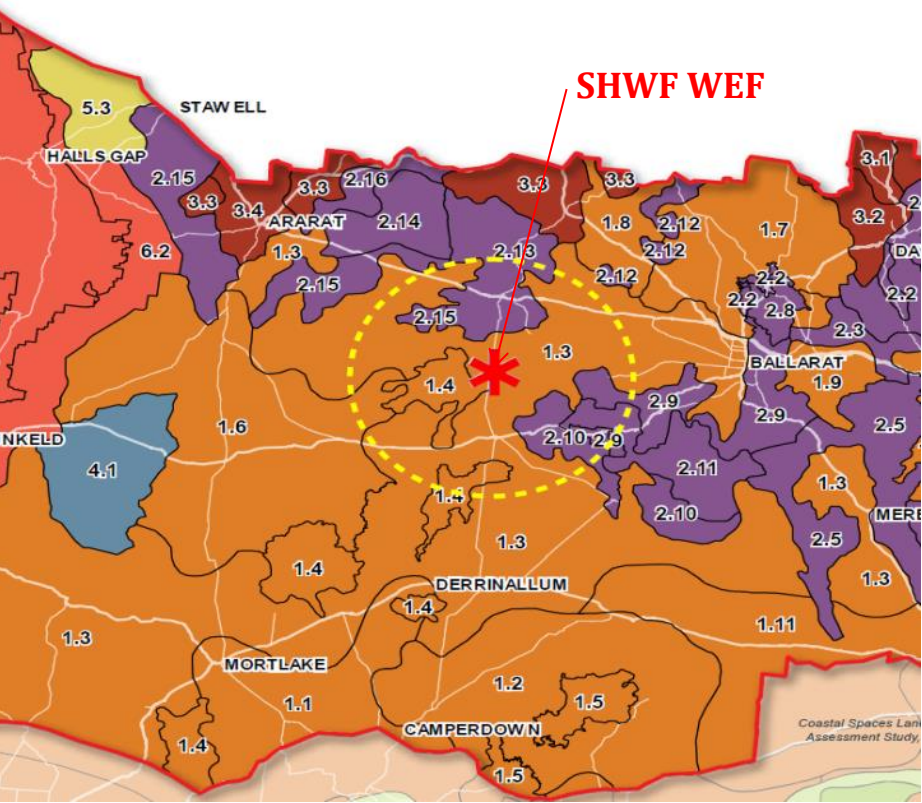
- The South West Victoria Landscape Assessment Study – Landscape Character of South West Victoria (DPCD & Planisphere, June 2013), (SWVLAS); and
- Kanawinka Geopark.

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

South West Victoria Landscape Assessment Study

The South West Victoria Landscape Assessment Study – Landscape Character of South West Victoria (DPCD & Planisphere, June 2013) (SWLAS) identifies the landscape character types in South West Victoria. It is not a reference document within the Planning Scheme. Two character types are identified that are within the viewshed of the WEF. These are the Western Volcanic Plains (Character Type 1) and the Uplands (Character Type 2). The location of these character types and the viewshed of the WEF are shown in Figure 5-1.

Figure 5-1 Character types and areas (Figure 1 - The Western Volcanic Plain Location)



The viewshed of the proposed WEF is located within the Western Volcanic Plains Landscape Character Type, which is described as follows:

“The fertility and cleared nature of the Western Volcanic Plains were ideal for grazing. The region became very wealthy and was dominated by large pastoral properties. These large properties often had extensive exotic gardens as the new settlers aimed to recreate their familiar British landscapes.”

“The landscape that we see today represents a hybrid of generally undisturbed underlying topography with patchwork remnants of the natural landscape, which are protected by national, and state parks. Intertwined with this lies the heavily modified landscape of exotic shelterbelts, dry stone walls, farming, infrastructure, rural development and wind farms.”

The sensitivity of Western Volcanic Plains to change is described as below:

“The volcanic plain is highly sensitive to change, the flat nature of the plain offers long range views and thus creates a landscape on which there is ‘nowhere to hide’. There is limited capacity for this character type to absorb development without is becoming prominent in the viewed landscape.”

“However, balanced against this is the degree to which this landscape has been modified, shaped by man over generations.”

The above narrative within the SWVLAS suggests that the volcanic plain has a reduced landscape sensitivity given its extensive modification following European settlement. There are remnant pockets of vegetation that support the original character of the area such as within national parks.

While there is greater consideration to the geological significance of the Volcanic Plains region, there is an acknowledgement of the change that the region is undergoing including developments such as wind farms.

The two character areas that fall within the viewshed are:

- Character area 1.3 - Volcanic agricultural. Key features identified are:
 - Open pastoral landscape with long distance views; Exotic shelterbelts and Stands of remnant vegetation.
- Character type 1.4 - Stony rises and lava flows. Key features identified are
 - Geology and geological features, Starkness and rough texture of the landscape, Exposed rocky outcrops and sinkholes and Textural contrast with adjacent paddocks.

Significant Landscapes and Views

The SWLAS does not identify any views of state or regional significance located within the viewshed of the SHWF WEF.

Implications of SWVLAS

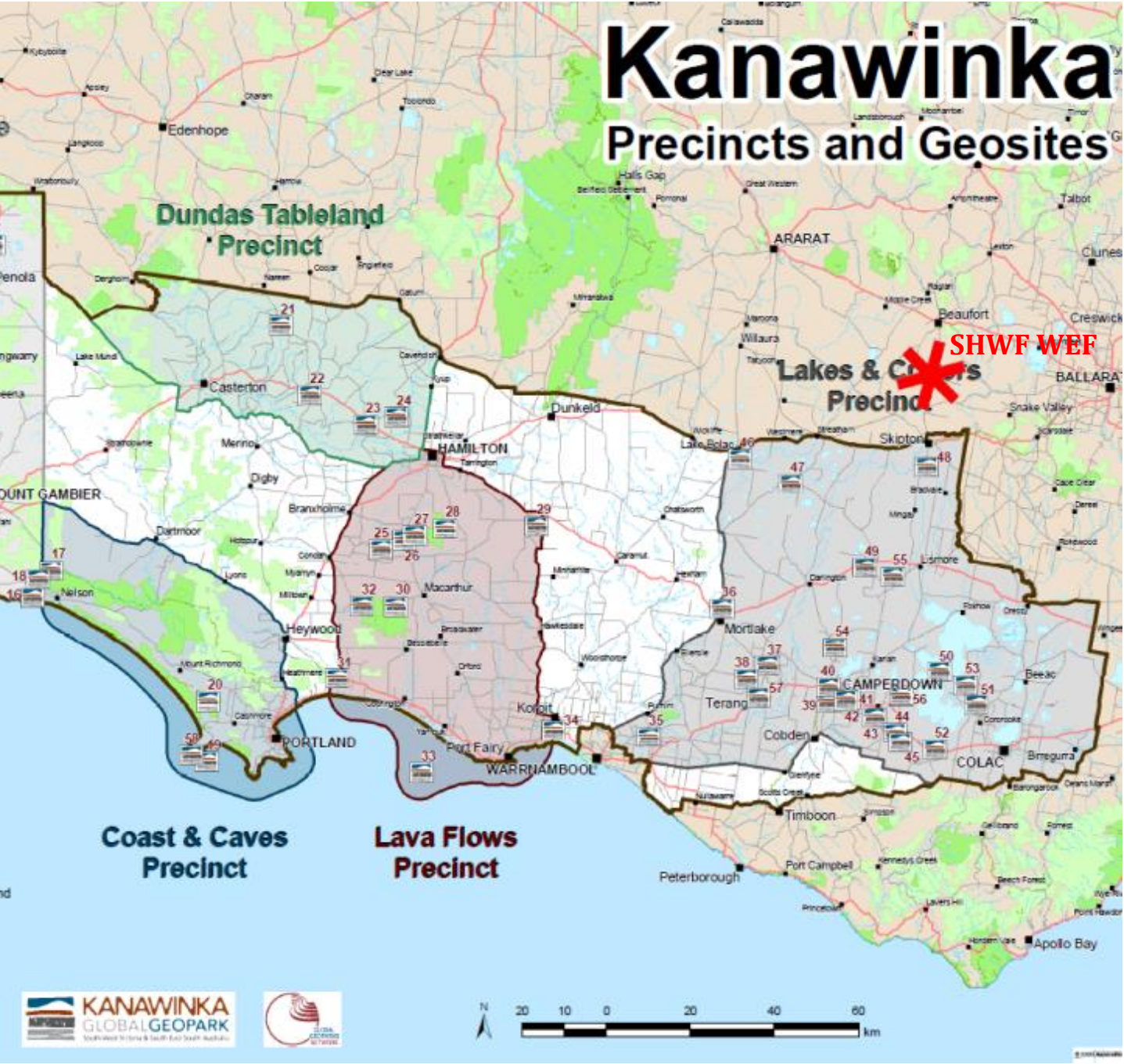
The SWVLAS recognises the change that this landscape has undergone since European settlement and the anticipated increased level of development suggesting lower landscape sensitivity. However, the SWVLAS recognises and values the geological formations that occur within the landscape of the Western Volcanic Plains and therefore increasing the landscape sensitivity of areas that have stony risers as well as the more noticeable features such as remnant volcanic cones.

This was also recognised in the original assessment and therefore the proposed amendment would not create changes to the landscape that were unanticipated under the Permit.

Kanawinka Global Geopark

The WEF viewshed is located just outside of the Kanawinka Global Geopark listed by UNESCO. An enlarged map is shown in Figure 5-2.

Figure 5-2 Kanawinka Geopark and the location on the SHWF WEF (Source: www.kanawinkageopark.org.au)



Discussion

While the Geopark is located in the southern edge of the viewshed of the WEF, there will be no landscape impact bought about by the increased height of the wind turbines to the Geopark.

6. SEEN AREA ANALYSIS

The visual impact implications of the amended WEF can be quantified using GIS based Seen Area Analysis (SAA). A Seen Area Analysis shows those areas within the viewshed from which wind turbines, or sections of wind turbines, may be visible. The SAA is mapped using Geographical Information Systems (GIS) software. The GIS mapping is based solely on topography and does not take into account screening by minor topographic changes, buildings and vegetation.

Figure 6-1 shows the SAA of the Permitted Layout.

Figure 6-1 SAA of the Permitted Layout

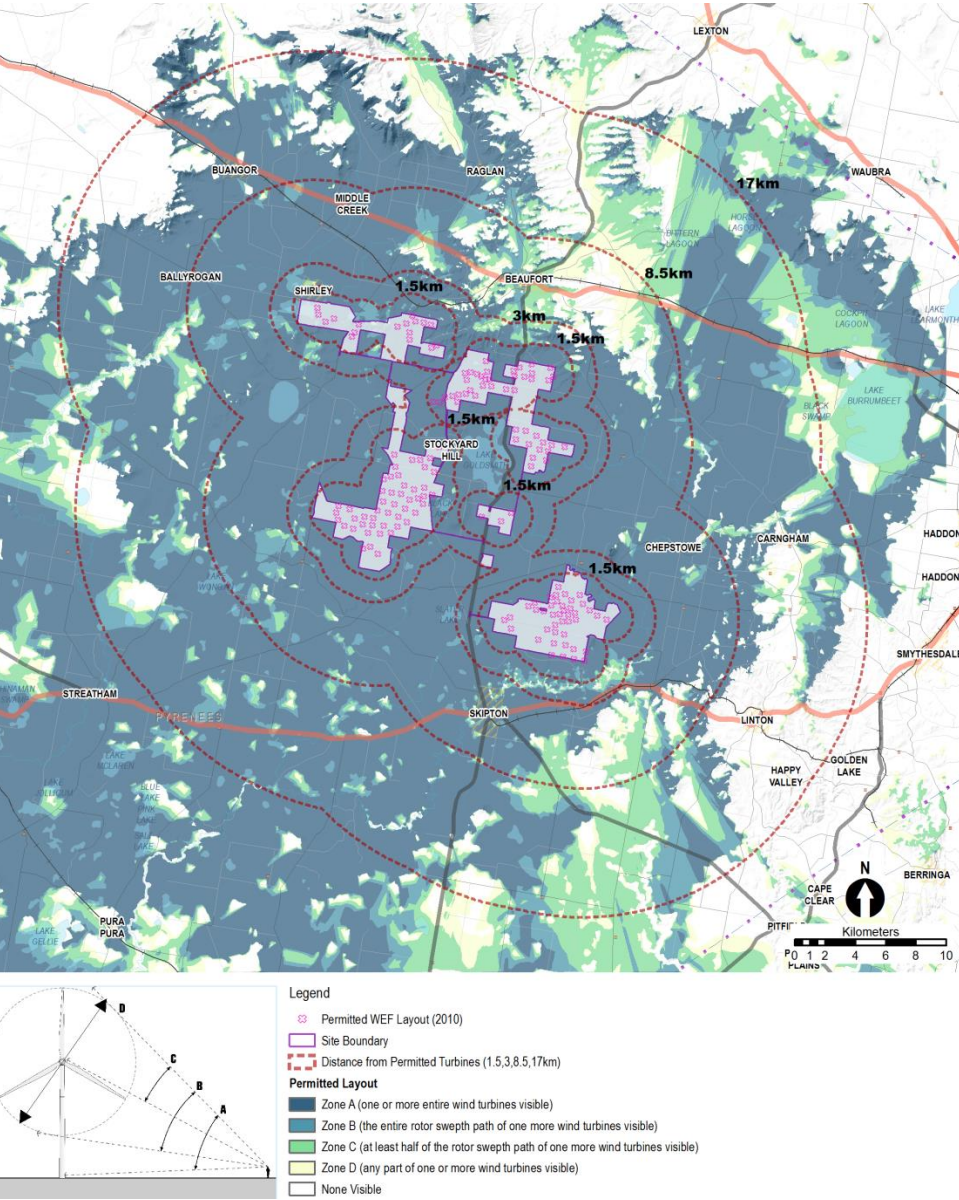


Figure 6-1 illustrates that across this landscape, the approved wind turbines of the permitted WEF will be visible in a large proportion of the viewshed.

Figure 6-2 shows the SAA of the amended layout.

Figure 6-2 SAA of the Amended Layout

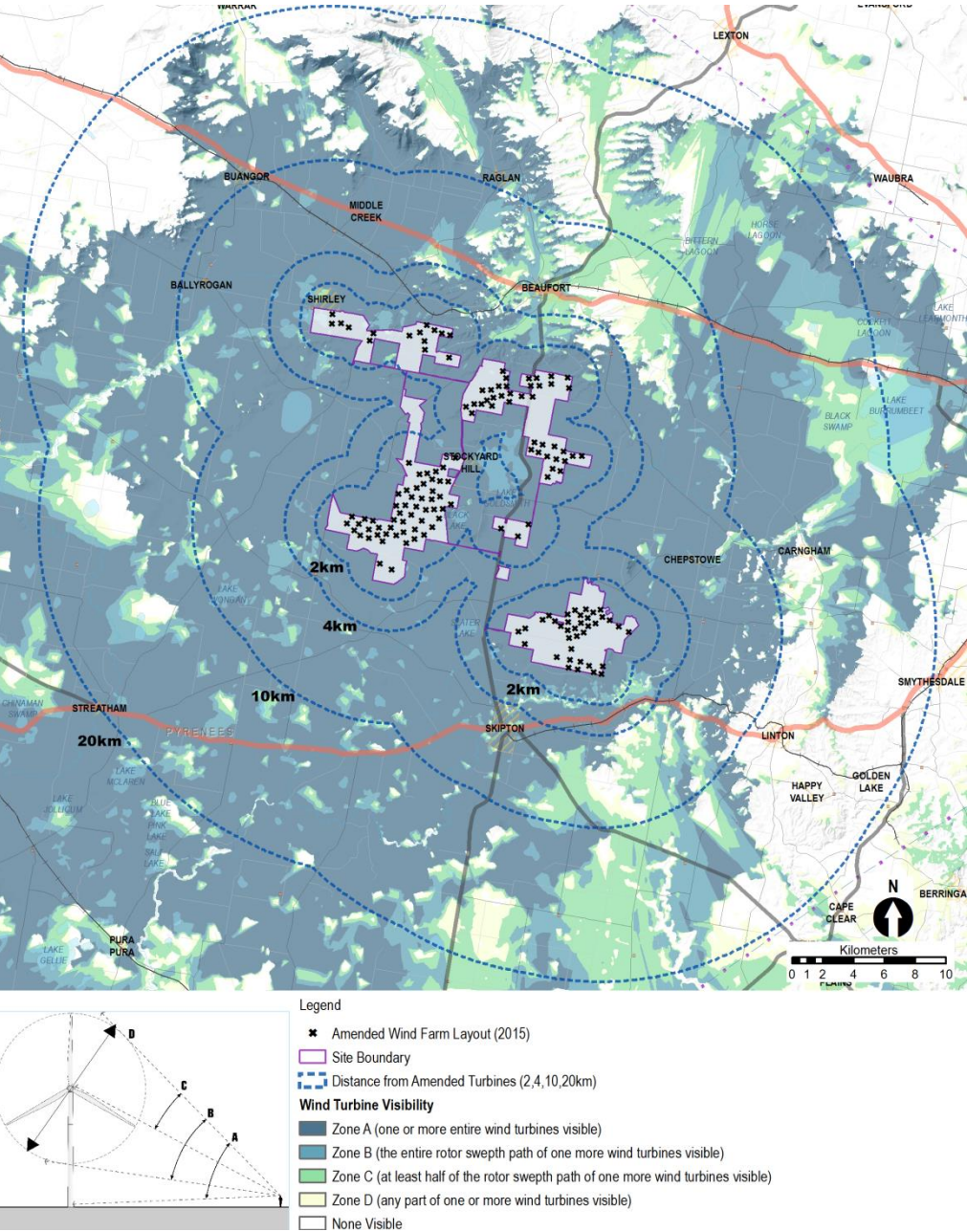
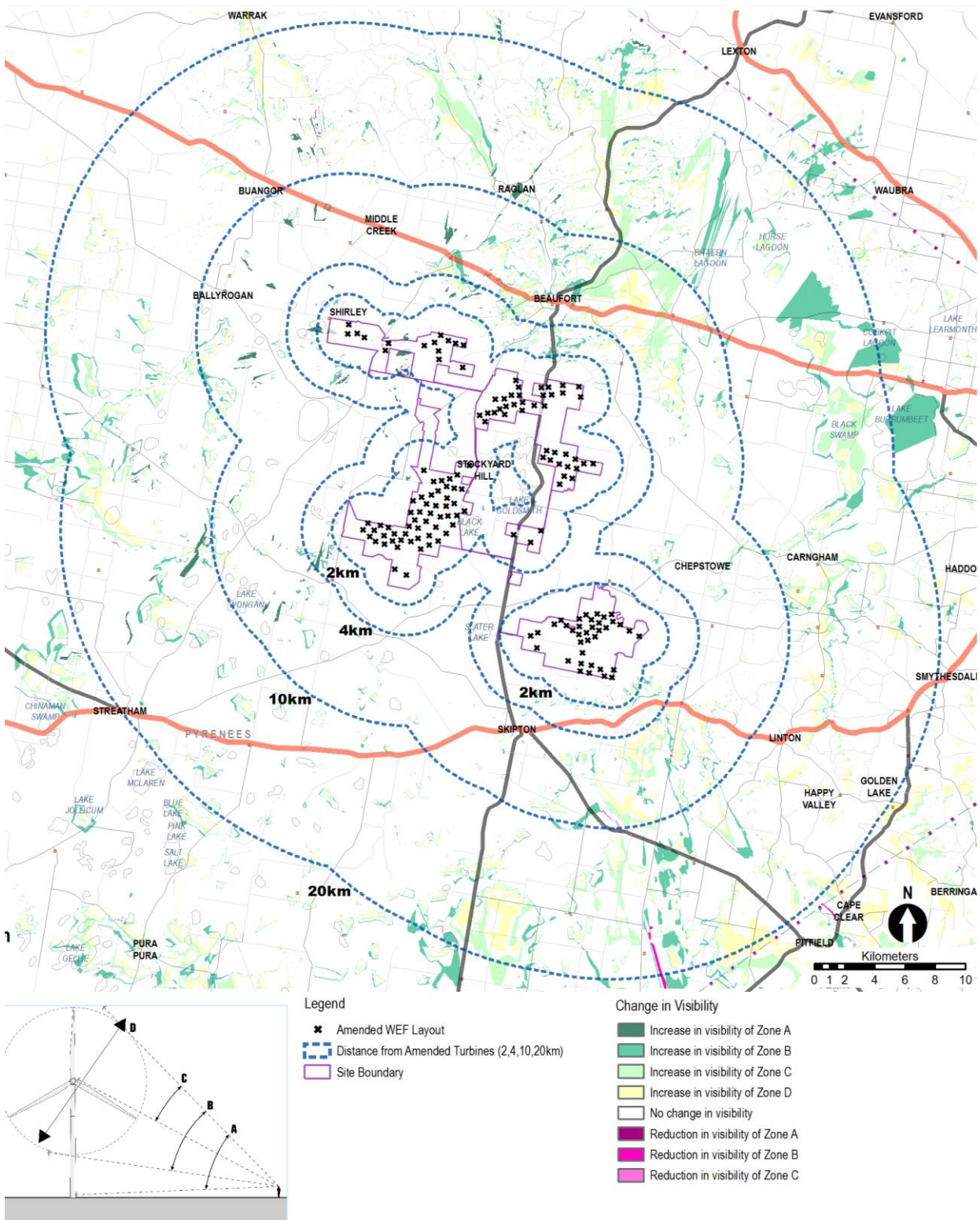


Figure 6-2 shows that the amended WEF will also be visible across a large proportion of the viewshed and the change in the visibility of the wind turbines is of such a minute magnitude that the change brought about by the increased turbine height will not change the potentially affected areas.

This SAA does not change the areas that are impacted by the amended WEF because of the increased height and amended locations. Areas that were unaffected by the permitted layout and areas of potential visibility are very similar.

Figure 6-3 illustrates the change between the Permitted WEF Layout and the Amended WEF Layout.

Figure 6-3 SAA showing change between Permitted and Amended Layouts



This change is not perceptible when comparing Figure 6-1 and Figure 6-2. Figure 6-3 highlights that the change in the permitted and amended layouts, as well as the change in height is minimal.

7. VIEWPOINT ASSESSMENT

The Seen Area Analysis in the previous section has shown that the amended WEF will only marginally change the areas of visibility.

The next step in this assessment is to determine if the views to the amended WEF will change as a result of either the relocation or change in height and width. An assessment can be partly based on preparing comparative photomontages of the permitted WEF and amended WEF to illustrate the change and as a basis for assessment of other viewpoints for which photomontages were not prepared.

Three locations in the public domain were selected to prepare illustrative photomontages that would assist in understanding the landscape and visual impacts that would change between the permitted WEF and the amended WEF. These locations are:

- Viewpoint N01 – Beaufort-Carranballac Road;
- Viewpoint N02 – Streathan-Carngham Road;
- Viewpoint N03 – Skipton Road.

A further assessment was also undertaken from Viewpoint R14 – “Mawallock” as the impacts on this historic landscape was a concern in the initial application.

The photomontages for the public viewpoints have been based on photos taken on a site visit 30 April 2014. The “Mawallock” photomontage was based on photography taken in 2008.

All these viewpoints were selected within 4km of the nearest wind turbine. As it is viewpoints that are in the 0-2km and 2-4km zones that have the greatest potential visual impact. These viewpoints were also indicative of several different landscape unit types located within the viewshed.

A set of A3 photomontages are attached in Annex A. Whilst these and the images used in the report are accurate, a better and perceptually more realistic image is obtained when the photomontages are printed at A0 and held at arm’s length.

The location of each of these viewpoints is shown in Figure 7-1.

Figure 7-1 Viewpoint Locations

