



PROPOSED TE RERE HAU EASTERN EXTENSION

Assessment of Landscape and Visual Effects

Prepared by Peter Rough Landscape Architects Limited
for New Zealand Windfarms Limited

28 May 2009

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by

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28 May 2009

Cover photograph: View north-east across the Tararua Range from the junction of the Pahiatua-Aokautere Road and North Range Road.

TABLE OF CONTENTS

SUMMARY	1
1.0 INTRODUCTION	4
1.1 Purpose of document	4
1.2 Background information: other wind farms in district, some of the history	4
1.3 Public attitudes	4
1.4 Outline of the Te Rere Hau Eastern Extension (TRHE)	5
2.0 SITE CONTEXT AND EXISTING LANDSCAPE VALUES	8
2.1 Landscape context	8
2.2 Existing landscape character	12
2.3 Key implications	16
3.0 RELEVANT STATUTORY AND POLICY DOCUMENTS	17
3.1 Key implications	17
4.0 POTENTIAL LANDSCAPE AND VISUAL AMENITY ISSUES	20
4.1 Turbines	21
4.2 Land modifications	27
4.3 Ancillary structures	29
4.4 Temporary facilities	30
4.5 Aviation obstacle lighting	31
4.6 Mitigation features	31
5.0 ASSESSMENT OF LANDSCAPE AND VISUAL AMENITY EFFECTS	33
5.1 Landscape and visual amenity assessment methodology	33
5.2 Photo-point identification	40
5.3 Visibility and assessment of visual amenity effects	43
5.4 Assessment of landscape effects	55
5.5 Potential cumulative effects	59
5.6 Synthesis and key implications for landscape and visual effects	61
6.0 PROPOSED TRHE IN THE CONTEXT OF RELEVANT STATUTORY AND POLICY DOCUMENTS	62
6.1 Tararua District Council Plan	62
6.2 Palmerston North City Council Plan	63
6.3 Regional Policy Statement and other regional matters	63
6.4 Resource Management Act 1991	64
7.0 CONCLUSIONS	66
REFERENCES	67
LIST OF TABLES	
Table 1. Summary details of wind farms in the Tararua and Ruahine ranges.	10
Table 2: Effect of distance from the turbines of a wind farm on the magnitude of visual effect for turbines of different maximum Tararua lowlands.	36

Table 3.	Photo-point locations and distance to nearest turbine within the proposed TRHE.	43
Table 4.	Summary table of visibility of consented wind farms, the visibility of the turbines of the proposed TRHE, and the magnitude and significance of potential effects on visual amenity.	54

LIST OF FIGURES

Figure 1:	Tararua lowlands	13
Figure 1:	Tararua Range uplands	14
Figure 3:	Foothills to the west of the Tararua Range	15
Figure 4:	Lowlands to the west of the Tararua Range	16
Figure 5:	Indicative turbine tower	23
Figure 6:	Indicative transformer building	30

APPENDICES

Appendix I:	Public attitudes to wind farms	70
Appendix II:	Relevant statutory and policy documents	73
Appendix III:	Photo-Simulation Methodology – Statement by Morgan Pollard Visual Limited	85

GRAPHIC ATTACHMENTS

1	Site and photo-point location map
2	Wind farm layout map
3-12	10 Photo-simulations by Morgan Pollard Visual Limited here as reduced and annotated A3 sheets

SUMMARY

- The Te Rere Hau Eastern Extension (TRHE) involves the construction of a wind farm on rural land in an upland area in the Tararua Range generally 1.8-4.1 km north-east of the junction of the Aokautere-Pahiatua Road with North Range Road. The turbines of the TRHE will all be situated east of North Range Road but generally adjacent to those of the consented Te Rere Hau Wind Farm (to the west of north Range Road).
- The Tararua Range constitutes a major landform and visual barrier between the western and eastern lowland plains. From the Manawatu Plains or the plains in Tararua District to the east, the Tararua Range forms a backdrop with a scenic skyline that is visible from great distances, and which is a significant landscape feature when viewed from these lowland locations. The skyline of the Tararua Range is noted as an outstanding natural feature in the relevant Regional Policy Statement, in the proposed Horizons One Plan, and in the Tararua District Plan. There are no areas of outstanding natural landscape under s 6(b) of the RMA in the vicinity of the proposed TRHE.
- The topography of the TRHE site is that of a hilly plateau at an elevation of approximately 440-520 m above sea level with a ridgeline that runs in a generally NE-SW direction. The flanks of the plateau are dissected by valleys that run to east and west, with intervening, elevated spurs that extend particularly to the east.
- The application site would originally have been covered with indigenous forest but as a result of land clearance and grazing, the land cover is now typically pasture with occasional shelter plantings. The application site is adjacent to the coniferous plantation of Aokautere Forest.
- The 56 turbines to be used in the TRHE will be identical to those of the Te Rere Hau Wind Farm. Each turbine will have a tubular steel tower 30 m in height, a two-bladed rotor 33.2 m in diameter, and an overall height of approximately 46 m. The turbines will be constructed and maintained directly from North Range Road, or using a network of newly constructed access roads approximately 7.3 km in total length running principally off North Range Road.
- Because of the proximity of the TRHE to the consented Te Rere Hau Wind Farm, there will be no requirement for the construction of an independent substation for the TRHE. The proposed turbines will be connected to the existing substation within the Te Rere Hau Wind Farm by underground cables.
- NZ Windfarms Limited commissioned Peter Rough Landscape Architects Limited to assess the potential landscape and visual effects of the proposed development. Potential effects of infrastructural developments such as the one proposed for the TRHE on landscape and visual amenity can be positive or adverse, they can range in magnitude depending on viewing distance and other contextual factors, and they can range in significance for different observers.

- Public opinion tends to vary widely in terms of acceptance of wind farms in the landscape. For instance, some people find that wind turbines have a sculptural elegance, whereas others find them unattractive and obtrusive. Undoubtedly, these developments have become a significant element of the character of the landscape of Palmerston North and Tararua District since the first development was commissioned 10 years ago.
- The 56 turbines of the TRHE will be relatively small compared to those of other wind developments in the Tararua and lower Ruahine ranges (apart from those of the Te Rere Hau Wind Farm). Nonetheless they will be noticeable from many locations, especially from the neighbouring lowlands in Tararua District, and to a lesser extent from the Manawatu Plains. The most obvious change will result from the erection of the wind turbines but there will also be some changes resulting from the construction of access roads and turbine platforms.
- Fundamental to the assessment of the effects of the wind farm on landscape character and visual amenity values are the observation points from which the wind farm will be viewed. Viewpoints representative of areas of importance to the community, including those on frequently used roads, were identified using a combination of desktop studies, site investigations, and computer modelling.
- In view of the significance attached to the skyline of the Tararua Range, viewpoints were selected that give views from transportation routes and residential areas in the lowlands on both the Tararua and Manawatu sides of the range. In addition, viewpoints were selected in the foothills of the Range on or near the Aokautere-Pahiatua Road in the vicinity of rural residential developments. Because the magnitude of visual effects, and potentially their significance, changes with observation distance, viewpoints were selected at a range of distances from the proposed TRHE development. The closest point to the TRHE on the Aokautere-Pahiatua Road within the Tararua Range was also selected as a viewpoint for examination.
- Representative photo-simulations of the proposed TRHE have been prepared by Morgan Pollard Visual Limited. These are an aid to conveying the proposal's varying levels of visibility and assessing the magnitude and significance of landscape and visual effects. The photosimulations include representations of wind turbines, roading, and cut and fill slopes associated with newly excavated roads.
- The proposal will generally have no effect, insignificant, or no more than a minor effect on visual amenity viewed from representative viewpoints. Potential adverse effects are assessed as moderate from some viewpoints in the lowlands on the Tararua side of the range, and from the closest point on the Aokautere-Pahiatua Road. The proposed TRHE will not dominate the landscape from representative viewpoints.
- The features and characteristics of the landscape in the vicinity of the TRHE and surrounding landscape are described, The potential effects of the TRHE on landscape character are assessed as being no

more than minor. Similarly, the potential for significant cumulative effects resulting from the proposed TRHE is assessed as minor.

- An important moderating factor in making these assessments is the existing important place of wind farms and their turbines in the Tararua Range and the southern limit of the Ruahine Range. The wind turbines have become a significant component of the landscape for those living in and passing through the region. Although the presence of wind farm developments might not be appreciated by all members of the public, wind turbines in particular have become a part of the landscape and add to the sense of place for people on both sides of the ranges. The existing skylines of the Tararua and Ruahine ranges are still regarded as outstanding landscape features.
- The proposed TRHE development is not contrary to the relevant landscape and amenity provisions of the RMA and it has been designed to avoid, remedy and mitigate any potential adverse landscape and visual effects.

1.0 INTRODUCTION

1.1 Purpose of this document

NZ Windfarms Limited is seeking to obtain resource consents to develop, commission, operate, and maintain an extension to its Te Rere Hau Wind Farm in the Tararua Range. This extension, referred to as the proposed Te Rere Hau Eastern Extension (TRHE), will occupy land generally contiguous with the consented Te Rere Hau Wind Farm on hill country close to the ridgeline of the Tararua Range (refer Attachment 1).

The purpose of the report is to identify the landscape and visual amenity values of the site of the proposed TRHE and its surroundings, and the potential effects of its development and operation on these values.

Landscape effects are relevant to Section 6(b) of the Resource Management Act 1991 (RMA). Changes in the biophysical landscape can have effects on the character of the landscape, or its sense of place. How this is experienced may in turn affect the perceived change in the value ascribed to the landscape.

Visual amenity is an issue that relates to Sections 7(c) and 7(f) of the RMA. Changes to visual amenity can arise from changes in the composition of the view, which in turn can affect people's appreciation and enjoyment of the landscape.

1.2 Background information

To date there are eight operational wind farms in New Zealand, with a generating capacity of over 320 MW. Two are under construction (including the consented Te Rere Hau Wind Farm), and resource consent applications have been lodged for several others.¹

The following operational wind farms are in the general locality of the proposed TRHE: the Te Apiti Wind Farm (Ruahine Range) commissioned in 2004, the Tararua Wind Farm (Stage I, II, and III in the Tararua Range) commissioned through 1999-2007, and the consented Te Rere Hau Wind Farm (Tararua Range), which is under construction.

1.3 Public attitudes to wind farms

People's attitudes towards wind farms are mixed and depend on many factors, such as an understanding of the importance of generating power from renewable resources, the values attached to landscape character, and how close the wind farm is experienced in relation to the home, frequently used roads, and walkways. Surveys of public attitude have produced a range of different responses on any issue. Not surprisingly, people support the development of wind farms and other forms of renewable energy generation in principle.² However, they might be more opposed to particular developments that affect them personally.^{3,4}

¹ New Zealand Wind Energy Association. Retrieved 24 November 2008 from http://www.windenergy.org.nz/FAQ/proj_dom.htm

² European Opinion Research Group (2002). *Energy: Issues, Options and Technologies, Science and Society*.

³ University of Newcastle (2002) *Visual Assessment of Wind Farms: Best Practice*. Report F01AA303A for Scottish Natural Heritage.

Many surveys have been conducted in other countries where local community circumstances of power generation, financial incentives, landscapes, and community consciousness with respect to wind farms might differ from those in New Zealand. However, a number of studies have also been conducted locally as the generation of electricity from wind energy has gained momentum (refer Appendix I).

In summary, these surveys and studies conducted for well over a decade, show that generally:

- There is a roughly 50:50 split in approval for a local wind farm when people are subjected to a survey instrument.
- Approval ratings for a local wind farm do not decline once the wind farm is operational, and might well increase slightly.
- Surveys should be used with discretion because results have been collected under differing circumstances, e.g. size and number of turbines, and the character of the landscape receiving the wind farm.
- Increasing distance from a wind farm to dwellings does not necessarily result in increasing approval of people living at these locations, and some people in urban areas who cannot see a wind farm might still be opposed to its operation.
- People might hold deep-seated feelings of attachment towards the landscape they see daily, as well as the landscapes they keep in their memories, which are hard to express. They give people a sense of place, or belonging, to a landscape.

1.4 Outline of the proposed Te Rere Hau Eastern Extension (TRHE)

1.4.1 Site location and access

The consented Te Rere Hau Wind Farm, which will comprise 97 two-bladed 0.50 MW turbines when fully operational, is in the process of construction on a generally rectangular piece of land 243 ha in area north-west of North Range Road within the boundary of Palmerston North City.

The site of the proposed TRHE is generally south-east of the consented Te Rere Hau Wind Farm, south-east of North Range Road and within the boundary of Tararua District (refer Attachment 1). The TRHE turbines will occupy an envelope 2.3 km long and 1.2 km maximum width long lying along the ridgeline. At its closest point, the proposed extension will lie 1.8 km from the Pahiatua-Aokautere Road.

Access to the application site will be via the Pahiatua-Aokautere Road, which ascends the Tararua Range from both the east and west sides of the range. From the saddle at the highest point in the highway, North Range Road extends to the north-east generally along the ridgeline to give access to both the consented Te Rere Hau Wind Farm and the proposed TRHE.

The nearest main settlements are Palmerston North to the west and Pahiatua to the east. Other smaller settlements in the area include Ashhurst, Aokautere, and Woodville (refer Attachment 1).

⁴ Eltham, D.C., Harrison, G.P., Allen, S.J. (2008). Change in public attitudes towards a Cornish wind farm: implications for planning. *Energy Policy* 36, 23-33.

The land on which it is proposed to locate the turbines of the TRHE is at an elevation of approximately 440-520 m. The land currently supports predominantly pasture.

1.4.2 Site layout

It is proposed to locate 56 turbines on the higher parts of a complex of spurs and plateaux within 1 km of the Tararua Range ridgeline. A plan showing the location of the turbines and access roads, provided by NZ Windfarms Limited, is attached (refer Attachment 2).

The majority of the turbines (36) will be accessed directly from North Range Road by way of three networks of on-site roads. These road networks are joined to North Range Road in the vicinity of the consented Te Rere Hau Wind Farm:

- Turbines T21-T25 (5) joined via Road 10
- Turbines T26-T29 (4) joined via Road 15
- Turbines T30-T56 (27) joined via Road 19

The remaining 20 and most north-easterly of the turbines will be accessed either directly from a new section of access road (Road 4) it is proposed to construct next to and south-east of a section of North Range Road:

- Turbines T1, T9-T14, T20 (8)

or from two networks of on-site roads connected to this newly constructed section of access road:

- Turbines T2-T8 (7) joined via Road 1
- Turbines T15-T19 (5) joined via Road 6

The newly constructed section of access road (Road 4) and associated turbines are generally north-east of the consented Te Rere Hau Wind Farm, i.e. beyond the consented wind farm and more distant from the Aokautere-Pahiatua Road.

1.4.3 Turbine design

The turbines of the proposed TRHE are of the same tower, nacelle, and rotor blade design as those of the consented Te Rere Hau Wind Farm. Each tubular steel tower is approximately 30 m tall, connected via the nacelle to a two-bladed rotor 33.2 m in diameter. The maximum height is approximately 46 m above a concrete foundation concealed below ground level. The towers, nacelles, and rotors of the proposed TRHE turbines are to be Resene Jungle Mist in colour with low reflectivity finish, as are those of the consented Te Rere Hau Wind Farm.

Each turbine will typically be located on a single pile concrete foundation of 2.4m diameter (where ground conditions permit) and between 7-10m in depth. The foundation diameter is typically 200 mm more than the tower diameter and no concrete pad is required (as was the case for the five turbines of Stage 1 of the consented Te Rere Hau Wind Farm). Next to this will be a crane pad which is integrated within the internal road. The

platform will accommodate a crane and enable the assembly and installation of the tower, nacelle and rotor blade components.

1.4.4 Internal roading and service tracks

Approximately 7.3 km of service roads will be constructed to erect and maintain the proposed turbines (Roads 1-3 and Roads 5-35, refer Attachment 2). These will make use of existing farm tracks where available but generally will be formed on landforms covered in pasture. Use will also be made of an existing service road (Road 4) that runs between the localities of proposed turbines T1 and T20 (refer Attachment 2). Otherwise no additional roading will be needed to access the site of the proposed TRHE because use will be made of the existing North Range Road.

1.4.5 Substation and transmission line connection

There will be no independent substation associated with the proposed TRHE because use will be made of the substation associated with the consented Te Rere Hau Wind Farm. All turbines of the proposed TRHE will be connected to the substation by underground cables.

1.4.6 Transformer housing, subsidiary structures

Each turbine will be associated with a transformer (approximately 1 m x 1.8 m x 1.5 m in height) located adjacent to the tower base. These will be painted an olive green colour similar to that used on farm buildings in the locality (G15 to AS 2700S-1996). There will be no subsidiary structures because use will be made of those associated with the consented Te Rere Hau Wind Farm.

2. SITE CONTEXT AND EXISTING LANDSCAPE VALUES

2.1 Landscape context

2.1.1 General considerations

Although the turbines of the proposed TRHE will be located solely within Tararua District, the proposed development will involve access using roading located on the boundary of Palmerston North City, and cable connections to substation facilities located on this western side of the Tararua Range. Apart from these operational linkages, some features of the proposed TRHE, notably turbines located closest to the ridge line, will be visible from roads and dwellings on the western (Palmerston North) side of the range. The turbines of the proposed TRHE will also be located close to a skyline that is valued for its landscape qualities when viewed from the western, as well as from the eastern (Tararua District) side of the range.

It is, therefore, appropriate to consider the landscape context, and the potential effects of the proposed development on landscape and visual amenity values, for both eastern and western sides of the Tararua Range.

2.1.2 Landform

The City of Palmerston North, which extends to the ridgeline of the Tararuas in the vicinity of the turbines of the proposed TRHE, is situated on the eastern fringe of the Manawatu Plain. The Plain is a complex area of floodplain terraces and marine terraces, overlain near the coast by extensive areas of sand dunes, and has a generally flat topography. The Manawatu Plain is bounded to the north by the Rangitikei-Oroua Hill Country, and to the east and the south by the more prominent axial ranges of the Ruahine and Tararua ranges. These arose during the Kaikoura Orogeny, and run in a northeast to southwest direction determined by the orientation of the Wellington Fault that borders the eastern side of the ranges.

The Tararua Range is divided from the Ruahine Range by the Manawatu River, which passes through the Manawatu Gorge at right angles to the axis of the ranges.

The Tararua Range extends for some 80 km towards the Rimutaka Range and Wellington. The range has several summits 1300-1500 m in height, attaining its highest points at Mitre (1570 m) and Mt Hector (1529 m). These high points are situated in the more southern portion of the range which descends towards the north to be 400-500 m asl closest to Palmerston North, and 350 m asl before descending into the Manawatu Gorge.

The Ruahine Range runs for some 110 km north of the Manawatu Gorge attaining its highest point at Mangaweka (1733 m). The range is some 25 km wide in the north, narrowing to a width of 6-8 km and descending to a height of 300 m before dipping down to the Manawatu Gorge. The range is clearly visible as a landform feature from Palmerston North, notably for the most southern of its high peaks, Wharite (920 m).

To the east of the Tararua Range, the catchment of the Manawatu is bounded by the Waewaepa Range and the more distant Puketoi Range. These rolling to steep hill country ranges run parallel to the Tararua and

Ruahine ranges with trends determined by the Wairarapa and Makuri faults. A long alluvial plain derived from a number of local rivers runs between these low ranges and the Tararua Range. Lower ridges also run northeast to southwest between the Waewaepa Range and the Tararua Range, such as that which runs between the Mangahao and Mangatainoka rivers. The landform is, therefore, made up of the mountain, hill country, and alluvial plains and river terrace components.

The axial Tararua Range (along with the Ruahine Range further to the north) constitutes a major landform barrier between the western and eastern sides of the lower North Island. In addition to the road passing through the Manawatu Gorge and the nearby Saddle Road in the hills to the north of the Gorge, the only other public route across the ranges in this locality is the Pahiatua-Aokautere Road (also known as the Pahiatua Track). This passes from the alluvial soils of the Manawatu Plain through the foothills of the range to a saddle at the junction with North Range Road before descending towards Pahiatua on the east.

Because of the contrast on landform between the Manawatu Plains and the Tararua Range, the range and its skyline is a prominent visual backdrop to the city of Palmerston North and other nearby settlements, such as Aokautere and Ashhurst. To the east of the range, a similar strong contrast in landform is apparent in places where there is relatively extensive level ground, such as between Ballance and Woodville. In other places, such as at Pahiatua, intervening low ridges make the contrast in landform less marked.

2.1.3 Land cover and vegetation

The original forest cover of the surrounding landscape would have extended from the alluvial plains to the tops of the Tararua Range. Species composition, forest structure and stature would have responded to local site factors of soil depth and fertility, exposure and rainfall.⁵ This forest was largely cleared in the last 150 years for timber extraction and to make way for agricultural production. Today, land cover reflects the pattern of rural activities that have been undertaken since European settlement.

The high biodiversity of the original forest has been replaced predominantly by open grassland composed almost entirely of introduced species. Forest plantations of introduced pine and other species form a patchwork within this grazing land, and intensive forms of horticultural and arable farming complement dairying on lower lying land.

The radiata pine plantation of the Aokautere Forest is a prominent feature of the Tararua Range skyline and foothills between the Pahiatua-Aokautere Road and the Manawatu Gorge. The pine trees are managed according to commercial forestry practice, and are subject to normal felling and replanting procedures. The Aokautere Forest abuts the site of the consented Te Rere Hau Wind Farm.

2.1.4 Land Use

The land surrounding the application site has a diverse range of rural uses that reflect the range of landform features and their associated soils and elevations. These include horticulture production units on more fertile,

⁵ Ravine (1995). Manawatu Plains Ecological District Protected Natural Areas Programme

alluvial soils, arable farming, and dairying. There is extensive grazing land in the hill country areas. Commercial forestry is also apparent in the Aokautere Forest on Forest Hill Road and further south on Scotts Road to the west. Forestry plantings have also been made to the east of the range. Woodlot and shelter plantings on farms are also a feature. Several areas of residential subdivision on the outskirts of Palmerston North, and individual rural-residential dwellings, have become prominent land use features to the west of the Tararua Ranges. Military, research and educational facilities are also prominent land uses to the west.

In recent years, the most noticeable addition to the more traditional rural land uses is the development of a number of wind farms in the Tararua and Ruahine Ranges. These have been concentrated in the lower portions of the ranges. The wind farms have become a prominent feature of the rural land use of the region. They have become promotional symbols and a tourist attraction in the region.

Because of this array of multiple uses, the rural zone exhibits a diverse pattern of traditional and more modern development:

Overall the rural area represents a patchwork of activities, some of which are not always compatible with each other, or which produce environmental effects which must, as far as possible, be mitigated.⁶

2.1.5 Local wind farm developments

Wind farms in the Tararua and Ruahine Ranges that are operational or in the process of being constructed are the Te Apiti Wind Farm, the Tararua Wind Farm (initially developed in two stages and the third stage Tararua TRHE), and the consented Te Rere Hau Wind Farm. The Te Apiti Wind Farm, although situated within the lower, southern hills of the Ruahine Range rather than in the Tararua Range, is considered a part of the landscape context because it continues the line of turbines evident near the skyline when viewed from either the western or the eastern side of the ranges. Summary details for these wind farms are provided (Table 1).⁷

Table 1. Summary details of wind farms in the Tararua and Ruahine ranges.

Wind Farm	Operator	Year commissioned	Number of turbines	Turbine capacity (MW)
Te Apiti	Meridian Energy	2004	55	1.65
Tararua I	TrustPower	1999	48	0.66
Tararua II	TrustPower	2004	55	0.66
Tararua III	TrustPower	2007	31	3.0
Te Rere Hau stage I	NZ Windfarms	2006	5 (of 97)	0.50
Te Rere Hau stage II	NZ Windfarms	2009	28 (of 97)	0.50

⁶ Palmerston North City Plan Section 9 Rural Zone

⁷ Retrieved from the website of the New Zealand Wind Energy Association (29 October 2007)

Starting from the most northern wind farm and working south, the 1150 ha Te Apiti Wind Farm is located north of the Manawatu Gorge in the locality of Saddle Road. Its 55 three-bladed turbines (Vestas 1.65 MW) are mounted on tubular steel towers. The towers are 70 m tall and the rotor blades 35 m long, making for a maximum height of approximately 105 m. The turbines are widely spaced relative to smaller turbines and apparently randomly positioned in the landform.

The Tararua Wind Farm (Stages I and II being built over 1998-2004) extends some 4.3 km south from high land immediately above the Manawatu Gorge close to the main ridge of the Tararua Range, roughly following the orientation and route of the North Range Road. The 103 turbines (Vestas V-47 0.66 MW) have three-bladed turbines mounted on steel lattice towers. The turbines have a maximum height of approximately 64 m and are formed generally in rows parallel with the ridgeline.

More recently, TrustPower erected an extension to the Tararua Wind Farm (Stage III) on land east, west and south of the original Tararua Wind Farm. Consent was sought for 40 Vestas V-90 3 MW three-bladed turbines, of which 31 were consented. Unlike the other turbines in the Tararua Wind Farm, these turbines have tubular steel towers rather than steel lattice towers. The towers are approximately 65 m tall and the blades are 45 m long, making for a maximum height of 110 m. Six turbines of Stage III are located to the south of the existing wind farm. These six turbines extend along the Tararua Range to approximately 0.5 km from the south-western edge of the Aokautere Forest.

The consented Te Rere Hau Wind Farm is in the process of construction on a generally rectangular piece of land 243 ha in area. The wind farm lies immediately to the southwest of the Aokautere Forest with which it shares a straight-line boundary. Its south-western boundary is 1.2 km from the closest point on the Aokautere-Pahiatua Road (the Pahiatua Track), and 2.1 km from the car park at the summit of this road where it passes from the Manawatu to the Tararua catchments. The south-eastern boundary is the North Range Road. The consented Te Rere Hau Wind Farm will consist of 97 two-bladed turbines (Windflow 500, 0.50 MW) mounted on tubular steel towers. The towers are 30 m tall and the blades approximately 17 m long, making for a maximum height of 46 m. The turbines are closely spaced relative to the largest turbines in the area and are positioned in a series of rows on spurs running generally northeast to southwest in the landform.

In June 2007, consent was obtained by Motorimu Wind Farm Limited from the Palmerston North City Council to develop and construct 75 wind turbines (Vesta V-52 0.85 KW) at the site known as the Motorimu Wind Farm in the Tararua Range to the south of Palmerston North. Consent was granted in September 2008 for a further five turbines. This wind farm is to be located approximately 12 km south-west from the highest point of the Pahiatua-Aokautere Road, and over 13 km from the application site.

Mighty River Power proposes to construct a wind farm (the Turitea Wind Farm) at a location in the Tararua Range generally south-east of Palmerston North. The turbines would extend along the Range from a point approximately 1 km west of the Aokautere-Pahiatua Road at the junction of North Range Road for a distance of approximately 13.5 km towards the

south-west. The proposal involves the erection of up to 131 wind turbines each with an overall height of approximately 131 m.

2.2 Existing landscape character

The proposed TRHE will be located in Tararua District in the upland area of the Tararua Range. It will be visible from a number of locations on either side of the range, although most obviously from the east, as well as being seen in the context of the upland landscape itself. Landscapes from which the proposed wind farm might be seen fall into four broad character types:

- Tararua lowlands to the east of the Tararua Range;
- the uplands of the Tararua Range itself (which will also physically contain the proposed TRHE);
- the foothills to the west of the Tararua Range; and
- the relatively low lying land to the west of the Tararua Range.

These differ from each other in terms of their topography, ground cover of vegetation, current land use, presence of buildings and structures, and relationship to the Range. The foothills on the eastern (Tararua) side of the Tararua Range are much steeper and occupy a smaller area than those to the west. This makes the transition from the Tararua lowlands to the uplands of the Tararua Range relatively abrupt (occurring over approximately 2 km), whereas the foothills to the west extend for some 5 km from ridge top to the lowland plains, and they are being progressively developed for rural lifestyle and residential purposes.

2.2.1 Landscape character of the lowlands to the east of the Tararua Range

The landscape character on the lowlands to the east of the Tararua Range is predominantly rural, with agricultural practices responding to local differences in topography. The alluvial plain and river terraces that run along the base of the Tararua Range and west of the series of less elevated ranges to the east are interspersed with low hills, such as that which separate the Mangahao and Mangatainoka rivers between Pahiatua and Ballance. There is a strong contrast in landform between the Tararua Range and the lowland areas, especially where there is relatively extensive level ground, such as between Ballance and Woodville (refer Figure 1).

The rural character of the landscape is strongly influenced by the extensive areas of pasture, paddocks separated by stock fences, and bands of dark evergreen coniferous trees and some deciduous trees. Further enclosing hills and low ranges, with planted forestry blocks, are evident especially to the east, in a landscape that includes scattered agricultural buildings and sheds, and occasional individual dwellings amongst the paddocks. A network of roads connects rural settlements, such as Pahiatua and Woodville, as well as smaller rural communities. These roads add to the character of the landscape, elaborating into rectangular grids on extensive areas of pasture.

The Tararuas accentuate the flatness of the pasture and strongly define its extent to the west. Although they are an important element in the landscape, they do not add or detract from the rural character of the valley floor, except possibly to suggest a protecting influence for agricultural activities. Rather, they are a prospect in the distance, separate from the

fertile valley lowlands. Part of this Tararua Range prospect is the sharp contrast of the skyline and the wind turbines that have operated there since the opening of the first stage of the Tararua Wind Farm. Turbines currently operating or consented are of a range of sizes, and rotor and tower designs.



Figure 1. Tararua lowlands

2.2.2 Landscape character of the Tararua Range uplands

The uplands of the Tararua Range close to the proposed TRHE have the character of a working rural landscape with a mix of pastureland, forestry, shelter plantings and isolated pine or macrocarpa trees on the rounded hilltops, ridges and spurs. Relatively steep sided gullies fall away to east and west. Fences are evident, but unlike the paddocks of the lowlands to the east, the grass in this upland area is short, and rocks are exposed in places. These features highlight the generally inhospitable and exposed nature of the landscape. The landscape is open and expansive, with clear views to the lowlands to the east and west (refer Figure 2).

In keeping with the expansive and elevated character of the uplands are the radar dome and a number of communication aerials visible from the car parking area at the saddle on the Pahiatua-Aokautere Road, and the presence of isolated buildings associated with agricultural activity.

Part of the experience of the landscape of this upland area is the strength of the wind, the smells of upland pasture, and the freedom to explore the Range further by walking along the course of the North Range Road.



Figure 2. Tararua Range uplands

2.2.3 Landscape character of the foothills to the west of the Tararua Range

The ascent of the Tararua Range from the west is somewhat different from that from the east, being longer as the road rounds and sidles across extensive foothill slopes and small river valleys. This is a relatively broken and enclosed landscape where views towards the tops of the Range and across its face, as well as views out to the Manawatu Plains are sometimes obscured by hills and tree plantings. It is fundamentally a working rural landscape with evidence of stock grazing and forestry activities, although it is far more domesticated than either the top of the Range or the lowlands to the east (refer Figure 3).

Residential lifestyle properties are evident to either side of the Pahiatua-Aokautere Road, and more settled residential areas have been developed on side roads. Closer to the base of the foothills on the outskirts of Aokautere and Palmerston North, subdivision is occurring at the urban margin. Here, these lifestyle and more urban residential developments, coupled with roading and other infrastructural elements, such as overhead electricity lines, give the foothills a progressively rural-residential character rather than a working rural landscape character.

Other elements of infrastructure that contribute to landscape character are the wind turbines of various designs and sizes that can be seen from many vantage points. Many of these appear to descend from the skyline onto the slopes of the foothills. In terms of their relationship to fulfilling the need for power, the nature of the contribution wind turbines currently make to existing character could be said to be in keeping with the rural-residential character and the presence of overhead power lines in parts of the foothills. They are predominantly located in the more upland, working rural landscape and as such contribute to other rural activities that utilise the natural resources of the area.



Figure 3. Foothills on the west of the Tararua Range

2.2.4 Landscape character of the lowlands to the west of the Tararua Range

The landscape character on the lowlands to the west of the Tararua Range, the Manawatu Plains, is predominantly determined by a mixture of rural activities from grazing and dairying to intensive horticultural production. These have historically been located in response to local variations in land use capability largely within the floodplain of the Manawatu River. The generally subdued topography has allowed the development of a patchwork of rectilinear field and roading patterns with fence lines reinforced visually and against the wind by shelter plantings (refer Figure 4).

However, the major urban centre of Palmerston North and smaller settlements such as Ashhurst and Feilding, together with roading and power infrastructure suggest a strong urban influence. Light industry, several major research facilities, and educational establishments all contribute to the domestication associated with urban centres. The urban influence is seen in extensive and numerous residential subdivisions, recent rural-residential lifestyle property developments, and more traditional rural properties on the fringes and permeating between the settlements.

As with their appearance from the east, the Tararua Range is a prominent element in the landscape. However, the ridgeline of the Range is somewhat distanced from the lowlands by the intervening foothills that mount progressively to the skyline. They are, therefore, a distant prospect, separate from the Manawatu Plains. A possible exception to this would be localities close to the base of the foothills, such as along Fitzherbert Road that runs from Aokautere to the Manawatu Gorge, where the presence of the higher ground is a protective and dominant influence.

The turbines on the Tararua Range, seen against the skyline or on the slopes of the foothills, have become an accepted part of the landscape, indicative of power generation from a renewable energy source. As with the Tararua Range itself, however, the turbines do not generally affect the elements that contribute to the character of the landscape of the Manawatu

Plains, except to accentuate the relatively low elevation of the ridgeline in this portion of the axial ranges.



Figure 4. Lowlands to the west of the Tararua Range.

2.3 Key implications

Landscape character in the immediate vicinity of the proposed TRHE and in the areas from which, to a greater or lesser extent, it will be visible tends to have important components of landform, land use, and features associated with settlement. The four broadly defined character areas differ in the ways described above with respect to each of these components.

All have relatively immutable features of landform. The three character areas not in the uplands of the Tararua Ranges have land use activities that would not be physically affected by wind farm development. In addition, all contain or have views to elements of infrastructure development, including power lines, communications masts, and the turbines of existing wind farm development. The extent to which landscape character will be affected by the proposed TRHE will be considered with respect to these various elements (refer Section 5.4).

3.0 RELEVANT STATUTORY AND POLICY DOCUMENTS

The following national, regional and territorial authority documents are relevant to the assessment of the landscape and visual effects of the TRHE. They provide guidance on the significance of potentially affected landscape and amenity values in the locality of the proposal. They also indicate issues, objectives, and policies intended to protect or enhance these values, and the rules and methods that shall be applied in different circumstances.

- Resource Management Act 1991
- Manawatu-Wanganui Regional Council (Horizons) Regional Policy Statement (RPS)
- Horizons Proposed One Plan
- Tararua District Council Plan
- Palmerston North City Council Plan

The last of these has been included because the turbines of the proposed development will be visible to some extent from the western (Palmerston North) side of the Tararua Range, despite their physical location within Tararua District. This is accordance with policy on cross boundary issues contained within the Tararua District Plan.⁸

Relevant landscape related matters are set out in Appendix I, summarised below.

3.1 Key implications

A number of implications for the assessment of the landscape and visual effects of the proposed TRHE flow from the documents outlined above.

3.1.1 Outstanding natural features and landscape

The general requirements of the Resource Management Act to recognise and provide for the protection of outstanding natural features and landscapes from inappropriate use and development is given specific definition by the Regional Council and relevant territorial authorities. The Horizons RPS states that such features lend character and identity to the Region, and can be thought of as a heritage resource.

With respect to the current application, the skyline of the Tararua Ranges is identified in the RPS as one of many features that are both outstanding and regionally significant. Specifically the skyline of the Tararua Ranges has *"scenic qualities provided by its prominence throughout much of the Region and its backdrop vista in contrast to the Region's plains"* (Policy 8.3, p1 (i)). Pointing out that the Tararua Ranges extend from north of Upper Hutt to the Manawatu Gorge, the principal reason stated in the RPS that the skyline achieves this significance is that the *"skyline is prominent throughout the lower North Island, and it provides a scenic vista separating the east and west coasts"*. The skyline of the Tararua Ranges is defined as *"the land/sky boundary as viewed at a sufficient distance from the foothills so as to see the contrast between the solid nature of the land at the crest at the upper points along the range and the sky"*.

⁸ Tararua District Plan. Section 2.11.1 Cross Boundary Issues. Policy 2.11.2.2 (b).

When the RPS became operative in 1998 there were no wind farms on the Tararua Ranges and the neighbouring Ruahine Range. Since 1998 the following wind farms have been commissioned (refer Table 1 Section 2.1.5). As a result of these additional wind farms being commissioned, the skyline of the northern end of the Tararua Ranges has changed significantly. Turbines are now a visible feature on sections the skyline from both sides of the range.

The proposed Horizons One Plan similarly identifies the skyline of the Tararua Ranges as it currently exists as outstanding for its “*visual and scenic characteristics, particularly its prominence throughout much of the Region and its backdrop vista in contrast to the Region's plains*” (Schedule F: Regional Landscapes, (c)). Maps that are part of the One Plan (Figure F:9, Tararua Ranges and Figure F:10, Manawatu Gorge) indicate that selected areas of the Tararua Ranges are regarded as “Significant Landscapes”. Areas of the Tararua Ranges not shown as being significant include those parts that contain all currently consented and/or built wind farms in this area including the land on which it is proposed to develop and operate the TRHE.

The Palmerston North City Plan does not specifically identify outstanding natural landscapes in its area. The Tararua District Plan identifies the ridgeline of the Tararua Ranges skyline as outstanding for its scenic values, particularly as viewed from adjacent plains.

Therefore, with regard to the visual and landscape assessment of the proposed TRHE, factors that could potentially affect the view to the skyline that is considered outstanding must be addressed. It is not stated that this provision extends to the area of land on which it is proposed to develop the proposed TRHE.

Notwithstanding the fact that the Tararua Range in the vicinity of the proposed TRHE is not recognised as being outstanding in the relevant District Plans and regional documents, case law recognises that sites that are outstanding, but have not been identified as such in a plan, can still fall to the part of the resource consent assessment under section 104 subject to Part 2 of the RMA.⁹

Several factors are typically used to assess whether or not a landscape is outstanding under s 6(b) of the RMA. These are commonly referred to in case law as the “modified Pigeon Bay criteria” (natural science values, aesthetic values, expressiveness, transient values, shared values, value to tangata whenua, and historical associations)^{10,11}.

Being familiar with the application of these criteria to identify areas of outstanding natural landscape in numerous situations throughout New Zealand, it is assessed that there is no reason to believe that the area of the Tararua Ranges in the vicinity of the application site should be regarded

⁹ Unison Networks Limited v Hastings District Council (HC, WN, CIV-2007-485-896 11 December 2007).

¹⁰ Environment Court New Zealand, Decision No. C32/99, *Pigeon Bay Aquaculture Limited v Canterbury Regional Council*.

¹¹ Environment Court New Zealand, Decision No. C180/99, *Wakatipu Environmental Society Inc. v The Queenstown – Lakes District Council*.

as achieving outstanding status. This view is consistent with all district plan and regional documents.

3.1.2 Visual amenity values, landscape character, and quality of the environment

These matters are also set out in the Resource Management Act and are given specific relevance by the regional documents, and the Tararua District and the Palmerston North City plans. Both territorial authorities stress the importance of the maintenance and enhancement of visual amenity in the rural areas, such as the Tararua Range. This is coupled with policy that seeks to enhance the diversity and vitality of the rural environment through activities that can be located only in the rural area, provided this does not adversely affect amenity or other values and qualities associated with the environment. Policy also seeks to protect the character of the rural area.

3.1.3 Change in the landscape

The Regional Policy Statement and plans of the relevant districts acknowledge the need to balance change in the landscape with protection of current values. The Regional Policy Statement also expresses a view that the collective cultural memory is also changing as the landscape changes, thereby acknowledging that the landscape is not static, neither is our perception of the landscape as a community.

Cumulative effects are not mentioned in the regional and territorial authority planning documents except in the context of housing density and spread on the fringes of settlements. Outside "urban buffer areas" (so termed in the Tararua District Plan), performance standards are regarded as adequate to manage cumulative effects.

4.0 POTENTIAL LANDSCAPE AND VISUAL AMENITY ISSUES

Wind farms considered in general, and in relation to particular wind farm proposals, can give rise to a range of landscape and visual issues. These might be positive or negative in relation to the landscape, and tempered by many considerations.¹²

Some of these issues have been identified in the relevant regional and district planning documents. Issues commonly identified in relation to proposals to erect wind farms in New Zealand that are relevant in the current case are potential effects on:

- The outstanding natural feature and landscape of the skyline of the Tararua Range, identified for its prominence and scenic qualities.
- The amenity values enjoyed by those for whom the TRHE will be visible.
- The natural character of the landscape and ambience of rural areas.
- The cumulative effects of development on landscape and visual amenity.

Although matters of landscape character and ambience have elements of intrinsic value associated with a sense of place and attachment with the landscape, each of the above issues has a strong visual component. For this reason, potential landscape and visual amenity issues are typically related to the potential effects arising from would be seen if the proposal were to be consented.

Wind turbines are distinctive structures and are necessarily located in open landscapes, typically on the high points of ridges and hills. A wind farm is highly visible within the viewing catchment it is placed, and can become a landmark in its own right in that landscape. Being highly visible and being a landmark does not necessarily constitute an adverse landscape and visual amenity effect. Modern turbines have a functional elegance that is directly conditioned by the wind resource they are intended to capture. Together with the speed of rotation and orientation of their rotors, this allows people to "see" the wind. This might be why people find moving turbine rotors more attractive than static ones, even though rotor movement also makes the turbines more conspicuous.¹³

Some, although by no means all, observers say the turbines have a sculptural quality and their arrangement on site can provide a feature that has a striking appearance. Wind farms undoubtedly have an effect on the appearance of a landscape. While some people are averse to the change and see it as having an adverse effect on character, others consider a landscape's character to be enriched by a collection of wind turbines.

A wind farm is made up of more than its turbines. Elements of the proposed TRHE that have potential for landscape and visual effects can be grouped as follows:

- Turbines: number, layout, tower and rotor size, tower and rotor blade characteristics including colour.

¹² Parliamentary Commissioner for the Environment (2006). *Wind Power, People, and Place*

¹³ University of Newcastle (2002). *Visual assessment of Wind Farms: Best Practice*. Report F01AA303A for Scottish Natural Heritage.

- Earthworks: modifications to the land for upgrading existing and constructing new access roads, the construction of turbine platforms, and the formation of fill disposal sites.
- Ancillary structures: transformer buildings.
- Temporary facilities: offices, workshops, stores, staff facilities, lay down areas and concrete batching plants.

The potential effects associated with each of these features, and measures to mitigate any adverse effects, are outlined below.

4.1 Turbines

4.1.1 Turbine number and layout

The turbines in the proposed TRHE will be sited to best utilise the wind resource on a site with varied topography, resulting in a turbine layout that correlates with the application site's spurs and plateaux. Turbines have been located to avoid undisturbed boggy areas, streams, and watercourses. The layout represents a balance between operational needs of the wind farm, environmental impacts, and engineering and access limitations, and cost implications. Turbines have also been sited in a relationship with each other to avoid turbulence between individual turbines. As the prevailing wind at the site is from the northwest, the turbines, therefore, tend to be aligned at right angles to this direction when closely spaced, and more widely spaced when there is greater potential for turbulence, such as when turbines are placed on a spur that runs somewhat NNW. In this way, the layout is an expression of responsiveness to the underlying topography and wind environments, at the same time as avoiding adverse effects on watercourses and related features.

The topography of the consented Te Rere Hau Wind Farm to the west of North Range Road is locally more subdued than that to the east of this road. As a result, it was practicable to locate several lines of relatively closely spaced turbines at right angles to the prevailing wind. In contrast, to the east of North Range Road and beyond the immediate ridge top, the ground falls away more steeply and the land is more dissected into deep gullies separated by spurs. The turbines of the proposed TRHE are generally less regimented than those in the consented Te Rere Hau Wind Farm, being distributed on ridges, plateau lands, and spurs..

The number of turbines (56) in the proposed TRHE is moderate compared with those being constructed in the consented Te Rere Hau Wind Farm (97). They are also smaller in size and number than those of the neighbouring Tararua Wind Farm (48, 55, and 31 turbines in its Stages I, II and III, respectively), and the more distant Te Apiti Wind Farm (55 turbines). In this respect, the potential for adverse effects is less, although even small numbers of turbines or a single turbine could potentially have an adverse effect.

Although it is currently proposed to add a relatively small number of turbines, they will not be completely contained in the same visual envelope as the consented Te Rere Hau Wind Farm when viewed from some angles. For example, from some places to the east (Pahiatua side of the Tararua Range), some of the turbines of the proposed TRHE will appear as a continuation in one or both directions along the ridgeline of the turbines of the consented Te Rere Hau Wind Farm. Viewed from the west (the

Palmerston North side of the Tararua Range), turbines of the TRHE will generally appear to coincide with those of the consented Te Rere Hau Wind Farm, or will not be visible from this direction. From the saddle at the junction of the Pahiatua-Aokautere Road with North Range Road, the turbines of the consented Te Rere Hau Wind Farm will generally not be visible. An exception to this is the appearance of the tips of the rotor blade of one consented turbine that will be seen apparently close and to the left of the radar dome. Parts of some of the turbines (approximately 17) of the proposed TRHE will be visible from the vicinity of this junction, and these will appear as a new collection of turbines set well back from the highway. Matters of turbine visibility and the magnitude and significance of such visibility are covered below (refer section 5).

Groups of turbines are potentially impressive and highly visible because of a combination of their height, repeating pattern, and location in high places. Despite this, dense clusters can add an undesirable level of complexity to the character of a landscape, and the greatest effect is thought to be caused by the number of turbines visible rather than their size or layout.¹⁴ Spacing between groups of turbines, or separation of groups by landform, helps to retain the open character of a landscape and the legibility of its landforms.

In the case of the TRHE, the landform requires that some turbines be separated to avoid valleys and steep terrain; others are grouped where the landform permits the close placement of turbines. These factors could potentially make for an appearance of disorder and confusion, although turbine placement (taking advantage of the high ground and following ridge and spur lines) could also be said to make the topography more legible.

4.1.2 Turbine and tower size and other characteristics

All turbines, towers, and nacelles within the proposed TRHE will be identical. Moreover, they will be the same as those in the neighbouring consented Te Rere Hau Wind Farm. This will make for unity within and between these wind farm areas. The tower, nacelle, and rotor of each turbine have been designed as an integral unit, with proportions and shapes that are capable of performing functionally and with elegance (refer Figure 5). They are, therefore, visually coherent structures in their own right. Each turbine will be painted Resene Jungle Mist with a finish of low reflectivity. This grey has been found to be generally suitable, in conditions ranging from clear to overcast, for mitigating the visual impact of tower and rotor structures when silhouetted against the sky.

¹⁴ Macaulay Land Use Research Institute (2004). *Perceptual studies of wind farms*. Retrieved (25 Nov 2005; and 6 November 2007) <http://www.macaulay.ac.uk/ccw/task-two/strategies.html>



Figure 5. Indicative turbine tower, nacelle and rotor of the type proposed in the TRHE painted with Resene "Jungle Mist".

The visual prominence of wind turbines varies considerably with light and atmospheric conditions. Turbines are more prominent when directly lit by sunlight and/or when the contrast with the backdrop sky is greatest. For instance, turbines might appear more prominent if their form is sunlit against a dark rain cloud sky, or when, in lesser light conditions, they are silhouetted against a light coloured sky. The opposite effect tends to occur in overcast weather with diffuse light conditions. Turbines also appear more clearly in still weather conditions, whereas hazy conditions will reduce their visibility, especially from photo-points that are more distant. In an apparent illusion, again arising from atmospheric conditions, ranges of hills such as the Tararuas and the turbines that stand upon them, can appear unusually near and immediate from locations when they would typically not be prominent.

The turbines of the proposed TRHE (and those of the consented Te Rere Hau Wind Farm) are the smallest turbines in the Tararua Range (46 m maximum height compared with 63-110 m for other wind farm turbines). While these are still impressive structures, their smaller overall dimensions will make them less likely to be seen and individually less prominent in the landscape when visible. However, this is somewhat offset by the greater density of the smaller turbines.¹⁵

The size of turbines has a bearing on the relationship between the magnitude of the effect of turbines on visual amenity and the distance from which the wind farm is viewed (as discussed in the next section). Broadly speaking, visual impact ranges from dominant, through prominent, distinguishable, and negligible with greater distances up to 25 km or more.¹⁶ It can be expected that intrusiveness to be generally less for smaller turbines compared to those greater than 100 m tall.

Parts of the proposed TRHE are located approximately 1.8 km from rural subdivisions, and 4-6 km from established settlements and the City of Palmerston North (from the outskirts of which some turbines will be visible). Because of this there is potential for visual amenity values to be affected if parts of turbines will be visible, in terms of pleasantness of

¹⁵ *Ibid.*

¹⁶ Parliamentary Commissioner for the Environment (2006). *Wind Power, People, and Place*. Section 5.5.4 Effects on visual amenity.

views or scenic qualities, even though the turbines are in the smaller size range.

The scale of turbines in relation to other elements in the landscape can have an effect on their prominence. Taller turbines might be expected to dominate subtle variations in relief or skylines.¹⁷ The turbines of the proposed TRHE are larger although no more than double the height of a large tree, and will be a less dominant element in the landscape than other, taller turbines in the area. In relation to the scale of turbines, it has been said that:

*...megawatt turbines on tall towers are out of scale with the landscape...by approaching if not exceeding topographic relief of 100 meters (300 feet). Certainly they are out of scale with trees and buildings, which are only 20 to 30 meters in height.*¹⁸

Woodlots, shelter tree plantings, and forests are a feature of the rural landscape of the Tararua Range, which would suggest the smaller turbines ought to be more in scale with their surroundings than the bigger turbines. The scale of variation of the topography (broken into hills, spurs and valleys, some of the lower of which have been developed for dwellings) would also suggest the smaller turbines would be more favourable than large turbines. Conversely, larger turbines would not be so much out of scale in an expansive landscape featuring wide, open spaces with few trees and subdued topographical variation.¹⁹

The generally constant and regular movement of a turbine's rotor blades increases their visibility and can cause shadow flicker (looking towards the sun) and blade glint (reflected off the blades looking away from the sun). Typically, the resulting stroboscopic effect is likely to be a nuisance only when the sun is low in the sky, and for a limited number of hours a year. Experience overseas suggests that shadow flicker has no perceivable effect at a distance further than 350-500 m,²⁰ or 10 turbine rotor diameters.²¹ In the case of the TRHE, 10 rotor diameters equates to 332 m. However, another study suggests 2 km to be a conservative limit at which flicker could be considered a potential nuisance.²² As the closest point on the nearby and frequently used highway (the Pahiatua-Aokautere Road) is over 500 m from the closest turbine in the proposed TRHE, and over 1 km from the car park and highway at the junction with North Range Road, shadow flicker is unlikely to be a nuisance.

Blade glint can be detected over longer distances than blade flicker, at least up to 12 km. It tends to be an occasional phenomenon, sensitive to

¹⁷ Scottish Natural Heritage (2005). *Strategic Locational Guidance for Onshore Wind Farms in respect of the Natural Heritage*. Policy Statement No 02/02 updated May 2005.

¹⁸ Loser, G. reported in Gipe, P. (2002). Design as if people matter: aesthetic guidelines for a wind power future. In: Pasqualetti, M.J., Gipe, P., and Righter, R.W. (eds.) *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego, Academic Press. Pp. 173-212.

¹⁹ Nielsen, F.B. (2002). A formula for success in Denmark. In: Pasqualetti, M.J., Gipe, P., and Righter, R.W. (eds.) *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego, Academic Press. Pp. 115-132.

²⁰ New South Wales Department of Planning (2005). *Taralga Wind Farm Visual Assessment. Appendix F* Retrieved (15 Nov 2007)

²¹ Department for Business Enterprise and Regulatory Reform (2007). *Onshore Wind: Shadow Flicker*. Retrieved (15 Nov 2007) <http://www.berr.gov.uk/energy/sources/renewables/planning/onshore-wind/shadow-flicker/page18736.html>

²² Voll, B. (2006). *Black Springs Wind Farm Shadow Flicker Study*. Retrieved (15 Nov 2007) http://www.planning.nsw.gov.au/asp/pdf/taralga_app_d_hassell_report04.pdf

very small changes in angle of view. The extent to which blade glint may be apparent from a particular location will depend on numerous factors related to the sun angle at different times of day, the season, wind direction, and turbine blade characteristics. The proposal to paint the blades with a low gloss finish, will reduce the potential for the turbines to cause troublesome blade glint. This phenomenon has not been publicised as a problem arising from the operation of other wind farms in the Tararua and Ruahine Ranges.

4.1.3 Positioning in relation to the skyline

The height of individual turbine towers and the top mounted rotors makes them potentially visible over long distances. Where the height of a turbine contrasts with that of the surrounding landscape features they can become prominent features on the horizon, particularly when viewed on a skyline. A study of the siting of wind farms in the landscapes of the Borders District of Scotland is relevant to the situation in the Tararua Range. It was held that more enclosed landforms, i.e. uplands amongst other upland features, are better able to accept wind farms without adverse effect than ridges and hills seen in the distance from lowlands.²³

However, the placement of turbines on, or protruding above, the skyline has been advocated in an early and frequently cited report of the aesthetics of wind farms in Europe.²⁴ In this report, it is stressed that a wind farm cannot practicably be hidden, and that "it is imperative that any wind farm development seems honest, rational and harmonious in the landscape, as an expression of visual clarity".²⁵ It has been noted that this "challenges the prevailing assumption among British planners against placing wind turbines on the skyline".²⁶

In the case of the Tararua Range (and Ruahine Range) in the Manawatu-Rangitikei Region, the range already has more than one wind farm, and turbines that are clearly visible on the skyline. These additions to the landscape, which appear prominently on the skyline, have become part of the identity of the region. They appear popularly in Councils' literature and commercial advertisements and promotions in the Manawatu and Tararua District. This suggests that the "honest" placement of turbines has been successful in causing the adoption of these elements in the landscape, even when placed on the skyline.

4.1.4 Potential cumulative effects of turbines

Cumulative effects are considered to occur in relation to wind farm developments in two general circumstances:

- Sequential effects: *When two or more sites are seen sequentially, but not simultaneously, whilst passing through the landscape; and*

²³ Borders District Council (2005). *Borders District Council Structure Plan Policy. Policy D4: Renewable Energy.*

²⁴ Stanton, C. (1996). *The Landscape Impact and Visual Design of Wind Farms.* Edinburgh, Heriot-Watt University.

²⁵ *Ibid.*, p. 43.

²⁶ Gipe, P. (2005). The landscape impact and design of wind farms by Caroline Stanton: a review. Retrieved (28 Nov 2005) <http://www.wind-works.org/articles/Stanton.html>.

- Simultaneous effects: *When two or more sites are simultaneously visible from a point of mutual visibility (whether sites themselves are intervisible or not).*²⁷

In relation to the existing wind farm developments in the Tararua and Ruahine ranges, a sequential cumulative effect could be experienced by someone travelling on State Highway 3 between Woodville and Palmerston North. On approaching the Manawatu Gorge the turbines of the Tararua Wind Farm would be seen; subsequently the turbines of the consented Te Rere Hau Wind Farm would be seen after travelling through the Gorge on approaching Palmerston North.

More typically, the observer on this route would experience the simultaneous effect resulting from views to the turbines of the Tararua Wind Farm in the Tararua Range with those of the Te Apiti Wind Farm on the hills to the north of the Manawatu Gorge.

Effects arising from simultaneous visibility can be further categorised depending on whether two or more wind farms are visible within the primary field of view (124°), or if the observer has to turn his or her head to see more than one wind farm from any given point, as follows:

- Combined effects: *...where the observer is able to see two or more developments from one viewpoint, without moving his or her head; and*
- Successive effects: *...where the observer is able to see two or more windfarms from any one viewpoint but has to move his or her head to do so.*²⁸

There is generally a clear visual distinction between the landform of the uplands of the Tararua and Ruahine ranges and the surrounding lowlands to east and west. This distinction makes for the prominence of the skyline and the backdrop for activities undertaken on the plains. For the same reason, there is generally good visibility to existing wind farm developments that have already been undertaken in the ranges.

From residential areas east and west of the range, state highways, and numerous smaller roads not immediately adjacent to the base of the ranges, there is the typically combined effect of seeing at least two wind farm developments. Successive effects might result for an observer placed relatively close to the range with, for instance, a view towards the Te Apiti Wind Farm in one direction, and by turning his/her head, towards the consented Te Rere Hau Wind Farm in the other.

There are thus numerous cases of the different forms of cumulative effects resulting from the existing wind farm developments (sequential, combined and successive). This is the context for the assessment of the landscape and visual effects of the addition of the turbines of the proposed TRHE.

The proposal will increase the number of turbines that can be viewed from various locations. As such, they will add to the accumulation of turbines. However, a cumulative effect in such circumstances occurs when there is a significant effect on landscape and visual amenity values (or other environmental features) as a result of this accumulation. Assessment of the

²⁷ Landscape Design Associates (2000). Section 3.1.1 (iii).

²⁸ Scottish Natural Heritage (2005). *Guidance. Cumulative Effect of Windfarms*. Appendix 5. P. 25.

potential cumulative effects of the proposed TRHE turbines is considered below (refer section 5.1.4).

4.2 Land modifications

The main sources of land disturbance will arise from:

- Forming of core access roads between North Range Road and the sites of individual turbines or turbine groups.
- Disposing excess excavated material at suitable sites identified within the project area.
- Forming lay down areas at suitable locations.
- Forming platforms for transformers.
- Constructing foundations for each turbine.
- Formation of crane pad areas at turbine sites.

Preliminary earthwork calculations for the proposed TRHE indicate that up to 222,000 m³ of material will need to be excavated for the construction of on-site roads, and approximately 12,000 m³ for turbine pads. These volumes will be offset by fill of approximately 35,000 m³.

4.2.1 Core site access roads

It is proposed to locate 56 turbines on the higher parts of a complex of spurs and plateaux within 1 km of the Tararua Range ridgeline. A plan showing the location of the turbines and access roads, provided by NZ Windfarms Limited, is attached (refer Attachment 2).

Use will be made of North Range Road in its existing state. The majority of the turbines (36) will be accessed directly from North Range Road by way of three networks of on-site roads. These will be approximately 5 m wide plus drainage channels 2.0 m wide on each side. These road networks are joined to North Range Road in the vicinity of the consented Te Rere Hau Wind Farm:

- Turbines T21-T25 (5) joined via Road 10
- Turbines T26-T29 (4) joined via Road 15
- Turbines T30-T56 (27) joined via Road 19

The remaining 20 and most north-easterly of the turbines will be accessed either directly from existing Road 4:

- Turbines T1, T9-T14, T20 (8)

or from two networks of roads connected to Road 4:

- Turbines T2-T8 (7) joined via Road 1
- Turbines T15-T19 (5) joined via Road 6

Existing Road 4 and associated turbines are generally north-east of the consented Te Rere Hau Wind Farm, i.e. beyond the consented wind farm and more distant from the Aokautere-Pahiatua Road.

A total length of approximately 7.3 km site access roads will need to be constructed. Construction of the internal access roads (which will involve either the upgrading of existing farm tracks or the formation of new sections of road) will involve cuts into slopes and areas of fill. The maximum vertical height of cut is anticipated to be approximately 10.7 m and will occur on Road 14 approximately 80 m from the intersection of Road 12 and Road 13 (refer Attachment 2). Maximum anticipated vertical height of fill will be approximately 4.7 m, which will occur on Road 2 approximately 70 m from the intersection with Road 1 (refer Attachment 2). It is envisaged that basecourse material for road construction will need to be sourced from local materials imported to the site, and will match those commonly used and evident in the farm tracks on neighbouring properties.

As the works progress, it is proposed to revegetate exposed fill surfaces and road edges with slopes less than 2:1 as soon as is reasonably practicable. Rehabilitation for cuts in soil and fill slopes will use the most practical and effective revegetation techniques available at the time the work is required. Generally this will involve hydro-seeding with pasture grasses and pasture legumes typical of those growing in the surrounding paddocks so that visual disturbance will be minimised. This technique has been used in other wind farms in the locality, e.g. the consented Te Rere Hau Wind Farm, and Te Apiti Wind Farm in the Ruahine Range.

Cut surfaces formed at slopes approaching 1:1 will not be revegetated because of the difficulty of establishing pasture. It is also not proposed to revegetate crane pads, although the level ground immediately surrounding the base of each turbine tower will be revegetated with pasture plants.

4.2.2 Turbine platforms

The reinforced concrete foundations for the wind turbines will be approximately 2.5 m in diameter, although a larger flat area will be required at each turbine site to accommodate the erection cranes.

Turbine platforms are typically located on ridgelines, although wherever possible in locations where earthworks associated with the platforms will not be visible from beyond the application site area. Mitigation measures for turbine platforms will involve back-filling up to the turbine base, spreading with stockpiled topsoil, and revegetating up to the turbine towers with pasture species using the same techniques as those indicated above for cut and fill associated with new access roads. This will reduce any erosion potential and re-establish the original appearance of the land surrounding each turbine sites.

4.2.3 Fill sites

An investigation carried out by NZ Windfarms Limited established that there will be an excess of 200,000 m³ of cut material created as a result of the wind farm construction. For areas of the site where a cut to waste approach is necessary, the excavated material will be disposed of at locations within the core project area. In some locations material will be utilised to aid shaping the adjacent ground to blend construction works with the existing terrain.

Fill batters and disposal sites for excess cut material near core site roading have been identified on relevant engineers' drawings. The surface of fill areas will generally be covered with topsoil (which will have been

previously removed and stockpiled within the application site) and revegetated with plant species already growing in the immediate vicinity of fill sites. All fill sites will thus be revegetated typically with pasture so that there will be no long-term visual effects resulting from the fill sites.

4.2.4 Borrow Areas

A preliminary appraisal, and experience with the construction of the consented Te Rere Hau Wind Farm, indicate that suitable material for the construction of roading and turbine platform and other basecourse is not available on site. This material will be sourced locally and imported to the site.

4.3 Ancillary structures

Ancillary structures typically associated with wind farms can be categorised as follows:

- Transformer buildings
- One or more substations
- Operations and maintenance buildings
- Power transmission lines
- Wind monitoring (meteorological) towers

However, in the case of the proposed TRHE, only the first of these bulleted items will apply. Use will be made of the facilities of the consented Te Rere Hau Wind Farm with respect to the need for a substation, operations and maintenance buildings, and wind monitoring equipment. Transmission lines between individual turbines in the TRHE and the substation of the consented Te Rere Hau Wind Farm will be underground and located either beneath or alongside core site access roads. In this way, they will have no effect on the landscape once excavations associated with road construction have been reformed and revegetated.

4.3.1 Transformer buildings

A transformer, housed in a structure with the dimensions 1 m x 1.8 m x 1.5 m in height, will be located near the base of each turbine tower (refer Figure 6). Each transformer will be free standing. While the turbines will be painted a light grey colour, the low stature of the proposed transformer buildings means that it will be more appropriate to relate the colour of the buildings to the landscape rather than the sky. It is proposed to paint the buildings G15 to AS 2700S-1996 (olive green).



Figure 6. Indicative transformer structure associated with each turbine of the type proposed in the TRHE.

The location of each proposed transformer unit will be 6.5-9.0 m from the base of its associated turbine tower. Screen planting will not be necessary as the transformers will not be visually intrusive if they are judiciously sited and painted as proposed. In addition, screen planting within the open pasture areas that generally characterise the site would be inappropriate, as it would serve to highlight the structure from distant views on a site which is generally devoid of any tree and shrub vegetation.

4.4 Temporary facilities

Temporary facilities typically associated with wind farms can be categorised as follows:

- Lay down areas
- Concrete batching plant
- Night lighting
- Project offices

However, none of these will feature as part of the proposed TRHE for the following reasons.

4.4.1 Lay down areas

Lay down (sometimes called stockpile) areas are required for temporary storage of wind turbine generator components and materials such as electrical cables ahead of installation. However, use will be made of

suitable areas on the consented Te Rere Hau Wind Farm. No new lay down areas will be associated with the proposed TRHE.

4.4.2 Concrete batching plant

There will be no concrete batching plant. All concrete will be trucked to the site as required.

4.4.3 Night lighting

It is envisaged that all work on access roads and at turbine sites will be undertaken during normal working hours. No night lighting will be required.

4.4.4 Project offices

Offices associated with the consented Te Rere Hau Wind Farm will be used during construction of the proposed TRHE.

4.5 Aviation obstacle lighting

No aviation obstacle lighting will be installed as the turbines and rotors are below the height for which such lighting is required.

4.6 Mitigation features

Mitigation measures, with respect to landscape and visual effects, are summarised as follows:

- (a) Roadworks and earthworks potentially associated with the upgrading of the existing access road to the core site will not feature as part of this application because adequate access is already provided by North Range Road, already used for access to the consented Te Rere Hau Wind Farm.
- (b) Internal access roads will utilise, where practicable, the alignment of existing farm roads. New roads have been designed to ensure that associated earthworks will be kept to a minimum. Where cuts have not been made into bare rock, the exposed earth surfaces will be revegetated with pasture species. Prominence of cut rock surfaces visible from outside the application site will be reduced through revegetation with moss species or similar.
- (c) The wind turbine generators chosen for the project have been designed as integral units, resulting in elegant and visually cohesive structures. All turbines within the proposed TRHE, and in the nearby consented Te Rere Hau Wind Farm, will be identical, which will result in the proposal having a considerable measure of unity.
- (d) Turbines will be painted with a light grey paint to assist in mitigating their visual effect when viewed against the sky, and to reduce blade glint.
- (e) The placement of turbines on ridges and spurs and the separation of groups of turbines, by landform, will help to retain the open character of the landscape and the legibility of its landforms.

- (f) Transformer buildings, while small structures in comparison to the wind turbines, will be painted a colour to minimise their visibility.
- (g) Turbine platforms will be mitigated by covering with backfill and topsoil, and revegetating exposed surfaces with pasture species.
- (h) Cut to waste material will be used to aid shaping of the adjacent ground to blend construction works with the existing terrain. Road edges and fill sites less than 2:1 steep will be revegetated with pasture species to help them to blend visually into the surrounding landscape.
- (i) Transmission of power between the turbines and the substation will all be underground.

5. ASSESSMENT OF LANDSCAPE AND VISUAL AMENITY EFFECTS

5.1 Landscape and visual amenity assessment methodology

As one of a range of measures needed to ensure positive outcomes from wind energy generation, The Parliamentary Commissioner for the Environment recently drew attention to the absence of “Robust national criteria ... for assessing landscape” in the context of applications for wind farm consents. Decision-making on individual cases has been robust. However, no set of criteria associated with landscape and visual assessment has gained universal acceptance, despite extensive research on the topic.²⁹ This is possibly because of the difficulty of assessing the significance for people of relatively intangible values, such as a sense of place, belonging to a landscape, or landscape character.

Visibility and visual criteria (“Is the view changed?” and “What is the magnitude of the effect?”) tend to dominate assessments. These are a good starting point for approaching effects of any change on landscape character, especially with respect to people who frequently see new wind farms from their homes, places of work, or transport routes. Despite this, people generally distant from wind farms might also be expected to have opinions regarding a wind farm proposal, especially their effects on landscape character (refer section 1.3).

A systematic approach is used in this landscape and visual assessment that works from issues of visibility and potential visual amenity effects to landscape effects, starting with the identification of representative photo-points (photo-points from which photographic simulations were prepared) from which different degrees of wind farm visibility will be possible.

5.1.1 Defining terms

There is no way to separate entirely satisfactorily between visual effects and the more intangible, landscape effects. They are complementary and integrated by each person experiencing their surroundings.^{30,31} However, landscape effects are generally associated with the perception of the character of the landscape or its sense of place. In contrast, visual effects are associated with amenity values, such as the pleasantness and visual coherence of an area, its appearance in a view, or its recreational attributes as defined in the Resource Management Act.

The recent revision of the *Guidelines for Landscape and Visual Assessment* (GLIVIA) has been used in the assessment of wind farm proposals in the United Kingdom and elements have been cited in assessments carried out in other countries, including New Zealand. It makes a distinction between landscape and visual effects, based on definitions for landscape and visual amenity.

“Landscape” is defined as:

²⁹ Macaulay Institute (2007). *Review of Existing Methods of Landscape Assessment and Evaluation*. Retrieved (6 November 2007) <http://www.macaulay.ac.uk/ccw/task-two/evaluate.html>

³⁰ Ashby, M. (2004). *Wind's Up: Planning the Future Now*, section Wind Development Issues, pp. 31-32.

³¹ Energy Efficiency and Conservation Authority (2004) *Guidelines for Local Authorities: Wind Power*.

human perception of the land conditioned by knowledge and identity with a place.

Landscape is made up of biophysical elements, and characteristics that contribute to landscape character. This is similar to the definition of landscape offered by case law in New Zealand. Landscape effects:

*derive from changes in the physical landscape, which may give rise to changes in its character and how it is experienced.*³²

The combination of physical and perceptual effects in this definition is supported by a document dealing primarily with cumulative effects of wind farms, where effects on the landscape are divided into those involving:

- Loss of damage to the specific elements which make up the fabric of the landscape
- Changes to the perceived character and quality of the landscape.³³

Visual amenity is defined as:

the value of a particular area or view in terms of what is seen.

Visual effects relate to:

*the changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.*³⁴

Landscape and visual effects, therefore, relate to the experience of change in landscape character and visual amenity, respectively.

5.1.2 Magnitude of effect

Attempts have been made to separate the magnitude of landscape and visual effects from their significance. The "magnitude" of change is usually applied to the assessment of visual effects. It depends on relatively objective factors, such as the size of the object affecting the change, the viewing distance from the object, and other visibility factors.

Even so, there is no consistent agreement between studies as to the relationship between distance and the magnitude of effect. In relation to wind farm assessments, this lack of consistent agreement is partly because of differences in the size of turbines, as well as the landscape context, weather conditions, and cultural factors.

Distilling the suggestions made in several studies of the effect of viewing distance on the magnitude of visual effects of wind farms^{35,36,37,38} the

³² Landscape Institute and Institute of Environmental Management and Assessment (2002) *Guidelines for Landscape and Visual Assessment*.

³³ Landscape Design Associates (2000). *Cumulative Effects of wind Turbines. A Guide to Assessing the Cumulative Effects of Wind Energy Development*. ESTU W/14/00538/REP.

³⁴ Landscape Institute and Institute of Environmental Management and Assessment (2002) *Guidelines for Landscape and Visual Assessment*.

³⁵ Scottish Executive (2002). *Renewable Energy Technologies. Planning Advice Note 45*.

³⁶ Borders District Council (2005). *Borders District Council Structure Plan Policy. Policy D4: Renewable Energy*.

³⁷ Ashby, M. (2004). *Wind's Up: Planning the Future Now*. Connell Wagner.

³⁸ Boffa Miskell (2004). *Tararua Wind Farm Stage 3 Extension Landscape and Visual Assessment*, pp. 20.

approximate distances at which different magnitudes of effect will be appreciated can be estimated (refer column 1, Table 2 below).

However, the studies on which such tables are based generally refer to wind farms containing turbines with a maximum height (to tip of rotor blades) in the range 100-145 m. For instance, the report of the Parliamentary Commissioner for the Environment refers to a study in which the magnitude of effect is estimated for turbines assemblies with a maximum height of 110 m.³⁹

The maximum height of the turbine and rotor assemblies to be erected in the proposed TRHE will be small compared with those for which the magnitude of effects is often quoted, i.e. 47 m compared to over 100 m maximum height. The magnitude of the effect of the turbines will therefore tend to be less than suggested in Table 2. The degree to which the magnitude of the effect of the smaller turbines of the proposed TRHE will be reduced can be gauged by reference to studies that have examined this relationship.

The Thomas and Sinclair-Thomas matrices are frequently cited as a guide for assessing the approximate distances over which the magnitude of the impact of wind farm turbines will be appreciated.^{40,41} The methodology used to compile these matrices tends to combine the magnitude with the significance of the effects. However, based on studies of assessments for turbines of different sizes, the following interpretations can be reached:

- Smaller turbines have less visual impact
- Visual impact is not proportional to the maximum height of the turbines: doubling the maximum height does not double the magnitude of effect, increasingly tall turbines having a decreasing effect relative to the extra height. Conversely, smaller turbines have a disproportionately large effect, albeit smaller than that of larger turbines.
- Halving the maximum height of turbines from approximately 80-100 m to 40-50 m, can be expected to reduce the distance at which a certain magnitude of effect will be appreciated by approximately 40%.

It is clear that the range of distances at which a certain magnitude of effect will be appreciated cannot be taken as constituting hard and fast rules. They should be used with discretion in the assessment of visual effects, and interpreted in light of local and site-specific factors.⁴² However, in light of the reasons given above, it is reasonable that the distances at which the 47 m high turbines of the proposed TRHE will achieve a given magnitude of effect will be less than those for turbines 100-145 m in maximum height. The distances relevant to the proposed TRHE (maximum turbine height 47 m) have been estimated conservatively as being approximately a third

³⁹ Parliamentary Commissioner for the Environment (2006). *Wind power, people, and place*. Wellington: Parliamentary Commissioner for the Environment. Table 4-1 p. 54.

⁴⁰ Sinclair, G. (2003) The potential visual impact of wind turbines in relation to distance: an approach to the environmental assessment of planning proposals. Narberth, Pembrokeshire, Wales: Environmental Information Services. Appendix D.

⁴¹ Ashby, M. (2004). *Wind's Up: Planning the Future Now*. Connell Wagner.

⁴² University of Newcastle (2002 revised in 2005). *Visual Assessment of Wind Farms: Best Practice*.

(33%) less than the distances for the larger turbines (refer column 2, Table 2 below). These distances have been used in this assessment to reflect the magnitude of potential effects.

Table 2. Effect of distance from the turbines of a wind farm on the magnitude of visual effect for turbines of different maximum heights.

Distance from wind farm (km)		Magnitude of effect	Defining phrases
Turbines in range 100-145 m maximum height	Turbines approximately 40-50 m maximum height		
Up to 1-2	Up to 0.5-1.5	Dominant	Defining influence or focus of view; visually intrusive
1-6	0.5-4	Prominent	Clearly visible, important, not defining element of view
6-10	4-7	Present	Visible but not prominent
10-20	7-13	Negligible	Visible but might go unnoticed, minor element
20-30	13-20	Typically not discernible	

5.1.3 Significance of effect

“Significance” of an effect varies according to the person appreciating the effect. Significance can be regarded as having commonsense categories, such as major (a substantial change to a view or landscape), moderate, minor (a slight change to a view of landscape), and negligible. These can be applied to landscape effects (for instance, to landscape character) as well as to visual amenity effects (for instance, to views) of different magnitude.⁴³

The concept of significance has been used inconsistently for landscape and visual assessment, sometimes overlapping with the assessment of the magnitude of effects, such as in the Sinclair-Thomas Matrix.⁴⁴ The terms substantial, moderate, slight, and negligible have been used to convey the potential for visual effects to be noticed.⁴⁵

⁴³ Boffa Miskell (2004). *Tararua Wind Farm Stage 3 Extension Landscape and Visual Assessment*, pp. 39-40.

⁴⁴ Ashby, M. (2004). *Wind's Up: Planning the Future Now*, section Wind Development Issues, pp. 81-82.

⁴⁵ Parliamentary Commissioner for the Environment (2004). *Wind Power, People, and Place*, p. 54.

5.1.4 Cumulative effects on landscape and visual amenity

The nature of potential cumulative effects of developments such as wind farms has been usefully described as follows:

Increasing numbers of wind energy developments within a landscape are likely to have an increasing effect. It is likely, however, that this relationship will not be entirely linear (purely additive) and that the process of change can be interpreted as a series of thresholds. Such thresholds can be a useful shorthand for describing the degree to which wind energy developments have become a defining characteristic of landscape character.⁴⁶

A table of energy landscape stages, originally produced by Cumbria County Council in the UK, is provided⁴⁷:

Stage	Description	Threshold
1	There is a wind farm development in this landscape.	Wind development becomes a significant characteristic of the landscape concerned.
2	This landscape contains a number of wind developments / significant numbers of turbines.	Wind development becomes the dominant characteristic by which the landscape would be described.
3	This is a wind energy landscape.	

While cumulative effects are typically regarded as being linked to adverse effect, the authors point out that a Stage 3 Wind Energy Landscape might have positive landscape effect in some circumstances. It is suggested by the authors that a Stage 3 Wind Energy Landscape might be thought of as occurring under the following illustrative circumstances of wind energy development:

- Developments begin to visually coalesce from some viewpoints.
- Simultaneous visibility of developments frequently occurs within the same field of view.
- Developments are frequently simultaneously visible of relatively short distances where they might dominate the view.
- Visibility from linear routes is frequent with little relief from this visual influence.

⁴⁶ Landscape Design Associates (2000). Section 3.1.5 (ii) Thresholds

⁴⁷ Cumbria County Council (2005). Planning Cumbria. Technical Paper 6. Planning for renewable energy development in Cumbria. Section 3 Onshore wind developments, s 3.1.8 (p. 13).

With regard to the introduction of the wind turbines, such as those of the proposed TRHE, it is important to define the stage of wind farm development in the existing landscape. The significance of cumulative change can be assessed by examining if the landscape moves across a threshold to the next stage of wind farm development.

The landscape of the northern Tararua Range would have been at Stage 1 when there was one wind farm development in the landscape, i.e. when Tararua Stage I was commissioned in 1999. It clearly crossed a threshold to Stage 2 when wind energy development became a significant landscape characteristic with the construction and operation of additional wind farms in the area since then. These are the Te Apiti Wind Farm on the neighbouring hillsides in the Ruahine Range, from a visual perspective, the different turbines of Stages II and III of the Tararua Wind Farm, and those of the consented Te Rere Hau Wind Farm. However, consideration should be given to the possibility that the landscape has already been so affected by wind farm developments that is best regarded as a Stage 3 Wind Energy Landscape.

Using criteria such as those suggested above relating to coalescence and simultaneous visibility, the following assessments suggest that the context of the proposed development should be regarded as already being a Stage 3 Wind Energy Landscape, as follows:

- Existing wind farm developments currently do coalesce visually when viewed from a number of viewpoints, e.g. State Highway 3 between Palmerston North and Ashhurst to the west of the range and between Woodville and the Manawatu Gorge to the east, and on State Highway 2 between Pahiatua and Woodville. Visual coalescence also occurs from the residential areas of some of these settlements, particularly from Palmerston North.
- Simultaneous visibility of existing wind farm developments does frequently occur within the same field of view, even when visually certain wind farms do not “coalesce” visually, e.g. the Te Apiti Wind Farm and the Tararua Wind Farm when viewed from Ashhurst.
- Domination of the view could be said to occur when two or more existing wind farm developments are viewed from close quarters (1-2 km from the observer). Such close observation would be possible close to the eastern entrance to the Manawatu Gorge when some of the turbines of both the Te Apiti and Tararua wind farms are visible.
- Relatively unrelieved and frequent visibility of existing wind farm developments can be had from sections of state highways, especially on the Manawatu Plains.

However, these general tests need to be examined in the context of the particular receiving environment. As described above (refer Section 2), there is generally a clear distinction in the vicinity of the current proposal between the landscape elements of the Tararua Range and the lowlands to either side. The uplands are clearly visible from the lowlands and form a significant backdrop, yet they are separated by distance, landform, and land use from activities on the plains. Therefore, notwithstanding the visual coalescence, simultaneous and sometimes unrelieved visibility of existing wind farm developments from the lowland plains, because these effects are localised to a distinctly different landform, the landscape of the Manawatu

Plains and of the lowlands in Tararua District cannot be said to be a Stage 3 Wind Farm Landscape. They are more accurately regarded as Stage 2 landscapes because the wind farms are not the dominant characteristic by which the landscape would be described.

On the other hand, observation of wind farm developments from within the Tararua and Ruahine ranges might well be regarded as constituting a Stage 3 Wind Energy Landscape. For instance, on travelling the Saddle Road generally through the Te Apiti Wind Farm and with views to the nearby Tararua Wind Farm, the surrounding upland landscape can be assessed as a Wind Energy Landscape. Similarly, travelling sections of North Range Road with simultaneous views to the turbines of the consented Te Rere Hau Wind Farm and of the different stages of the Tararua Wind Farm can be assessed as a Wind Farm Landscape.

In contrast, there are observation points within the Tararua Range, such as at the junction of the Aokautere-Pahiatua Road with North Range Road, where there is currently little evidence of wind farm development. Such places could be regarded as not having reached Stage 1 in terms of wind farm development.

In future, if consent were to be granted to the proposed Turitea Wind Farm, together with the consented Moturimu Wind Farm, there would be more of the skyline of the Tararua Range affected by wind turbines to the south of the Aokautere-Pahiatua Road. However, applying the argument outlined above, the landscape of the Manawatu and Tararua Plains would still not be a Stage 3 Wind Energy Landscape.

However, these wind farm development stages and thresholds of cumulative effect might be too coarse to be useful in assessing the significance of small cumulative changes and cannot be taken as definitive.⁴⁸ Another document dealing specifically with the cumulative effects of wind farm developments warns of the difficulty of identifying and justifying what is an unacceptable cumulative effect.⁴⁹

The significance of cumulative effects can also be judged against the capacity of a landscape to absorb or accommodate change, or its sensitivity to change, although generally accepted protocols for assessing these have not been established. Landscape capacity "refers to the degree to which a particular landscape character type or area is able to accommodate change [such as a wind farm development] without significant effects on its character".⁵⁰

Other reports have associated the clustering of turbines with the same design, and the separation of clusters by turbine-free areas with the minimisation of cumulative effects. However, such recommendations would result in the separation of wind farms by 10 km or more to avoid cumulative effects depending on the openness of the landscape.^{51,52} Such

⁴⁸ Landscape Design Associates (2000). Section 2.1.5 (ii) Thresholds

⁴⁹ Scottish Natural Heritage (2005). *Cumulative Effect of Wind Farms*. Version 2 revised 13.04.05, paragraph 53.

⁵⁰ Swanwick, C. (2002). Landscape Character Assessment Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity. Scottish Natural Heritage and the Countryside Agency Report GD272434., p. 2.

⁵¹ Macaulay Land Use Research Institute (2004). *Perceptual studies of wind farms*.

⁵² Horner & Maclellan and Envision (2005). *Visual analysis of wind farms: good practice guidance*. Consultation draft (document SNH AB(AA308)030487) prepared for Scottish Natural Heritage and others retrieved (29 Nov 2005) from <http://www.snh.org.uk>.

recommendations would not be appropriate in the Tararua Range where existing wind farm developments are considerably closer and there is already some visual overlap or close placement of turbines of different design.

In this report, in addition to the consideration of landscape and visual amenity effects, cumulative effects are assessed with respect to their significance for the potential change of the character of the landscape and with respect to the existing environment and potential wind developments additional to that of the current proposal. Consideration is given to whether or not the proposal is likely to result in the landscape of the lowland plains passing from a Stage 2 (wind energy development a significant landscape element) to a Stage 3 landscape (a Wind Energy Landscape), and if other changes in stage will potentially be apparent from within the Tararua Range, specifically at the junction of the Aokautere-Pahiatua Road and North Range Road.

Whatever the means of approaching the issue of potential cumulative effects, there are likely to be widely divergent responses from the public regardless of expert judgement. These could range from no perceived effect, to extremes of positive and negative perceptions.⁵³

5.2 Photo-point identification

5.2.1 General considerations

The locality of the proposed TRHE will result in the potential for there to be landscape and visual effects in a number of localities. It is proposed to locate the turbines predominantly on spurs and plateaux within the catchment of the Tararua District. It would be appropriate, therefore, for candidate photo-points to be surveyed on this eastern side of the Tararua Range. These would need to reflect the potential for public visibility from commonly used roads and settlements.

However, some of the turbines will be located close enough to the ridgeline of the Tararua Range for them to be visible from some locations to the west in the Manawatu catchment. Therefore, candidate photo-points were also surveyed on the western side of the Tararua Range.

The Pahiatua-Aokautere Road is a busy route connecting the western Manawatu Plains to the Tararua District. Its course offers several opportunities to view the proposed TRHE in transit. In particular, the car parking area at the saddle between the Manawatu and Tararua District will offer travellers the chance to stop and view turbines of the proposed TRHE at their leisure from quite close proximity, if they so choose.

As part of the process of identifying photo-points from which landscape and visual effects could be assessed, full consideration was given to potential cumulative effects resulting from the simultaneous visibility of the turbines of the proposed TRHE and those of other wind farm developments. In addition, points were considered at which "visual coalescence" between such developments might occur, when they would appear to overlap in the field of view.⁵⁴

⁵³ Landscape Design Associates (2000). *Cumulative Effects of Wind Turbines. Volume 2.* p. 34.

⁵⁴ Landscape Design Associates (2000). Section 3.1.4 (ii) Viewpoint analysis.

5.2.2 Field survey

The site of the proposed TRHE and the surrounding landscape is familiar from long association and residence in Palmerston North, and from travels from north to south, and east to west in the North Island in the vicinity and within visibility of the Tararua Range.

The site and surrounding landscape were also surveyed from a number of candidate photo-points accessible to the public to assess the visibility of the proposed TRHE and potential effects on landscape character and visual amenity. The locations and appearance of the turbines that had already been constructed in other wind farm developments were noted. In order to guide the selection of photo-points, digital image simulations of the Tararua Ranges (ridgelines and foothills) including the turbines of the consented Te Rere Hau and other wind farms, and of the proposed TRHE were prepared. Potential photo-points were also surveyed at the limits of visibility.

Elements of the biophysical and cultural landscape contributing to landscape character were also reviewed in the vicinity of the candidate photo-points and from other localities in the Manawatu and Tararua District.

5.2.3 Photo-point selection and photosimulations

Photo-points representative of areas of residential, transport, and recreational significance were selected using the combination of personal experience, desktop study, digital modelling, and field survey noted above (refer Table 3 and Attachment 1). In order to convey the visibility and visual impact of the proposed TRHE (or lack of visibility), photosimulations were prepared using 10 representative photo-points. These were prepared by Morgan Pollard Visual Ltd under the instruction of Peter Rough Landscape Architects Limited and NZ Windfarms Limited.

The simulations are an aid to conveying the varying level of visibility and visual impact of the proposed TRHE, and in representing the layout, positions and orientation of the turbines and some of the effects of sun and shade. They cannot substitute for seeing and otherwise experiencing the turbines in reality, although they do give a useful impression of their likely visibility and visual impact. Similarly, they do not show the movement of the turbine blades in operation, a feature that is said to increase public acceptance of wind farm developments.⁵⁵ They also cannot account for small differences in visibility and visual amenity effect from other nearby locations not selected as photo-points where trees or other potential obstructions might obscure the view.

There are many features associated with a wind farm development other than the turbines (refer section 1.4). However, the turbines are typically the most obvious and potentially most intrusive element. The simulations

⁵⁵ Gipe, P. (1993). The wind industry's experience with aesthetic criticism. *Leonardo* 26, 243-248, as reported in Macaulay Institute (2007). *Perceptual Studies of Wind Farms*. Retrieved (6 Nov 2007) <http://www.macaulay.ac.uk/ccw/task-two/strategies.html>

do not show the transformers associated with each turbine because they are relatively small and will generally be concealed from view. Newly formed and upgraded farm tracks needed for access to turbines sites are also not shown as these will be mostly concealed from view. The proposed disposal sites are not shown, as their locations will be determined as work proceeds (refer section 4.2.3), and they will have no long term visual impact following revegetation.

The photosimulations are in the form of pairs of large, high quality images:

Upper Image: the view towards the locality of the proposed TRHE but showing only the currently erected turbines and those already consented to be built.

Lower image: the same view as the Upper Image, but now with the inclusion of the turbines of the proposed TRHE.

These “before” and “after” images indicate the level of change in the view from each photo-point resulting from the proposed TRHE. When held at arms length (viewed from a distance of approximately 500 mm), the photosimulations convey the scale of the landscape and the proposed TRHE as it would be seen in reality. Reduced versions of the photo-simulations are included with this report (refer Attachments 3-12). A description of the methodology used to create the photosimulations has also been included (Appendix III).

The following photo-points were selected for the preparation of simulations (refer Table 3 and Attachment 1). The positions of the photosimulation points and their elevations are indicated on each image. The distance from the closest turbine in the proposed TRHE, which influences the magnitude of effect, has been shown in parentheses.

In addition, the outlook from close to the War Memorial on the Palmerston North-Wanganui Road (SH3) at a distance of 24 km [E2723812; N6103388] was also included for consideration, although without a photosimulation.

Table 3. Photo-point locations and distance to nearest turbine within the proposed TRHE.

Photo-point	Location	Distance to nearest visible turbine (km)
1	Troup Road on the outskirts of Woodville	9.6
2	Kaitawa-Tiraumea Road on the outskirts of Pahiatua	10.3
3	Elevated portion of the Pahiatua-Mangahao Road	6.3
4	Post Office Road on the outskirts of the settlement of Ballance	4.1
5	Junction the Pahiatua-Aokautere Road with North Range Road at the saddle of the Tararua Range	1.8
6	Ridgeview Road off Harrison Hill Road close to a number of rural residential properties	[not visible]
7	Pahiatua-Aokautere Road offering views to the Tararua Range from the highway	[not visible]
8	Branksome Place off Polson Hill Drive in the foothills near Aokautere	7.5
9	Pacific Drive, Pacific Heights subdivision on the outskirts of Palmerston North	6.5
10	Junction of Napier Road (SH3) with James Line east of Palmerston North	8.9

5.3 Visibility and assessment of visual amenity effects

5.3.1 Photo-point 1: Troup Road on the outskirts of Woodville

Woodville is a focus of rivers, roads and the railway that converge on the nearby Manawatu Gorge. It is situated close to the entrance to the Gorge and somewhat beneath the northern end of the Tararua Range that rises steeply from the fertile river flats that extend southwest from the outskirts of town. Troup Road runs across these open pasturelands on the southern outskirts of Woodville, and has unbroken views to the Tararua Range and associated wind farm developments.

The photosimulation of the Tararua Range (refer Attachment 3, upper panel), including all currently consented wind farms of Te Rere Hau, Tararua Stages I-III, and Te Apiti, shows turbines with a range of sizes and densities from the foot of the Ruahine Range near the Manawatu Gorge south to the vicinity of the Pahiatua-Aokautere Road. Because the turbines are located in different positions in the landform, not all towers and rotors are completely visible. However, collectively they have become a significant, although not dominating, landscape feature.

The turbines of existing wind farms recede towards the southwest, terminating in a group of the relatively small, two-bladed turbines that are part of the consented Te Rere Hau Wind Farm almost due west of the observer (to the far left as viewed). Because of their position predominantly to the west of the ridgeline of the Tararua Range (on the

Manawatu side), only a few (13-14) of the turbines of the consented Te Rere Hau Wind Farm are visible.

Visibility of the proposed TRHE

Comparing the photosimulation of the currently consented wind farms with the one that includes the proposed TRHE (refer Attachment 3, upper and lower panels), there is a difference in the number of turbines that are visible in the vicinity of those of the consented Te Rere Hau Wind Farm. Parts or whole rotor assemblies of approximately 38 new turbines of the proposed TRHE are visible extending the line of consented turbines mainly to the left along the skyline as viewed. There are also several locations close to the proposed turbines of the TRHE where roading and cut and fill slopes are visible, although these are not readily discernible from the distance and angle of Photo-point 1.

Effects on visual amenity values

The turbines that can be seen of the proposed TRHE are discernible from this distance, although the magnitude of their effect is negligible (refer column 2, Table 2 above).

The significance of the effect on visual amenity is assessed as minor. Part of this assessment relates to the small scale of the turbines relative to the visual mass of the Tararua Range, and the difficulty of discerning any excavation associated with roading. The skyline of the Range appears to be 10-20 times taller than the height of one of the proposed turbines, minimising the effect of the latter. Moreover, the Tararua Range is a land mass that already features wind turbines, many of which are larger than those proposed for the TRHE. Existing turbines are also located closer to this observation point, and seem additionally larger than those of the proposed TRHE owing to the effect of perspective.

5.3.2 Photo-point 2: Kaitawa-Tiraumea Road on the outskirts of Pahiatua

The second photo-point is situated by the side of the Kaitawa-Tiraumea Road on the southern outskirts of Pahiatua. As the road descends a small hill at the entrance to the town, a clear view to the north-west is afforded over the buildings of Pahiatua and the intervening low hills and trees to the Tararua Range beyond.

In the photosimulation of the Tararua Range showing all currently consented wind farms (refer Attachment 4, upper panel), some of the more elevated two-bladed turbines of the consented Te Rere Hau Wind Farm are visible, appearing in two groups of six and 13 turbines separated by a rise in the hills on the skyline. To the right can be seen the larger three-bladed turbines of Stage III of the Tararua Wind Farm, and still further to the right are the smaller turbines of the earlier Tararua Wind Farm stages.

Visibility of the proposed TRHE

Most (47) of the turbines of the proposed TRHE are visible in the photosimulation of the view from Photo-point 2 (refer Attachment 4, lower panel). These appear to be located on the skyline with the turbines of the consented Te Rere Hau Wind Farm, and extend mainly to the right and slightly to the left as viewed.

In addition, there will be visibility to roads and cut and fill slopes associated with roads used to access, construct and maintain the turbines from Photo-

point 2. Notable of these are sections of Road 2 and Road 3 to the right, Road 14 and Road 6 towards the middle, and Road 35 to the left as viewed in the photo-simulation. From Photo-point 2, Road 2 has the greatest vertical fill distance (approximately 4.7 m) and Road 14 the greatest vertical cut distance (approximately 10.7 m).

Effects on visual amenity values

Similar to the view from Photo-point 1 at Troup Road, Woodville, the magnitude of the effect of the turbines of the proposed TRHE is negligible in the view from Photo-point 2 owing to the distance of 11 km between the closest turbines and the viewing point (refer column 2, Table 2 above). The viewing point allows a good "side-on" view of the proposal, allowing all the proposed turbines to be seen from about the same distance.

The effect of the proposed TRHE on visual amenity is assessed as minor. This is because of the small scale of the proposed turbines relative to the visual bulk of the Tararua Range, the skyline appearing over ten times higher than the height of the proposed turbines. In addition, the foreground and middle distance hills of the intervening landscape distract attention away from the more distant Tararua Range skyline. While the cut and fill areas associated with the roading to turbines can be discerned in the photo-simulation from Photo-point 2, the photosimulation suggests that once vegetation has been established on cut and fill soil batters, and rock surfaces too difficult to vegetate have weathered, it will be reasonably difficult to see these excavated areas. Moreover, for much of the day, these generally south-east facing slopes will not be particularly well lit by direct sunshine.

It could not be said that the two-bladed turbines of the proposed TRHE and the much larger three-bladed turbines of Tararua Wind Farm Stage III could lead to visual confusion and lack of visual coherence. This is because the parts of the skyline occupied by these two kinds of turbines do not coincide, and they are sufficiently distant from the viewing point for this effect to be no more than minor. Such an assessment is supported by the generally positive response of people to wind turbines already constructed in the Tararuas where a range of overall turbines sizes and tower designs has been constructed.

5.3.3 Photo-point 3: Elevated portion of the Pahiatua-Mangahao Road

Driving west from Pahiatua towards Palmerston North along the Pahiatua-Mangahao Road, the road traverses a minor range of hills before descending to Mangahao. The prospect towards the Tararua Range is from almost the same angle as that from Photo-point 2 on the southern outskirts of Pahiatua. However, the proposed TRHE is only 6.3 km distant from here rather than over 10 km.

From this closer location, fewer of the two-bladed turbines of the consented Te Rere Hau Wind Farm can be seen (12 rather than 19). Five of the taller Tararua Wind Farm Stage III turbines are more distinctly visible (refer Attachment 5, upper panel).

Visibility of the proposed TRHE

Approximately the same number of the proposed TRHE turbines are visible from Photo-point 3, and to the same extent, as when viewed from the southern outskirts of Pahiatua (Photo-point 2). Similarly, they coincide with the turbines of the consented Te Rere Hau Wind Farm, and extend to the right and to the left of these as viewed (refer Attachment 4, lower panel).

As for the view from Photo-point 2, there will be visibility to roads and to cut and fill slopes associated with roads, including Roads 2, 3, 6, 14, and 35. These can be discerned in the photosimulation of the proposal from Photo-point 2.

Effects on visual amenity values

At a distance of 6.3 km from the closest of the turbines of the proposed TRHE, the magnitude of effect can be regarded as being "present" but close to the boundary of being negligible in the view (refer column 2, Table 2 above), i.e. present in the view but potentially going unnoticed. They are not located at a distance at which turbines of these dimensions achieve prominence.

Visual amenity from Photo-point 3 is strongly influenced by the prospect down to the valley floor and hills that occupy the space between the observer and the Tararua Range. This is a pleasant vista of rounded low hills with patterns of pasture and forestry plantings, and the plains surrounding the Mangahao River. The presence of turbines on the more distant skyline does not detract from the high amenity value of the scene.

When looking over the foreground and middle distance, the effect of the turbines on visual amenity is generally minor. Their effect might, however, become more moderate under particular conditions of lighting, for instance, when the foreground is obscured and the skyline accentuated, such as towards sunset. While the turbines might be seen as having a moderate effect under these conditions, the effect on visual amenity would not be substantial. Moreover, this might not be perceived as an adverse moderate effect because wind turbines have become an established feature of the Tararua Range.

While the cuts and fill areas associated with the roading to turbines can be discerned in the photosimulation from Photo-point 3, the simulation suggests that once vegetation has been established and rock surfaces have weathered, it will be reasonably difficult to see these excavated areas.

The fact that some of the turbines of the proposed extension extend the line of turbines further along the Range than has previously been seen might lead to a minor adverse effect from this photo-point. However, the lack of overlap between the length of the skyline affected by the three-bladed turbines and the smaller two-bladed turbines will remain distinct, helping to reduce visual confusion.

5.3.4 Photo-point 4: Post Office Road on the outskirts of Ballance

From this photo-point there is an almost uninterrupted view directly from the fertile floodplains towards the Tararua Range, except where shelter trees are planted close to the roadside. This is similar to the view from Photo-point 1 (Troup Road, Woodville) except that the foot of the Range is closer (2 km rather than approximately 5km).

The turbines of the proposed TRHE are seen at roughly half the distance. Consequently, this is a photo-point from which the effect of the proposed development on visual amenity as a result of the size of the towers and rotor blades of the Tararua Range skyline might be most marked. However, by approaching closer to the foot of the Tararua Range, turbines are progressively lost from view as they are obscured by hills in the middle distance.

The photosimulation of the Tararua Range showing all currently consented wind farms of Te Rere Hau and Tararua Wind Farm shows the relatively tall turbines of Tararua Wind Farm Stage III (towers and some blades partially obscured) and a few (8) turbine rotors and tops of towers of the consented Te Rere Hau Wind Farm, which protrude slightly above the skyline (refer Attachment 6, upper panel).

Visibility of the proposed TRHE

Unlike the visibility of the proposed turbines from the Pahiatua-Mangahao Road (Photo-point 3) or from Pahiatua (Photo-point 2), only 31 turbines can be seen because of the closeness of the observation point to the Range, 21 of these as whole rotor assemblies. Other turbines visible from a greater distance have become obscured by intervening spurs and the ridgeline of the Range itself.

Turbines of the proposed TRHE that are visible appear on either side of the place on the skyline where the tops of the rotor blades of the consented Te Rere Hau Wind Farm can be seen (refer Attachment 6, lower panel). There are also two areas where excavation and fill associated with roading will be visible associated with Roads 2 and 3 to the right as viewed, and Road 35 more distantly to the left.

Effects on visual amenity values

At a viewing distance of 4.1 km, the turbines of the proposed TRHE are present in the view, although close to being prominent in terms of magnitude of effect (refer column 2, Table 2 above), i.e. towards being clearly visible and important, although not a defining element of the view. This would be an appropriate description for the magnitude of the effect of the proposed turbines. As for Photo-point 3, the appearance of the turbines of the proposed TRHE would become more prominent at sunset when the foreground might be obscured and skyline highlighted. However, it would not be appropriate to regard the turbines as dominant in the view under these circumstances.

The excavation associated with roading used to access turbines will be reasonably obvious soon after construction. It is anticipated that these will become progressively less obvious as pasture vegetation becomes established and exposed rock weathers. While the surfaces might still be discernible, from this distance it is assessed that the potential adverse

effects on visual amenity will be no more than minor, partly because cuts and fill surfaces associated with roading in the Tararua Range are a familiar occurrence, e.g. to the side of farm tracks and public roads.

The significance of the effect of the proposed turbines on amenity values is minor because the skyline itself and the bulk of the Range become dominant under these conditions, rather than the turbines that are sited on or close to the skyline. The view into which it is proposed to introduce the turbines of the proposed TRHE already contains wind turbines. Wind farms already in operation have become part of the accepted view of the Tararua skyline, in which case the addition of the proposed turbines will do no more than make a relatively small addition to an established expectation.

5.3.5 Photo-point 5: Junction of North Range Road and the Pahiatua-Aokautere Road at the saddle of the Tararua Range (1.1 km)

The road that ascends from the Pahiatua side of the Tararua Range towards the saddle at the top of the range is generally tortuous, and the only extensive area to pull off the road and view the scenery is in the vicinity of Photo-point 5. At this point there are magnificent, expansive views to the plains to the east and west, as well as to the northeast along the ridgeline of the Range. People often break their journey here to enjoy the views. It is also situated at the junction with North Range Road, which is used for sightseeing, walking, and other recreational pursuits.

The photosimulation of the Tararua Range including all currently consented wind farms shows that the turbines of the Tararua Wind Farm and the Te Rere Hau Wind Farm are not visible (refer Attachment 7, upper panel), except for the tip of the rotor of one Te Rere Hau turbine visible to the left of the radar dome as viewed, which might go unnoticed. The scene is dominated by the rolling swells of the intersecting hills and gullies of the range top, the shelterbelts and isolated trees that show the effects of the prevailing wind, and isolated farms buildings and sheds. The presence of the prominent radar dome and radio masts further accentuates the elevated nature of the site. A young forest tree plantation is evident in a wide band in the middle distance to the right.

From this photo-point, the ridgeline of the Tararua Range is seen to be unexpectedly wide: a collection of rounded hilltops, plateaux, and gullies rather than a sharp divide as suggested by observation from the surrounding lowlands.

Visibility of the proposed TRHE

Parts of 17 turbines are visible in the photosimulation from Photo-point 5. However, the rotor assemblies and the turbine towers are generally obscured by the hills on the ridgeline (refer Attachment 7, lower panel). No roading associated with the proposed development will be visible as shown in the photosimulation.

Effects on visual amenity values

Because the proposed TRHE is generally set back at least 1.8 km from Photo-point 5, the turbines that are visible will typically be a prominent component in the view to the northeast (refer column 2, Table 2 above). However, they will be subordinate to the landform on which they will be

placed, which is a wide expanse of hilltops and plateaux. The collection of proposed turbines is seen to occupy only approximately a small proportion of the skyline of this upland area. In addition, the focus of attention in the view from this position (not shown in the simulations except partly to the east) is the prospect to the Manawatu in the west, and to the Tararua lowlands in the east rather than along the ridgeline towards the proposed TRHE.

Apart from the rotor blades of one turbine in the consented Te Rere Hau Wind Farm, the proposed TRHE is the only wind farm that is visible from this viewpoint. There is little possibility of loss of visual coherence or cumulative effect resulting from the visual overlap of the proposed turbines with others in the area. Instead, the effect of the proposed TRHE is to make turbines visible from this photo-point that were not readily discernible before. Considered in this light, the appearance of turbines, albeit only prominently rather than dominantly placed, would be of moderate significance for the visual amenity values.

Depending on the attitude of the viewer towards wind farms in general, this effect might be considered beneficial or adverse. A range of responses could be expected. Those wanting to view the turbines of a wind farm might well find the view improved by the addition of these turbines, adding to recreational opportunities in the region. North Range Road offers a convenient way for people to drive or walk closer to view a wind farm in operation. The Pahiatua-Aokautere Road is a well developed carriageway that would assist in such an activity, much as the less well developed Saddle Road in the Ruahine Range allows people a close prospect of the Te Apiti Wind Farm turbines in operation. Conversely, those who would prefer to see the tops of the Tararua Range completely devoted to grazing and other traditional rural land uses, albeit already affected by numerous radio masts and a radar navigation dome) would find the turbines of the proposed TRHE adversely affect visual amenity.

To moderate these potential points of view, even though turbines were not originally visible from this point, the observer would have been aware of the presence of turbines in the Range when approaching from either the Manawatu or Tararua District. The turbines of the wind farms of the Tararua Range are also part of the local cultural consciousness. In addition, the view from Photo-point 5 is not that of a pristine landscape, but contains the cultural elements of a farmhouse, a radar navigation dome, and radio masts within its rural setting. Lastly, in scale the turbines appear to be far less tall and prominent than the pine trees growing on nearby and intervening hillsides.

In view of these considerations, on balance, the effect of the proposed TRHE will be of moderate significance from Photo-point 5, possibly as much positive as adverse in nature.

5.3.6 Photo-point 6: Ridgeview Road off Harrison Hill Road in the western foothills of the Tararua Range

Ridgeview Road rises up from Harrisons Road to give a view to the top of the Tararua Range relatively unobstructed by intervening hills and trees. The most prominent feature in the background is the swell of a hillside that extends out from the main range in a series of spurs and gullies. This hillside carries a dense stand of planted coniferous forest on its upper slopes, and gorse on the lower slopes. To the right, the skyline of the main

Tararua Range is visible some 2 km in the distance to the east. Rural lifestyle properties with individual dwellings scatter the lower slopes in the middle distance and along Ridgeview Road itself. Towards the upper limits of these slopes, a number of exposed earth cuts are currently visible where existing farm tracks and the North Range Road cross the field of view.

Two turbines (and a third, less prominent turbine) of the consented Te Rere Hau Wind Farm are visible above the closest ridge of the prominent hill mentioned above. No turbines of any other wind farm are apparent when viewing the Range from this photo-point (refer Attachment 8, upper panel).

Visibility of the proposed TRHE

None of the turbines of the proposed TRHE are visible in the photosimulation from this viewpoint (refer Attachment 8, lower panel).

Effects on visual amenity values

There will be no effect of the proposal on visual amenity.

5.3.7 Photo-point 7: Pahiatua-Aokautere Road in the western foothills of the Tararua Range

With respect to the proposed TRHE, this photo-point is almost diametrically opposed to Photo-point 4, which is 4 km from the nearest turbine viewed from Ballance on the eastern side of the Tararua Range. However, the views are very different. There is an almost uninterrupted view from Photo-point 4 directly from the fertile floodplains towards the Tararua Range. In contrast, from Photo-point 7 on the Manawatu side of the Range, the view is one of the steadily rising foothills receding into the distance, the main road route extending between the hills, a side road diverging to service one of a number of lifestyle subdivisions in the foothills, dwellings, and overhead electrical power lines and a pylon tower. In the background, the skyline of the Tararua Range is visible above this middle distance scene of domestication.

In the photosimulation of the Tararua Range showing all currently consented wind farms, only the turbines of the consented Te Rere Hau Wind Farm are visible (approximately 68 in number) (refer Attachment 9, upper panel). Broadly speaking these are visible on the ridgeline that runs between of a prominent hill covered in forest and gorse in the middle distance towards the forest block of the Aokautere Forest further to the left (as viewed). Trees and a hillside in the foreground obscure turbines that might otherwise have been visible in the Tararua Wind Farm further towards the Manawatu Gorge.

Visibility of the proposed TRHE

As for the view from Photo-point 6, none of the turbines of the proposed TRHE are visible (refer Attachment 9, lower panel).

Effects on visual amenity values

There will be no effect of the proposal on visual amenity.

5.3.8 Photo-point 8: Branksome Place off Polson Hill Drive in the foothills near Aokautere

Photo-point 9: Pacific Drive, Pacific Heights subdivision on the outskirts of Palmerston North

The views from these two photo-points are considered together as they share some similarities and are both located approximately 7 km from the nearest visible turbine in the proposed TRHE. However, most of the proposed turbines are not visible. Both photo-points are removed far enough from the Range to have a prospect that includes a number of different wind farm developments, although small variations in neighbouring hills heights and plantings can obscure the turbines of some of the wind farms. Photo-point 8 in Branksome Place has a relatively frontal view towards the proposed TRHE (refer Attachment 10, upper panel). From Photo-point 9 in Pacific Drive, the view to the Range is somewhat oblique (refer Attachment 11, upper panel). The land around these photo-points is being developed for lifestyle blocks and residential subdivisions, respectively. An overhead electricity transmission line is visually intrusive at the latter site.

From both photo-points, numerous turbines of the consented Te Rere Hau Wind Farm can be seen (89 and 68 for Photo-points 8 and 9, respectively). These extend in an unbroken line stretching generally between the distinctive edge of the Aokautere Forest on the left as viewed towards the radar dome on the right (more clearly visible in the simulations from Photo-point 8). The larger turbines of Tararua Wind Farm Stage III appear to meet those of the consented Te Rere Hau Wind Farm at the left.

Visibility of the proposed TRHE

From the photo-simulations from both photo-points, very few (5-6) of the turbines of the proposed TRHE are visible on the skyline, and the rotor assemblies of most of these are not wholly visible. In the photosimulation from Photo-point 8 (refer Attachment 10, lower panel), five turbines are visible, and for three of these the whole rotor assembly can be seen. However, the turbines are located in an area of the skyline currently occupied by the turbines of the consented Te Rere Hau Wind Farm. The proposed turbines that are visible are also further away from the photo-point (7.5 km) than the consented Te Rere Hau turbines. In other words they are behind the consented turbines and appear smaller.

In the photo-simulation from Photo-point 9 (refer Attachment 11, lower panel), only six of the turbines of the proposed TRHE are visible, the whole rotor assembly of only one of which can be seen. As viewed, these appear at the right hand end of the line of turbines of the consented Te Rere Hau Wind Farm, and extend this line slightly into a shallow saddle on the skyline at a distance of approximately 6.5 km.

There will be a small amount of newly constructed roading visible from Photo-point 8, but this will be not readily discernible. None of the proposed roading will be visible from Photo-point 9.

Effects on visual amenity values

At a distances of 6.5-7.5 km, and viewed hypothetically in isolation, the proposed turbines might be expected to be present in the view or to have

negligible magnitude (refer column 2, Table 2 above). However, to the extent that they can be seen in the photo-simulations, the few turbines are a minor addition to the turbines of the consented Te Rere Hau Wind Farm, which are of the same design.

Because of the context in which the additional turbines are visible, the significance of their effect is minor in the case of Photo-point 9. In the case of the photosimulation from Photo-point 8, in which the proposed turbines are behind those of numerous turbines in the consented Te Rere Hau Wind Farm, there effect will be negligible.

There is no loss of visual coherence resulting from the size and design of the proposed turbines because where they are located they appear to be, to the extent that they are noticeable, part or an extension of a group of turbines of the same design characteristics.

5.3.9 Photo-point 10: Junction of James Line and Napier Road (SH3) east of Palmerston North

The view from this photo-point is typical of those that might be had from a number of places along the more westerly portions of the road between Ashhurst and Palmerston North. This is one of the best views of wind farm developments in the Tararuas because it is close enough for many people to be able to see the detail of skyline developments with the naked eye, yet far enough away not to have the view obstructed by foothills. Photo-point 10 is also slightly elevated above the fields of horticultural crops in the foreground.

Turbines of the Te Apiti, Tararua (Stages I-III), and consented Te Rere Hau Wind Farms are visible, spread through a wide viewing angle in the distance. These range in size, and tower and rotor blade design, and are set in a landscape that here is seen as predominantly pasture with a pattern of large and small forestry blocks and shelter plantings.

The consented Te Rere Hau Wind Farm occupies a position towards the right hand side of the array of all currently consented wind farms, as the skyline begins to descend towards the place where the Pahiatua-Aokautere Road crosses the saddle in the Tararua Range (refer Attachment 12, upper panel).

Visibility of the proposed TRHE

No turbines of the proposed TRHE will be visible to the right of the block of turbines in the consented Te Rere Hau Wind Farm. Most of the turbines of the proposed TRHE are completely obscured by the landform on the skyline. Approximately 11 of the proposed turbines are visible to the left of those of the consented Te Rere Hau Wind Farm at a distance of 8.9 km, appearing to extend the line of the consented turbines in this direction (refer Attachment 12, lower panel). There will be one small section of roading visible from Photo-point 10 although this will not be readily discernible.

Effects on visual amenity values

The proposed turbines are negligible in magnitude (refer column 2, Table 2 above). Given their relative lack of prominence, their visual coherence with the turbines of the consented Te Rere Hau Wind Farm, and the contrasting

array of established wind farms extending from close to the Pahiatua-Aokautere Road to and beyond the Manawatu Gorge, the proposed turbines are of negligible significance.

5.3.10 Outlook close to the War Memorial on the Palmerston North-Wanganui Road

This outlook is a well known stopping place on the road from Wanganui to Palmerston North and offers wide views into the land surrounding Palmerston North and the uplands where the Ruahine and Tararua Ranges meet. From this distance, the collections of turbines in the ranges can be almost indiscernible in hazy conditions, but generally the larger turbines are visible. It would be practically impossible from this distance, four times the distance of Photo-point 10, to be able to pick out the turbines of the proposed TRHE.

5.3.11 Summary of potential effects on visual amenity

Overall, the magnitude and significance of these potential effects, along with the approximate number of turbines that would be in view, can be summarised in the following points (refer also to Table 4):

- From the ten selected photo-points, the magnitude of effect of the turbines of the proposed TRHE (for those that are visible) will typically be negligible to present in the view, becoming prominent at distances of less than 4 km, such as when viewed from the saddle at the junction of North Range Road and the Aokautere-Pahiatua Road. None of the turbines will appear dominant in views (unless deliberately approached).
- The effects on visual amenity resulting from the development when taken in the context of the surrounding landscape and other wind farm developments are generally of minor significance.
- No effect on visual amenity resulting from the proposed TRHE will be substantial.
- Some visual amenity effects might be positive, such as the ability to view wind turbines from close proximity if desired, a pastime enjoyed at the Te Apiti Wind Farm in the Ruahine Range.

Table 4. Summary table of visibility of consented wind farms, the visibility of the turbines of the proposed Te Rere Hau TRHE, and the magnitude and significance of potential effects on visual amenity.

		Proposed Te Rere Hau TRHE								
Photo-point	Consented wind farms visible from photo-point	GENERAL LOCATION	TURBINES VISIBLE (those obscured by trees shown in parentheses)				DISTANCE to closest visible turbine (km)	MAGNITUDE of effect	SIGNIFICANCE for visual amenity	
			Total – any part	Whole rotor and nacelle	Nacelle, not whole rotor	Blade tip, not nacelle				
1. Troup Road, Woodville	Te Apiti Tararua Te Rere Hau	Coincident with turbines of the consented Te Rere Hau Wind Farm, and extending mainly to the left, and slightly to the right, as viewed.	38	23 (1)	8 (2)	7 (5)	9.6	Negligible	Minor	
2. Kaitawa Road, Pahiatua	Te Rere Hau Tararua	Coincident with turbines of the consented Te Rere Hau Wind Farm, and extending mainly to the right, and slightly to the left, as viewed.	47	40	4	3	10.3	Negligible	Minor	
3. Pahiatua-Mangahao Road	Te Rere Hau Tararua (part)	Coincident with the turbines of the consented Te Rere Hau Wind Farm, and extending to the left and right.	44	40	0	4	6.3	Present	Minor to moderate	
4. Post Office Road, Ballance	Te Rere Hau Tararua	Flanking either side of the few turbines of the consented Te Rere Hau Wind Farm visible on a low-lying section of skyline.	31	21	6 (2)	4 (1)	4.1	Present	Minor	
5. Junction of the Pahiatua-Aokautere and North Range roads	Te Rere Hau (one turbine tip)	On the skyline to the right of the radar dome as viewed.	17	2	5	10	1.8	Prominent	Moderate	
6. Ridgeview Road, Aokautere	Te Rere Hau		0	0	0	0	-	Not visible	No effect	
7. Pahiatua-Aokautere Road	Te Rere Hau		0	0	0	0	-	Not visible	No effect	
8. Branksome Place, Aokautere	Te Rere Hau Tararua	Behind a small section of the consented Te Rere Hau Wind Farm.	5	3	1	1	7.5	Negligible	Negligible	
9. Pacific Drive, Palmerston North	Te Rere Hau Tararua (part)	Extending the line of turbines of the consented Te Rere Hau Wind Farm slightly, towards the right as viewed.	7	1	2	4	6.5	Present	Minor	
10. Junction of Napier Road & James Line	Te Rere Hau Tararua Te Apiti	Extending the line of turbines in the consented Te Rere Hau Wind Farm, slightly towards the left as viewed	11	7	2	2	8.9	Negligible	Negligible	

5.4 Assessment of landscape effects

The landscape effects of the proposed TRHE relate to how the change associated with the development might potentially affect how people experience that landscape, its unique qualities, sometime referred to as its sense of place. These effects can be captured by describing the elements that go to make up the character of the landscape, and how these might be affected by the development.

Because landscape character is a holistic concept, including biophysical and cultural elements, it does not relate as strongly to the photo-point in a particular direction as shown in the photo-point simulations used to assess visual amenity effects. However, these photosimulations contain the landscape elements associated with the four broad landscape character areas identified above (refer section 3.2).

The assessment of the effects of the proposed TRHE on landscape character will be discussed with reference to these four areas.

5.4.1 Effects on landscape character in the lowlands to the east of the Tararua Range

The landscape character on the lowlands to the east of the Tararua Range (represented in the upper images of photo-simulations in Photo-points 1-4) is predominantly rural. The rural character of the landscape immediately to the south of Woodville, such as near Troup Road (refer Attachment 3, Photo-point 1), is strongly influenced by the extensive pasturage developed on the fertile, visually flat valley floor. Paddocks are noticeably separated by stock fences typical of lowland farms, and bands of evergreen and deciduous trees. These trees are also an important part of the rural character of the landscape, offering protection and shelter for stock from the wind, and contrasting with the plain of the paddocks. The bands of trees only partially obscure the continuing prospect of the pasture extending into the distance across the fertile valley floor. The trees also partly obscure the Tararua Range, especially towards the southwest as the Range recedes into the distance. The Range is more obvious towards the Manawatu Gorge. Further enclosing hills and low ranges, with planted forestry blocks, are evident especially to the east, in a landscape that includes agricultural buildings and sheds, and occasional individual dwellings amongst the paddocks.

This pattern of productive valley floor pasture, stock fences, shelter trees and small forest blocks on low hills, and agricultural structures is also evident in the vicinity of Ballance (refer Attachment 6, Photo-point 4). Here, as from Woodville to the northeast, the Tararua Range is again seen as the backdrop in the west to this working rural landscape.

Closer to Pahiatua, the landscape is more that of a rural settlement, with a greater density of housing and roads, along with commercial buildings and factories. The landform is more broken by low hills (refer Attachments 4 and 5, Photo-points 2 and 3), and there is not the same contrast between level plain and surrounding hills as seen near Ballance and Woodville.

Potential effects on landscape character to the east of the Tararua Range

As described above the rural landscape with its small rural settlements immediately east of the Tararua Range depends for its sense of place on a combination of elements associated with farming practices, which themselves are shaped by variations in landform. It is a landscape enclosed by hills in the middle distance. The Tararua Range is a backdrop to the west, which is more or less noticeable depending on the location and extent of level ground at its base. Wind farms have become an accepted part of the skyline in this northern section of the Range.

The development of the proposed TRHE will result in a number of associated turbines becoming visible from various points in the landscape of the Tararua Range. However, this will have no more than a minor effect on the character of this rural landscape because the local elements of paddocks, fences, shelter trees, woodlots, farm buildings and settlements as described will not in themselves be changed. They are the elements that determine the sense of place. It is a relatively enclosed landscape strongly determined by its own visual elements. Moreover, the Tararua Range is a somewhat separate backdrop, an accepted part of which is the presence of turbines of existing wind farms.

5.4.2 Effects on landscape character in the uplands of the Tararua Range

In the uplands of the Tararua Range close to the proposed TRHE the landscape character is predominantly rural with an open, expansive nature resulting from the upland location and relative absence of trees. The working rural landscape contains hilltop infrastructure elements of the radar dome and telecommunication aerials (represented in Photo-point 5, Attachment 7), and the North Range Road itself. There are uninterrupted views to the east and west that the traveller can experience after the ascending from either side of the Range. The view northwest from the Pahiatua-Aokautere Road car park along the ridgeline towards the radar dome and telecommunications masts does not currently contain any wind turbines. However, walking or travelling only 1-2 km along the North Range Road would bring the turbines of the consented Te Rere Hau Wind Farm and the taller ones of the Tararua Wind Farm into view.

Potential effects on landscape character in the uplands of the Tararua Range

Development of the proposed TRHE would add wind turbines to a landscape where none were visible before, at least from the car park at the saddle on the Pahiatua-Aokautere Road. It might be said that this addition constitutes to an adverse effect on the rural landscape character, introducing an industrial element in a landscape that features predominantly traditional agricultural activities in an apparently natural environment. However, the landscape is already highly modified by land clearance and planting of introduced species and their management for production purposes. Moreover, infrastructural elements in the form of a ridgeline road, a radar dome, and telecommunication aerials are also evident. This elevated location has been long used for the purpose of siting activities that can most appropriately be located on the ridgeline. The latter activities have not detracted from the sense of place resulting from the openness, and eminence from which to enjoy the expansive views.

The proposed turbines are set back at least 1.8 km from the main road, some of which are prominent, but not dominant, elements in the view.

They are also not large turbines relative to many others in the district. They will therefore not obstruct views to the lowlands below, nor will their presence dominate the experience of standing on the highest point of, or driving along, the Pahiatua-Aokautere Road. Moreover, the person travelling along the Pahiatua-Aokautere Road from either the Pahiatua or Aokautere sides would be well aware of the presence of turbines in the Tararua Range. It would therefore not be an unfavourable surprise to see turbines from the summit of the road.

For these various reasons, the turbines and other developments associated with the proposed TRHE will have no more than a minor effect on existing landscape character at this location.

5.4.3 Effects on landscape character in the foothills to the west of the Tararua Range

The landscape in the foothills to the west of the Tararua Range has a working rural character into which have been increasingly introduced elements of settlement and domestication (represented in Photo-points 6-9, Attachments 8-10). Residential lifestyle properties and more settled residential areas have been developed, and residential subdivision is occurring at the rural margin on the outskirts of Aokautere and Palmerston North. Lifestyle and more urban residential developments, coupled with roading and other infrastructural elements, such as overhead electricity lines, give the foothills a rural-residential character rather than working rural landscape character.

Domestication is more evident closer to the bottom of the foothills, to roadways, and to settled areas. The landform elements of descending spurs, ridges, and valleys makes for a relatively enclosed landscape, rather than an open or expansive one with visibility tending to be obscured by hills, scrub growth, shelter, and tree plantings. Even so, residential developments tend to be located where views can be had to the Manawatu Plains and/or the Tararua Range.

The existing turbines of the Tararua Range are a distinctive part of the landscape, visible from many locations in the foothills. They might be regarded as being in keeping with the rural-residential character and the presence of overhead power lines in parts of the foothills, or as part of the working rural landscape of the upper parts of the Range where they contribute to other rural activities by utilising the renewable resources of the area.

Potential effects on landscape character in the foothills to the west of the Tararua Range

The turbines of the proposed TRHE will not be visible from a number of locations in the foothills as noted above (refer Sections 5.3.6 and 5.3.7). From viewpoints where they will be visible, the magnitude of this visibility is assessed as present, not prominent, i.e. not important in the view. A far greater feature of the landscape is the development associated with the already consented or constructed turbines of the Te Rere Hau and Tararua wind farms. These are generally prominent on the upper, western slopes of the Tararua Range. They add to the existing character in the ways suggested in the previous section.

Although taken in isolation, the turbines of the proposed TRHE will be present in the view, they might go unnoticed in their effect on landscape character given the numerous other turbines already in view. Overall, the elements of landscape character of the foothills will be affected to no more than a minor extent by the proposed TRHE because these rely on the unchanged underlying enclosing topography, working rural activities, and the presence of rural residential developments.

5.4.4 Effects on landscape character in the lowlands to the west of the Tararua Range

The landscape character on the lowlands to the west of the Tararua Range is predominantly determined by a mix of extensive and intensive rural activities developed on a patchwork of rectilinear fields and shelter plantings. Set within this are the major urban centre of Palmerston North and smaller settlements such as Ashhurst and Feilding, which along with their industrial, research, and educational establishments, add to a sense of domestication. The urban influence is also seen in extensive and numerous residential subdivisions, recent rural-residential lifestyle property developments, and more traditional rural properties at the fringes and between the settlements.

The Tararua Range is a prominent element in the landscape, although the ridgeline of the Range is somewhat distanced from the lowlands by the intervening foothills. As suggested above, the Tararua Range between Palmerston North and the Manawatu Gorge does not generally affect the elements that contribute to the character of the landscape of the Manawatu Plains. Here the Range is of low elevation relative to parts of the axial ranges to the north and south, and carries an unremarkable land cover predominantly of pasture and introduced forest trees most typical of a rural landscape rather than indigenous forest cover seen in other parts of the Range. For these reasons, the turbines already located on the skyline and slopes of the Tararua Range have added to its significance and prominence visually, as well as becoming a highly visible expression of power generation from a renewable energy source.

Potential effects on landscape character in the lowlands to the west of the Tararua Range

Given the continuity of rural, urban fringe and essentially urban activities on the lowlands to the west of the Tararua Range, the placement of the turbines of the proposed TRHE will have negligible effect on landscape character. The Tararua Range is an important backdrop to activities carried out on the lowlands, and part of that backdrop is the development of several wind farms with their turbines that have been built or are currently being built. As noted in the previous section, the turbines have added greater prominence to this relatively low section of the Tararua Range. If the turbines of the proposed TRHE were to be noted from the lowlands to the west of the range (and they are not prominent; refer section 5.3.11), their effect on landscape character would be negligible.

5.4.5 Summary of potential effects on landscape character

Potential effects on landscape character of the proposed TRHE were assessed for four different locations differing in existing landscape character. In all cases, the potential effects on landscape character were generally assessed as no more than minor because:

- Elements contributing strongly to landscape character that are not related directly to wind farm developments will not be affected by the proposal and would continue to assert their influence on landscape character despite the proposed development;
- Wind turbines have become a part of rural and rural-residential landscape character in this part of the Tararua Range.

5.5 Potential cumulative effects

Cumulative effects of wind farms are of “growing relevance and recognition” or even a “key issue” in the Tararua Range.⁵⁶ There are a number of ways to consider the potential for an adverse cumulative effect of wind farms, including reference to stages of development of a wind energy landscape and potential to absorb multiple developments. These matters were canvassed earlier in this assessment (refer Section 5.1.4).

As already assessed, the landscape of the Tararua Range when viewed from the Manawatu and Pahiatua plains is one in which wind energy development has become a significant characteristic of the landscape, i.e. the landscape has the character of a Stage 2 wind farm landscape (the landscape contains a number of wind developments / a significant number of turbines). However, given the minor significance of the effect of the proposed development on the character of the landscape, the generally minor effects on visual amenity, and the clear distinction between the lowlands and the range, the proposed TRHE would not cause the landscape of the plains to cross a threshold into a wind energy landscape (Stage 3). Addition of the turbines of the proposed TRHE would not cause wind development to become the dominant characteristic by which the landscape would be described when viewed from these localities. In the respect of not crossing this threshold, the proposal would not lead to a significant cumulative effect.

To add further support to this assessment, the turbines of the proposed TRHE are of the same design as those of the nearby consented Te Rere Hau Wind Farm, and they will appear to be grouped with this existing wind farm. This will further minimise the effect of any potential cumulative effect by reducing the noticeability of the change.

The grouping of similar turbines in the consented Te Rere Hau Wind Farm and the proposed TRHE will also be separated from the turbines of intermediate stature in Stages I and II of the Tararua Wind Farm (refer Photo-points 1-4 and 10, Attachments 3-6 and 12). This will also help to minimise any potential adverse cumulative effect.

The largest six turbines at the southern extremity of the Tararua Wind Farm (Stage III), although relatively close to the proposed TRHE, are quite different in appearance, size, density, and placement (being apparently set somewhat back and to the west of the ridgeline). In this respect, they appear as a different “species” of wind turbine from those that are being proposed, and in the consented Te Rere Hau Wind Farm. The result is one of contrast rather than a cumulative effect.

Consideration will now be given to the potential cumulative effect of the TRHE on the landscape as viewed from within the Tararua Range, specifically the junction of the Aokautere-Pahiatua Road and North Range

⁵⁶ Parliamentary Commissioner for the Environment (2006). *Wind Power, People, and Place*, p. 89.

Road (Photo-point 5). From here there is a small but potentially unnoticed visibility to the rotor of one turbine within the consented Te Rere Hau Wind Farm. Essentially, the view from this location will change from one in which wind energy developments are not apparent (or only to an insignificant extent) to one in which turbines of a wind energy development will be prominent and have a moderate effect on visual amenity. In this respect the landscape will enter the table that considers cumulative effects as a Stage 1 wind energy landscape and can be considered as a change isolated from other wind farm developments. As such, this does not constitute a cumulative effect.

The above considerations refer to potential cumulative effects in relation to wind farms located between the Pahiatua-Aokautere Road and the southern Ruahine Range, which can generally be seen in the same field of view (combined visibility) from numerous locations on the surrounding lowlands. The turbines of the consented Motorimu Wind Farm to the south of Palmerston North will be separated from those of the proposed TRHE (and turbines in consented wind farms) by at least 13 km. From viewpoints on the Manawatu Plain it is possible that there will be simultaneous visibility to some of the turbines of the Motorimu Wind Farm and the proposed TRHE within the same field of view, as well as to a number of other wind farm developments. Such combined visibility would be possible only at distances from the foot of the Tararua Range comparable to that of Photo-point 10, for instance on some sections of SH57. However, from this distance the turbines of the proposed TRHE would be negligible in magnitude (as they are from Photo-point 10). Moreover, the turbines of the proposed TRHE are located in Tararua District and the majority are not visible from the Manawatu. Therefore, it is unlikely they will cause a cumulative adverse effect.

It is also possible that from closer quarters there will be successive visibility (in facing in different directions from the same viewpoint) of turbines in the Motorimu Wind Farm and those in the proposed TRHE. However, the effect of this successive visibility is likely to be no more than minor because the wind farm developments are separated by the visually complex landscape of the Tararua Range foothills.

For these various reasons, the potential for significant cumulative effect resulting from the proposed TRHE is assessed as minor.

The potential for further wind farm development through the proposed Turitea Wind Farm, which is generally located between the Motorimu Wind Farm and the Aokautere-Pahiatua Road, will now be considered. It is believed that this proposal involves the construction of turbines with an overall height of 131 m to approximately 1 km of this road. Leaving aside the potential effects of the Turitea Wind Farm proposal in its own right, it is likely that there will be combined visibility of wind energy developments (Turitea, Te Rere Hau and TRHE wind farms) on the approach to the Tararua Range from the east, and successive visibility (moving the head to see each in turn) of the Turitea and TRHE wind farms from the saddle at the junction of North Range Road. This would result in a cumulative effect at the latter saddle area (generally in the vicinity of Photo-point 5), which would could then be regarded as Stage 2 in terms of the landscape of wind energy development. This effect might, or might not, be considered as being a more than minor adverse effect depending on the details of turbine location and visibility of the Turitea Wind Farm proposal.

5.6 Synthesis and key implications for landscape and visual effects

Landscape and visual amenity issues were artificially separated for the purposes of carrying out a systematic examination of the potential effects. The effects of the proposed development on both landscape character in different locations and visual amenity from selected photo-points were assessed as generally minor, achieving moderate significance only from closer observation or under certain conditions.

This is not to say that all people would judge the potential effects as minor or moderate because long association with the landscape and visual amenity of the district might result in any change being seen as a more than minor or moderate adverse effect. Conversely, some people might see the erection of turbines within easy walking distance from, but not dominating the scene at, the car park at the junction of Pahiatua-Aokautere Road and North Range Road as a positive effect on visual amenity.

A key moderating influence for this assessment is the existing important place of wind farms and their turbines in the Tararua Range and the southern limit of the Ruahine Range. To judge by surveys of public opinion (refer section 1.3), although their presence has not been welcomed by all, they have become a part of the landscape and add to the sense of place for people on both sides of the ranges. Having wind farms as a distinctive part of the landscape does not necessarily mean that there is not potential for there to be adverse cumulative effects. However, for the reasons given above, it is unlikely that more than minor adverse cumulative effects will result from the proposed TRHE.

6. PROPOSED TRHE IN THE CONTEXT OF RELEVANT STATUTORY AND POLICY DOCUMENTS

The effects of the proposed TRHE are now considered in the context of the relevant statutory documents and policies. The reason for doing this is that these provide the parameters against which the effects of the proposal on the landscape are assessed. There is a common thread to all of the statutory documents where they defer to RMA Sections 5, 6 and 7. Generally, these seek to protect outstanding natural features and landscape, and to maintain and enhance amenity values at the same time as allowing for change in the landscape to fulfil the purpose of the Act. There are, nonetheless, differences between them on how these sections of the Act are achieved. Therefore, this summary considers each document in turn, from which conclusions are drawn with regard to how their provisions apply to the proposal.

6.1 Tararua District Council Plan

In relation to landscape and visual matters, the Tararua District Plan discusses how to achieve a balance between the vitality of the rural area and the requirement to maintain its character. The District Plan states that this balance shall be provided for by locating activities that require a rural location in the rural area. In this respect the location of the proposed TRHE in the rural area of the Tararua Range is consistent with the District Plan, since an elevated, open space location such as that provided in the rural area is required for such an activity. The District Plan also encourages the sustainable use of natural and physical resources, with which the proposed TRHE is also consistent.

In Section 2, the District Plan also identifies the need to achieve a high level of environmental quality and amenity by ensuring any actual or potential adverse environmental effects of activities are avoided, remedied or mitigated. The District Plan regards amenity values as giving an area its particular identity, including the elements which constitute the character of the area, its landscapes and views. As detailed above, the effects of the proposed TRHE are not expected to have any more than a minor effect on landscape character in the Tararua District. Although some of the turbines will be prominent, the effects on visually amenity are assessed to be of minor significance except when viewed under certain conditions when they might achieve minor to moderate significance.

In seeking to protect important natural features and landscapes from inappropriate subdivision, development or use, the District Plan identifies the ridgeline of the Tararua Range skyline for its scenic values particularly when viewed from adjacent plains. In the assessment carried out above, the skyline of the Tararuas already features prominent turbines which have become part of the character of the landscape of the Tararua Range. As such, the proposed TRHE will be consistent with the preservation of that skyline viewed from the adjacent plains. A small number of turbines of the the proposed TRHE will also be in view from the ridge top itself (at the saddle of the Pahiatua-Aokautere Road). From this vantage point the turbines of the proposed TRHE will not be part of the scene on the skyline "from the adjacent plains".

6.2 Palmerston North City Council Plan

Similar to the Tararua District Plan, the overall objectives for the Palmerston North City Council Plan seek to protect landscape and visual features that include visual amenity, outstanding landscapes, and rural character while promoting the sustainable management and development of physical resources.

In the Rural Zone, Objective 2 encourages the effective and efficient use and development of the natural and physical resources of the rural area, which the proposed TRHE would constitute. Policies intended to achieve this objective point out that adverse effects of such activities in the rural area are to be avoided, remedied or mitigated such that the amenities of the area and nearby urban areas are maintained. As detailed above, the potential effects of the proposed TRHE are assessed as being generally of only minor significance. Greater adverse effects have been avoided by locating turbines in a section of the Rural Zone that is distant from urban areas. In addition, a number of mitigation measures related to the proposed development are intended that will further minimise adverse effects on visual amenity.

Rural Zone Objective 3 seeks to enhance the quality and natural character of the rural environment by encouraging the adoption of sustainable land use practices, and controlling adverse visual effects on the rural environment. The proposed TRHE is assessed as having an insignificant effect on landscape character. The natural character, in terms of the living rather than constructed elements that make up the landscape, will be largely unaffected apart from where turbines themselves are located and a limited area needed for access roads. The natural character resulting from pastoral activities will be essentially unaffected. The need to protect the amenity values and general ambience of the rural environment from any adverse effects is also mentioned by way of explanation. Visual amenity and landscape character will generally not be affected to more than a minor extent by the proposal.

No specific mention of the skyline of the Tararua Range as a significant feature of the landscape is made in this Plan.

6.3 Manawatu-Wanganui Regional Council (Horizons) Regional Policy Statement and other regional matters

The character of the Manawatu-Wanganui Region is seen as deriving from its landscapes, habitats, and natural and cultural heritage, with landscape being the most immediate of these.

The two issues for natural and cultural features most relevant to landscape are the loss or degradation of regionally significant natural features and landscapes that contribute to the character and identity of the Region, and the identification and evaluation of regionally significant heritage resources, including characteristic landscapes. These resources are valued for their amenity, scenic, historic, spiritual, or intrinsic value.

In summary, objectives and policies identify the skyline of the Tararua Range as an outstanding and significant component of the regional landscape that adds to its character. The Ranges achieve this status because of their scenic qualities, which spring from their prominence and contrasting backdrop with the Region's plains.

The values and attributes of the Tararua Range are to be protected from inappropriate subdivision, use and development, taking into account the degree to which the activity provides for the social or economic well-being of people and communities, and ensuring adverse effects on the landscape are avoided, remedied or mitigated.

As noted above, the skyline is not expected to be affected in more than a minor way by the proposed TRHE. On the other hand, the proposal will help provide for the social well-being of the community, and adverse effects, such as they are, will be avoided and mitigated to the fullest extent possible.

Wind farm turbines are an established part of the skyline of the Tararua Range and might well add to its prominence in the locality in question. Interestingly, the Regional Policy Statement notes that landscape itself is changing over time as physical, ecological and cultural components are adapted to suit community needs. Along with this physical change, the "collective cultural memory" also changes over time, keeping pace with changes in the landscape. The introduction of wind turbines in the Tararua Range constitutes a good example of this adaptation to change since the skyline was valued before turbines were introduced, and continues to be valued since their introduction.

That the landform of the Tararua Range is such a dominant feature of the landscape that it can express its distinctiveness and retain the scenic value of its skyline regardless of the addition of wind turbines is a less plausible explanation for the general acceptance of wind energy turbines at or close to the skyline. As noted above, the elevation and prominence of the Tararua Range is not great in the vicinity of the wind farm development compared to their development further south. Addition of wind turbines in this locality might well have added to their significance in the landscape.

The scope of the Horizons Proposed One Plan includes the protection of outstanding landscapes, again drawing attention to the balance to be struck between infrastructural development, including renewable energy, and the protection of outstanding landscape. As for the Regional Policy Statement, the skyline of the Tararua Ranges is listed as an Outstanding Natural Feature and Landscape for its visual and scenic characteristics, particularly its prominence throughout much of the Region and its backdrop vista in contrast to the Region's plains.

It is the skyline seen in prospect from within the lowlands that is considered outstanding, and not the parts of the Tararua Range itself where wind farms are currently located. Only selected, more elevated parts of the Tararua Range are shown as "Significant Landscape". The parts not shown as "significant" include all parts of the Tararua Ranges from the Manawatu Gorge at their northern limit to a point approximately 90 km to the southwest. This part of the Range includes the land that is the subject of the current TRHE proposal.

6.4 Resource Management Act 1991

The layout of the proposed TRHE, its details of design and proposed mitigation measures will address, as far as is practicable, Section 5(2)(c) regarding avoiding, remedying or mitigating any adverse effects on the environment.

Section 6(b) matters have been addressed above in relation to the protection of the skyline of the Tararua Range viewed at some distance from the lowlands, which has been identified as outstanding in the relevant Regional Policy Statement and Tararua District Plan.

Section 7 requires that in achieving the purpose of the Act, particular regard shall be had to several other matters. With respect to landscape and visual values and the potential effects of the proposal on these values, relevant other matters are the maintenance and enhancement of amenity values and the quality of the environment.

This report has considered visual amenity values. The proposed TRHE might enhance amenity values with respect to the recreational or tourist attraction of the Tararua Range. However, in general, it is difficult to assert that the proposed development will enhance visual amenity values, except possibly as viewed from the junction of the Pahiatua-Aokautere Road and North Range Road where there will be moderately significant effects. Its effect on visual amenity values will vary considerably depending primarily on viewing distance. The significance of these effects, generally ranging from negligible to minor, has been documented in this report, in which case visual amenity will be maintained.

7.0 CONCLUSIONS

This landscape and visual assessment has indicated that the potential adverse effects of the proposed TRHE will predominantly be no more than minor. Moreover, the potential for cumulative effects was considered and was also found to be no more than minor.

The proposed TRHE will be consistent with policy set out by the relevant regional and territorial authorities, particularly with respect to the preservation of the character of the existing skyline of the Tararua Range when viewed from the adjacent plains, and the effective use of the resources of the rural area by a land use that can be most appropriately located in the rural area.

With respect to Section 6(b) matters of the Resource Management Act, concern for the preservation of the Tararua skyline viewed from the plains has been indicated in regional and district plans, and not for the area of land on which it is proposed to develop the TRHE. Visual amenity will be potentially affected to predominantly no more than a minor extent, and in this respect the values associated with Section 7 matters will be maintained.

Overall, the proposed TRHE will have no more than minor effects on features of landscape or visual amenity.

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Appendix I:

PUBLIC ATTITUDES TO WIND FARMS

Overseas studies

Overseas studies of public attitudes to wind farms were recently reviewed.⁵⁷ In a Scottish survey of 1,810 residents living within 20 km of existing farms, there was a significant difference in attitude between anticipated effects and those actually experienced after construction.⁵⁸ Half of the people (54%) had anticipated no problems before construction. After construction, many of those who had earlier expressed negative expectations changed their minds and the number reporting no problems after construction rose to 82%. Adverse effects on the landscape were the commonest pre-construction concern, and visual impact was the biggest factor in the dislike of wind farms. The study found that people living closest to the wind farms tended to have the most positive attitude towards them. Of those who lived within 5 km of a wind farm, 45% said it had a positive effect compared with 17% of those who lived 10-20 km away. Similarly, a survey conducted in Victoria, Australia found that overall people had a positive attitude towards a nearby wind farm project (88%), and found the wind turbines "interesting" (94%) or "graceful" (74%) rather than "ugly" (5%).⁵⁹

Other research supports the view that anticipated adverse effects are generally greater than the actual effects of living near a wind farm, although the spectrum of opinion on the subject is very wide.⁶⁰ Part of that spectrum reflects a generally negative attitude towards wind farms, which is less frequently reported. For example, in the views of ten wind industry experts from Europe and the United States, several acknowledged public opposition to wind farms:⁶¹

*Although wind power produces electricity by a process that is clean, affordable, and available, one cannot easily dismiss the fact that in many places it has received an unexpectedly chilly reception from the public.*⁶²

Part of the negative spectrum of public opinion towards wind farms is believed to stem from a deep emotional attachment to landscape that is rarely expressed and difficult to assess efficiently in public surveys. Resistance to wind farms is bound up with memory:

⁵⁷ Ashby, M. (2004). *Wind's Up: Planning the Future Now*. Connell Wagner

⁵⁸ Brauholtz, S. and McWhannell, F. (2003). *Public Attitudes to Wind Farms: a Survey of Local Residents in Scotland*. MORI Scotland for the Scottish Executive. Edinburgh, Scottish Executive.

⁵⁹ Auspoll (2003). Survey undertaken for Pacific Hydro as reported in Ashby (2004).

⁶⁰ Warren, C.R., Lumsden, C., O'Dowd, S., and Birnie, R.V. (2005). Green on green: public perceptions of wind power in Scotland and Ireland. *Journal of Environmental Planning and Management* 48, 853-875.

⁶¹ Pasqualetti, M.J. (2002). Living with wind power in a hostile landscape. In: Pasqualetti, M.J., Gipe, P., and Righter, R.W. (eds.) *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego, Academic Press. Pp. 153-172.

⁶² *ibid.*, p. 154.

*...the most ardent [opponents] have emotional attachments to the land in question. By attachment I mean that they have a 'sense of place' regarding the site which is to be altered.*⁶³

In the same volume, the view is expressed that:

*Wind energy leaders fail to grasp the important links among landscape, memory, and beauty in achieving a better quality of life. And particularly, they fail to realize that these links are spiritually important not only to a rural populace, but to urban people as well.*⁶⁴

Therefore, because landscape is contained in memory as well as being actively seen, it is not necessary to be able to see a landscape routinely to have an opinion about its value, and the effect of a wind farm development in that landscape. Spiritual and cultural links to landscape exist for urban as well as rural dwellers. Attachment to landscape and the loss of attachment or alienation that can be experienced when a wind farm enters that landscape are intangibles that people have difficulty expressing.⁶⁵ This intangible "specialness" of landscape and the care that needs to be taken when considering wind farm development has been surveyed in a study conducted in Australia.⁶⁶

It should be noted that surveys conducted overseas have tended to focus on the people living within sight of a wind farm, whereas others who live elsewhere and might see turbines only in their travels also have valid opinions about the effects on valued landscapes. In addition, many studies still referred to today promote attitudes towards wind farms that were recorded during the 1990s. Wind farms at that time were relatively novel and turbines were commonly smaller than those built today.⁶⁷

New Zealand studies

A study of New Zealand attitudes to wind farms similarly found that a negative response to a wind farm proposal might be founded on feelings about the landscape that are hard to express in public. Negative responses are minimised by the selection of sites that are not judged to be outstanding or do not have high visual amenity, also by community consultation. However, there is reported to be high public support for the concept of wind energy, followed by a slump in local acceptance when a specific project is announced, followed by a rise in positive attitudes once the wind farm has been constructed and operational.⁶⁸

⁶³ Righter, R.W. (2002). Exoskeletal outer-space creations (p. 37). In: Pasqualetti, M.J., Gipe, P., and Righter, R.W. (eds.) *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego, Academic Press. Pp. 19-42.

⁶⁴ Short, L. (2002). Wind power and English landscape identity (p. 43). In: Pasqualetti, M.J., Gipe, P., and Righter, R.W. (eds.) *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego, Academic Press. Pp. 43-58.

⁶⁵ Schwahn, C. (2002). Landscape and policy in the north Sea marshes (p. 139). In: Pasqualetti, M.J., Gipe, P., and Righter, R.W. (eds.) *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego, Academic Press. Pp. 133-150.

⁶⁶ Australian Wind Energy Association (2005). *Wind Farms and Landscape Values: Identifying Issues*. Stage One Final Report. Melbourne and Canberra, Australian Wind Energy Association and Australian Council of National Trusts.

⁶⁷ Simon, A.M. (1996). A summary of research conducted into attitudes to wind power from 1990-1996. Retrieved (31 October 2007) from British Wind Energy Association <http://www.bwea.com/ref/surveys-90-96.html>

⁶⁸ Berg, C. (2003). *Minimising Community Opposition to Wind Farm Developments in New Zealand – Opportunities in Planning*. Unpublished MSc thesis, Victoria University of Wellington.

An early study conducted by the MRL Research Group⁶⁹ in 1995 when wind farm technology was still a novelty for most of the public, the majority of people were in favour of having a wind farm in their region. However, "favourability declines as the proposed windmills [sic] become closer to home" (p. 10). People were strongly in favour of not seeing or hearing the turbines.

More recently, a public opinion survey conducted by UMR Research⁷⁰ showed that electricity generated from wind power was approved of by 82% of the population. More than 40% said they would prefer that future electricity needs be met by wind power, more than any other source. Now 60% of those surveyed were "in favour" of [35% strongly support (1 on 5-1 scale) and 25% somewhat support (4 on 5-1 scale)] a wind farm in their area. When it was specified that the wind farm could not be seen or heard from the home, there was movement in favour. Similarly, 57% were strongly in favour if the turbines were on the skyline but inaudible; 43% if the turbines were across the road but inaudible.

As an indication of comparative support for wind farms in 1994 and 2004 (although the results cannot be rigorously compared), these two surveys show that there had been a slight shift in favour of wind farms in that time. The level of support is probably about 50% for distant wind farms with inaudible turbines, especially for those who live in urban areas. The decreasing support the more a wind farm is in view or audible suggests that people as a whole do not value these elements as beneficial to the landscape. A consistent quarter of the population finds them an eyesore, or ugly and unsightly.

In agreement with these findings are surveys of residents in Ashhurst carried out before and after the local wind farm was constructed and operational (2003 and 2005) at Te Apiti (2 km from the settlement in the Ruahine Range). These showed that slightly over half of the residents (54%) consistently viewed the local wind farm favourably. Disapproval was expressed by about a fifth of residents (declining slightly from 22.5% to 18% before and after construction).

In summary, these surveys and studies conducted for well over a decade, show that generally:

- There is a 50:50 split in approval for a local wind farm when people are subjected to a survey instrument.
- Approval ratings for a local wind farm do not decline once the wind farm is operational, and might well increase slightly.
- Surveys should be used with discretion because results have been collected under differing circumstances, e.g. size and number of turbines, and the character of the landscape receiving the wind farm.
- Increasing distance from a wind farm does not necessarily result in increasing approval, and some urban dwellers might be opposed.
- People hold deep-seated feelings of attachment towards the landscape they see daily, as well as the landscapes they keep in their memories, which are hard to express. They give people a sense of place, or belonging, to a landscape.

⁶⁹ MRL Research Group (1995). *Attitudes Towards Wind Energy Generation of Electricity*.

⁷⁰ UMR Research (2004). *Omnibus results*. Retrieved (28 Nov 2005) from <http://eeca.govt.nz/>

Appendix II

RELEVANT STATUTORY AND POLICY DOCUMENTS

The Resource Management Act 1991

The Part II matters that are to be considered when conducting a landscape and visual assessment are to be found in:

- Section 5: Purpose
- Section 6: Matters of national importance
- Section 7: Other matters

Section 5: Purpose

Section 5 is concerned with the purpose to promote the sustainable management of natural and physical resources, while sustaining the potential of these resources to meet the reasonably foreseeable needs of future generations, safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Section 6: Matters of national importance

Section 6 requires that in achieving the purpose of the Act, several matters of national importance shall be recognised and provided for. With respect to landscape and visual values and the potential effects of the proposal on these values, matters of national importance are the preservation and protection of the natural character of wetlands, lakes and rivers and their margins, and the protection of outstanding natural features and landscapes, and of historic heritage, from inappropriate subdivision, use, and development.

Section 7: Other matters

Section 7 requires that in achieving the purpose of the Act, particular regard shall be had to several other matters. With respect to landscape and visual values and the potential effects of the proposal on these values, relevant other matters are the maintenance and enhancement of amenity values and the quality of the environment.

Amenity values are defined in Part I Section 2 of the Act, meaning:

...those natural and physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.

Manawatu-Wanganui Regional Council (Horizons) Regional Policy Statement (1998)

Introduction

The character of the Manawatu-Wanganui Region is seen as deriving from its landscapes, habitats, and natural and cultural heritage, with landscape being the most immediate of these. Landscape itself is seen as changing over time as physical, ecological and cultural components are adapted to suit community needs. The Introduction to the Regional Policy Statement

notes that the “collective cultural memory” is also changing over time with the landscape.⁷¹

There are two issues for natural and cultural features (NCF) most relevant to landscape:

Issue NCF1 Loss or degradation of regionally significant natural features and landscapes

Many of the natural features and landscapes in the Region are significant because they contribute to the character and identity of the Region or they have values which are important to the Region. These natural features and landscapes include those which have scenic qualities, provide important habitats, have special cultural significance or have amenity or intrinsic values.

Issue NCF4 Identification and evaluation of regionally significant heritage resources

Heritage is a complex resource that people perceive and value from many different perspectives. At one level it is a public resource, but it is also a local and personal resource.

Information about heritage is highly variable. Natural resource values are more fully recorded than cultural resources. Some cultural heritage resources are tangible and easily recognised so they can be managed or protected, such as a specific building or structure. Others are less easily recognised and their continuity more difficult to ensure. Examples include characteristic landscapes, or sites of historic or spiritual significance.

From the introductory remarks and these issue statements, it is clear that there is concern that significant natural features and landscapes, as well as heritage resources that can include characteristic landscapes, could be lost from the Region or degraded. These resources are valued for their amenity, scenic, historic, spiritual, or intrinsic value.

Objective and Policies - Section 22.3

The objective and parts of the policies accompanying it for natural and cultural features most relevant to landscape and visual matters are:⁷²

Objective 8: To protect natural features and landscapes which are outstanding and regionally significant from inappropriate subdivision, use and development.

Policy 8.1: To consider the following matters when identifying which natural features and landscapes are outstanding and regionally significant:

a. with respect to major geographical and geological features or landscapes, the degree to which it contributes to the Region's character in terms of:

⁷¹ Regional Policy Statement section 22.2 Landscapes

⁷² Regional Policy Statement section 22.3

- i. visual prominence; and*
- ii. scenic characteristics, including views, vistas and backdrops;*
and

d. special or important amenity and intrinsic values, including scientific, cultural and recreational values, of the area to the Region;
and

e. the degree to which the feature or landscape has recognised national or regional protection.

Policy 8.2: To protect regionally significant natural features and landscapes which are outstanding from inappropriate subdivision, use and development. In determining inappropriate subdivision, use and development the following will be taken into account:

a. the degree to which activities would adversely affect the values specified in Policy 8.3 so far as those values provide a significant contribution to outstanding features and landscapes; and

b. the degree to which the activity provides for the social or economic well-being of people and communities, (including providing essential services to the public);

while ensuring that, in all cases, adverse effects of any activity on the features or landscapes are avoided, remedied or mitigated.

Policy 8.3: To protect, from inappropriate subdivision, use and development, the specified values associated with the following features which are both outstanding and regionally significant:

p. The skyline of the Tararua Ranges, specifically:

i. its scenic qualities provided by its prominence throughout much of the Region and its backdrop vista in contrast to the Region's plains.

The reasons stated for identifying the skyline of the Tararua Ranges as an outstanding natural feature and landscape are described as follows⁷³:

The Skyline of the Tararua Ranges.

The Tararua Ranges extend from north of Upper Hutt to the Manawatu Gorge. The skyline is prominent throughout the lower North Island, and provides a scenic vista separating the east and west coasts.

The skyline of the Tararua Ranges is an outstanding natural feature or landscape of regional significance as it meets criteria a of Policy 8.1. The values and attributes of the ranges which contribute to its significance, and are to be protected, are listed in Policy 8.3. The skyline is defined as the boundary between the land and sky at the crest of the highest points along the ridge. The skyline of the Tararua Ranges is the land/sky boundary as viewed at a sufficient distance from the foothills so as to see the contrast between the solid nature of the land at the crest at the highest points along the range and the sky.

⁷³ Regional Policy Statement section 22.3.4

Other Regional Matters - Horizons Proposed One Plan

The Manawatu-Wanganui Region Council (Horizons) Proposed One Plan, which will incorporate and replace the Regional Policy Statement, is expected to become operative in 2008.⁷⁴

Infrastructure, Energy, and Waste (Chapter 3)

In Chapter 3 of the One Plan, Policy 3-3 states in relation to potential adverse effects of infrastructure development on the landscape:

When making decisions on consent applications regarding infrastructure, the adverse effects of infrastructure on the environment shall be managed in the following manner:

(a) Effects to be avoided – The following adverse effects of infrastructure shall be avoided to the same extent required of other types of activities:

(iv) effects on the outstanding natural features and landscapes identified in Chapter 7

unless functional constraints make this impossible, in which case adverse effects should be mitigated.

By way of explanations and reasons for policy, the One Plan states⁷⁵:

...Policies 3-1 to 3-5 have been adopted to recognise the benefits of infrastructure and having it well integrated with other land uses, and to recognise and provide for renewable energy and energy efficiency measures. The policies on infrastructure aim to give guidance to decision makers about how to weigh up the local adverse effects of infrastructure against the positive regional and national benefits. They also aim to provide guidance on how to avoid adverse effects on important infrastructure through the inappropriate use of land near or adjoining important infrastructure. The policies regarding energy efficiency and renewable energy seek to recognise the benefits to be derived from the use and development of renewable energy, and the efficient use of energy and resources (both of which are matters to be had in particular regard in Part II of the Resource Management Act 1991).

Living Heritage (Chapter 7)

Landscape and visual matters are considered in the Living Heritage chapter of the One Plan. In this regard, its scope is:

*The protection of outstanding landscapes and the management of the natural character of the coastal environment, wetlands, rivers, lakes and their margins.*⁷⁶

⁷⁴ The Proposed Manawatu-Wanganui Region Resource Policy Statement, Regional Plan and Regional Coastal Plan, adopted by Council 24 April 2007.

⁷⁵ Proposed One Plan, section 3.7.1 Infrastructure and Energy

⁷⁶ Proposed One Plan, Living Heritage. Section 7.1.1 (2)

In relation to the balance to be struck between infrastructural development and the protection of outstanding landscape, the One Plan states:

A number of outstanding or unique regional landscapes and their associated values are identified in Schedule F. Although the issue of landscape change and competing pressures is best dealt with at a territorial level, some policies giving guidance on the appropriate balance between important infrastructure, including renewable energy, and other values, such as landscape, are provided in Chapter 3.⁷⁷

On issues, objectives and policies, the One Plan notes as a significant resource management issue:

Issue 7-2: Landscapes and natural character

(a) The Region's landscapes are at risk from the effects of development, particularly the Tararua and Ruahine ranges. Developments with the potential for greatest impact include wind farms, residential subdivision and other major structures.

The relevant parts of the objective addressing this issue, and the relevant policy⁷⁸ are:

Objective 7-2: Landscapes and natural character

(a) The characteristics and values of the outstanding landscapes identified in Schedule F are protected as far as practicable.

Policy 7-7: Outstanding landscapes

The landscapes listed in Schedule F shall be recognised as outstanding. All subdivision, use and development affecting these areas shall be managed in a manner which:

(a) avoids or minimises to the extent reasonable any adverse effects on the characteristics and values specified in Schedule F for each landscape

(b) takes into account and avoids any cumulative adverse effects

(c) takes into account the policies in Chapter 3 when assessing activities involving renewable energy and infrastructure of regional importance.

Considering Schedule F of the One Plan, the Skyline of the Tararua Ranges is listed as an Outstanding Natural Feature and Landscape. The associated characteristics/values are:

Visual and scenic characteristics, particularly its prominence throughout much of the Region and its backdrop vista in contrast to the Region's plains.

No other values are indicated. As part of Schedule F, a map shows the locality of the relevant Outstanding Natural Features and Landscapes.⁷⁹

⁷⁷ Proposed One Plan. Landscapes and Natural Character, Section 7.1.3

⁷⁸ Proposed One Plan sections 7.3 Objectives and 7.4 Policies

Only selected, more elevated parts of the Tararua and Ruahine Ranges (rather than these upland areas in general as indicated by the 1998 Regional Policy Statement) are shown as "Significant Landscape". The parts not shown as "significant" include all parts of the Tararua Ranges from the Manawatu Gorge at their northern limit to a point approximately 90 km to the southwest. This part of the Range includes all currently consented and/or built wind farms in this part of the Tararua Ranges, and the land that is the subject of the current application.⁸⁰

Tararua District Plan

Issue 1

The Tararua District Plan identifies the nature of activities in rural areas as a resource management issue.⁸¹ The issue of how best to achieve a balance between rural and non-rural activities Plan is discussed, mainly in relation to subdivision and housing.

In relation to the landscape and visual matters of this application, the objective, policies and methods derived from this issue are:

2.3.3.1 Objective: To maintain the vitality and character of the District's rural areas.

2.3.3.2 Policies

(b) To provide, in rural areas, for activities which require a rural location or which specifically serve or support the rural community, where their effects are compatible with the surrounding rural area and the environmental results sought for Rural Management Areas.

In the explanation and reasons for this policy, it is stated that:

Policy 2.3.3.3(b) aims to provide greater flexibility of location for activities which need to be located in rural areas and where the rural community benefits from the provision of the service/facility.

The Council wishes to encourage the continued vitality of rural areas and the sustainability of rural communities. The main priority is, however, the sustainable use of natural and physical resources.

Anticipated Environmental Results include:

(b) Activities which serve or support the rural community or require a rural location will be located and operated so that adverse environmental effects are avoided, remedied or mitigated.

Issue 2

Another issue identified in the Plan is the protection of environmental quality and amenity as it relates, among other things, to:

⁷⁹ Proposed One Plan Schedule F Regional Landscapes Figure F:9

⁸⁰ Proposed One Plan, Schedule F Regional Landscapes

⁸¹ Tararua District Plan section 2.3.1.2

*Protection of outstanding natural features and landscapes.*⁸²

The following objective, policies and methods are derived from this issue:

2.3.4.1 Objective: To ensure a high level of environmental quality and amenity throughout the rural areas of the District.

2.3.4.2 Policies

(a) To ensure that any actual or potential adverse environmental effects of activities are avoided, remedied or mitigated.

(b) To protect and enhance the character, features, level of amenity and environmental quality of the District's rural areas.

The anticipated environmental results include:

(b) Rural amenity values and character will be protected and enhanced.

Under Amenity and Environmental Quality⁸³, the District Plan outlines amenity values defined in the RMA and regards these as giving an area its particular identity, including:

- *the elements which constitute the character of the area*
- *landscapes and views (including the coastal environment)*

The significant resource management issues facing the Tararua District in relation to landscape and visual matter include:

2.6.1.1 Protection of environmental quality and amenity

The following objective and policy are derived from this issue include:

2.6.2.1 Objective: To protect and enhance amenity values and environmental quality in the District, for present and future generations.

2.6.2.2 Policy

(a) To manage the effects of activities on amenity values by specifying and enforcing minimum environmental standards for the development and maintenance of such activities.

2.6.1.3 Protection of important natural features, landscapes and habitats

Expanding upon this issue, the District Plan states that

The Tararua District contains a variety of different landscapes which have been modified to varying degrees by human activities and which together make up the character of the District. In managing the District's natural and physical resources, it is important that consideration be given to the impacts of activities on the District's

⁸² Tararua District Plan section 2.3.1.3

⁸³ Tararua District Plan section 2.6

significant natural features, landscapes and views. The Proposed Regional Policy Statement (RPS) for the Manawatu-Wanganui Region identifies (in Policies 8.1 - 8.3) several outstanding natural features and landscapes as being "regionally significant" for reasons including visual prominence, scenic characteristics, ecological, cultural or spiritual significance, or other amenity values. The regionally significant natural features and landscapes in the Tararua District (as listed in the RPS) are [these include]:

- the ridgeline of the Ruahine Ranges;*
- the ridgeline of the Tararua Ranges;*

The following objective, policies and methods are derived from this issue include:

2.6.4.1 Objective: To protect important natural features (including areas of indigenous vegetation and habitats of indigenous fauna) and landscapes in the District which are of local, regional or national significance.

2.6.4.2 Policies

(a) To identify particular natural features and landscapes that contribute in a significant way to the amenity and environmental quality of the District and to classify them according to their significance and relative value to the community. In determining the significance of natural features and landscapes, the following matters shall be considered:

- the degree to which a feature or landscape contributes to the District's character in terms of visual prominence and scenic characteristics;*
- special or important amenity and intrinsic values, including scientific, cultural and recreational values;*
- the degree to which the feature or landscape has recognised national or regional significance or has been afforded protection.*

(c) To encourage the protection of significant natural features, landscapes and habitats from inappropriate subdivision, development or use, and to promote public access where this will not adversely affect conservation or private property values.

Policies 2.6.4.2(a) and (b) recognise that it is necessary to identify natural features, landscapes and habitats which are of particular value to the community, in order to provide protection. The policies provide guidance as to the values and attributes that will be considered in assessing the significance of a natural feature. The criteria are adapted from the Proposed Regional Policy Statement for the Manawatu-Wanganui Region.

Policy 2.6.4.2(c) recognises that the significant natural features, landscapes and habitats of the District should be protected in the public interest as their scenic, ecological, cultural and spiritual (intangible) values are a public good which are often not reflected by market forces or by individual land owners. In considering resource consent applications in relation to features which are listed as being of "regional significance" in the Proposed Regional Policy Statement for

Manawatu-Wanganui, regard shall be had to the values and attributes listed in the Regional Policy Statement.

The Council shall implement policies 2.6.4.2 (a),(b) and (c) by the following methods:

(a) District Plan and resource consents - The Council has included in this District Plan, a Schedule of Natural Features, and has adopted rules which aim to control the adverse effects of activities at, or in close proximity to, such sites and features. The Schedule classifies the natural features and landscapes as Category A or B according to their significance and the level of protection required. The classified important natural features are identified on the District Plan maps. In assessing resource consent applications for developments which may adversely affect indigenous vegetation and habitat, the Council shall ensure that adverse effects are avoided, remedied or mitigated.

2.6.4.5 Reasons

The Council's aim is not to restrict all development, or any modification, of significant features but to provide a means for the assessment of proposals in a consistent manner.

Identified sites are listed in Appendices 2 and 3 of Part 9 of the Plan. The following is entered under the Schedule of Natural Features⁸⁴:

Name/Description: Ridgeline of the Tararua Ranges skyline.

Reasons: Scenic values, particularly as viewed from adjacent plains.

Cross Boundary Issues

2.11.2.1 Objective

To address resource management issues which cross administrative boundaries in a coordinated and integrated manner.

2.11.2.2 Policies

- (a) To encourage the formulation of industry-wide guidelines and Codes of Practice.*
- (b) To cooperate with other District and Regional Councils and other relevant agencies, and to facilitate joint hearings where appropriate, to address resource management issues in an integrated manner.*

Palmerston North District Plan

Overall objectives

The following are overall objectives of the Palmerston North District Plan (City View) relevant to the landscape and visual qualities of the current proposal:

The Healthy Community

- To promote a clean, healthy and safe environment.*

⁸⁴ Tararua District Plan Appendix 3 section 3.3 Other significant natural features and landscapes

- *To avoid remedy or mitigate the impacts of activities using hazardous substances.*
- *To avoid, remedy or mitigate the adverse effects of natural hazards.*

The Working Community

- *To provide the conditions to ensure the physical resources of the City are managed and developed while avoiding, remedying, or mitigating adverse environmental effects.*
- *To promote a range of business and economic activity which lead to the efficient use and development of natural and physical resources.*
- *The Leisure Community.*
- *To encourage a broad range of leisure opportunities in the City.*
- *The Heritage Community.*
- *To identify and preserve the cultural heritage fabric of the City.*
- *To preserve and enhance the natural heritage features of the City, including lake and river margins, significant areas of indigenous vegetation and habitats, and important natural features and landscapes.*

The Attractive Community

- *To maintain and enhance the visual appeal of the City.*
- *To recognise the distinctive rural and urban character of the City.*
- *To manage the adverse effects of activities on the environment.*

In the explanation for these objectives, the Plan identifies Section 7 of the Resource Management Act (RMA) (the maintenance and enhancement of amenity values) as having particular relevance for the *Healthy Community*.

The objective of the *Working Community* and the *Leisure Community* are seen as having relevance in connection with the sustainable management matters of RMA Section 5(2).

In relation to the last two objectives:

The Heritage and Attractive Community objectives are derived from community concerns and clearly reflect the concerns of [RMA] Section 7(c) [amenity values] and 7(e) [heritage values], and matters of national importance, such as the protection of the margins of lakes and rivers, areas of significant vegetation and habitats and outstanding natural features and landscapes, contained in Section 6(a)[natural character of the coastal environment and other water matters] to 6(c) [indigenous vegetation and habitats, and including outstanding natural features and landscapes].

Overall, in relation to the current application, the City View objectives seek to protect landscape and visual features that include visual amenity, outstanding landscapes, and rural character while promoting the sustainable management and development of physical resources.

Rural Zone

City View overall objectives are further developed in objectives and policies for the Rural Zone. Those most relevant to this landscape and visual assessment are as follows.

Objective 2: To encourage the effective and efficient use and development of the natural and physical resources of the rural area.

Policy 2.2: To ensure that the adverse effects of activities in the rural area are avoided, remedied or mitigated such that the amenities of the area and nearby urban areas are maintained.

Policy 2.3: To control the actual or potential environmentally adverse effects of activities in the rural area, including the adverse effects of:

- *odour;*
- *noise;*
- *traffic;*
- *visual impact.*

Policy 2.4: To encourage the maintenance of sustainable land-uses in the rural area.

Objective 3: To enhance the quality and natural character of the rural environment.

Policy 3.2: To encourage the adoption of sustainable land use practices.

Policy 3.3: To control the adverse visual effects on the rural environment (including effects on rural dwellers) of activities that disturb the land surface, introduce buildings, remove and/or process natural material.

In the Explanation for this objective and policies, it is stated that:

The rural environment has a range of unique qualities which are valued by rural dwellers and those who view or travel through those areas. It is important that the amenity values and general ambience of the rural environment is protected from any adverse effects on them.

Objective 4: To recognise and enhance the diversity of the rural community.

Policy 4.1: To permit a variety of land-based activities subject to control of their adverse environmental effects.

Policy 4.2: To provide for community and leisure facilities to serve rural and urban communities.

Policy 4.3: To allow a range of other activities where their adverse effects can be avoided or mitigated.

The Explanation for this objective and policies states:

While much of the rural area is devoted to large scale rural land uses such as farming and forestry, there are a wide variety of other activities which contribute to the maintenance of land and the diversity of the rural community. These other activities include small engineering works, schools, community halls, recreational activities,

home occupations, veterinary clinics, animal boarding establishments, roadside stalls, and garden centres. While these activities are valuable parts of the rural community, and which often also serve urban communities, it is important that there are controls over any adverse environmental effects which they may produce. However, the existence of these activities also helps to make the rural community a sustainable community, in that it avoids extended energy inefficient journeys to use the business, recreational and leisure facilities which are provided in the urban area.

The Environmental Outcomes Anticipated as a result of these (and other) policies and their methods of application include:

- *Encouragement of diversity in the use of the natural and physical resources of the rural area.*
- *The avoiding, remedying or mitigating of the adverse effects of activities on the rural environment.*
- *Establishment of activities which contribute to the diversity and enhancement of the amenity values of the rural environment.*

Application status

The City Plan identifies wind farms as Discretionary Activities (Unrestricted).⁸⁵ As such, and in addition to those covered above, further policies relevant to landscape and visual matters are to be applied to assess applications for resource consent, as follows.

In determining whether to grant consent and what conditions if any to impose, Council will in addition to the City View objectives in section 2 and the Rural Zone objectives and policies, assess any application in terms of the following further policies:

(a) To avoid, remedy or mitigate adverse visual impacts of any proposed building, structure or storage areas for products and waste, on the surrounding rural environment, and on the landscape values of adjoining areas.

(b) To avoid, remedy or mitigate the effects of noise and other environmental disturbance, on the amenity of the surrounding area.

In the Explanation for these policies in relation to Discretionary Activities, it is stated:

All industrial activities in the rural area, because of the lack of services, have the potential to create adverse effects on the rural environment. Their usually, "one-off" location also increases their visual impact as does outdoor storage of goods and waste. A Discretionary Activity consent process gives Council the opportunity to assess any adverse effects and to ensure that those effects are avoided, remedied or mitigated. In the case of wind farms, the largely unknown effects of the activity mean that it is essential that it be examined on a case by case basis. In respect of these activities, it should be noted that horizons.mw may have separate consent requirements.

⁸⁵ Rural Zone R 9.9.2 Sawmills, Rural Industries and Wind Farms

Appendix III Photosimulation methodology

STATEMENT FROM MORGAN POLLARD VISUAL LIMITED

Thursday, 28 May 2009

1 SOURCE OF INFORMATION

- 1.1 Survey data including 20, 10 and 2 meter landform data, road design, turbine design and colour, turbine locations and levels were supplied by NZ Windfarms Ltd and their various consultants.
- 1.2 The turbines blade direction for each photo point was set in accordance with data supplied by NZ Windfarms Ltd.
- 1.3 All the position and reference co-ordinates for the photo simulations were located by using survey data collected by Kevin O'Connor & Associates Ltd.
- 1.4 All photographs for the photo simulations were taken by Jason Blair. A digital 5D full frame 35mm Cannon SLR camera with a stock 50mm lens was used to take all the photographs. A 50mm lens is the current standard accepted by the Court.

2 METHODOLOGY

- 2.1 To achieve a photo simulation, a 3D model is rendered into a 2 dimensional photograph.
- 2.2 Peter Rough Landscape Architects Limited chose the photo point positions and Jason Blair took the relevant panoramic photos from the designated positions.
- 2.3 A surveyor from Kevin O'Connor & Associates Ltd then survey marked the positions of the camera and reference points.
- 2.4 We then create a series of 3D computer cameras within the simulation software. They were positioned accurately to the corresponding survey marked photo position from

which the photos were taken. The camera depicts a real world camera, including matching the focal length of the 50mm lens.

- 2.5 Markers are then positioned at the reference point co-ordinates. To duplicate the view through the real world camera, we must match the reference markers and landform data to their respective physical objects in the photo, thus ensuring an accurate horizontal and vertical alignment. The reference points may consist of existing ground features in the environment such as power poles, light stands, signs, fence posts and/or prominent trees. The reference points must be of varying heights and distance to the camera.
- 2.6 The turbine model is then imported into the scene and populated to the exact specifications including positions and elevations. A colour and texture is added to add realism.
- 2.7 A simulated real world sun was then created and positioned as per north on the survey data received. This system is suitable for shadow studies of proposed and existing structures. The Sunlight system uses light in a system that follows the geographically correct angle and movement of the sun over the earth at a given location.
- 2.8 A new image is then rendered containing the accurately positioned proposed wind turbines overlaid on the original photograph within the 3D simulation software.
- 2.9 Any vegetation in the foreground was then overlaid using photo-editing software. This was then checked against aerial photography from the site to ensure correct replacement.

3 CONCLUSION

- 3.1 I consider the Photo Simulations produced to be an accurate impression of the proposed wind farm created from data provided to us.

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