DEVELOPMENT APPLICATION

RESPONSE TO INFORMATION REQUEST

Mount Emerald Wind Farm

April 2014

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ATTACHMENTS

1. INTRODUCTION

This report has been prepared in response to each specific item contained within Information Requests issued by the Tablelands Regional Council and the Department of Environment and Resource Management on 1 May 2012 and 30 April 2012 respectively.

This report represents the extent of response the applicant intends to make to these Information Requests, and accordingly requests the relevant agencies to proceed with assessment of the application. Section 2 of this report details the applicants response to the Information Request issued by Tablelands Regional Council, whilst Section 3 provides the applicant's response to DERM's Information Request.

2. ASSESSMENT MANAGER'S INFORMATION REQUEST

2.1 Mapping

Information Request 1

Question

Provide mapping containing current aerial/satellite imagery and cadastral boundaries on A3 sheets at a scale of 1:25,000, covering an area bounded by Tolga, Walkamin, Lotus Glen Prison and the Walsh River.

Response

See **Attachment 1** – Wind Farm Layout

See **Attachment 2** – Adjacent Land Uses

See **Attachment 3** – Regional Context Map

Information Request 2

Question

R26 is not labelled on Figure 8 - Surrounding Residences Plan.

Response

See **Attachment 4** – Receptor Locations

2.2 Assessment Framework

Information Request 3

Question

The Overall Outcomes of Temporary Local Planning Instrument 01/11 (Wind Farms) require assessment to take account of state and national recognised standards. Please justify the turbine layout in the context of current New South Wales and Victorian wind farm requirements guidelines.

Response

The TLPI does indicate the assessment should take account of state and national recognised standards – however, given the location of the proposal it was expected this to be restricted to the State of Queensland and the Nation of Australia.

The concept of addressing standards outside of this jurisdiction could then be extrapolated to include assessment against recognised standards of any state and further to any nation. This interpretation of the TLPI is deemed unreasonable.

Throughout the documentation the standards used for assessment have been noted.

The key requirement from the NSW and VIC guidelines would seem to be the inclusion of a "2km setback". The separation or "setback" between wind turbines and adjacent dwellings should be determined through a scientific basis rather than by applying a pre-determined distance because a pre-determined distance does not reflect the attributes of a particular site and thus cannot account for the impact of topography, vegetation and other conditions on noise, blade flicker and other wind farm impacts.

Each site should be assessed on its own merits, with the specific turbine, topography and local conditions taken into account.

Generally, the key factor in determining the separation distance is provided by the adherence to specific noise guidelines and standards applicable to wind farms in Australia. By ensuring the noise level standards are met at the dwellings, the distance from turbines is sufficient to adequately cover any potential safety issues, regardless of the size of the turbines involved.

The requirement for consent to be given by landholders who fall within a mandatory distance is not considered appropriate or reasonable. Wind farm developments should comply with appropriate regulations and community consultation requirements, as any new infrastructure would do.

Applying a pre-determined setback distance or requiring landholder consent within a setback distance is arbitrary, has no scientific basis for addressing the impacts of wind farm development and is not required for any other infrastructure development.

2.3 Community Consultation

Information Request 4

Question

Council has received a number of enquiries about information sessions and the applicant indicates willingness to provide

- ***(i) information during and after the assessment process***
- ***(ii) an additional consultation session after the 2012 re-lodgement***

Please provide more specific details about these initiatives, so that Council can respond appropriately to enquiries?

Response

A summary of the key consultation activities is shown in the table below.

Date	Stakeholder	Description
May 2009	Various neighbouring landowners	Introductory meeting with discussion on general project concept
July 2009	TRC mayor and planning staff	Introductory meeting with discussion on general project concept
September 2009	TRC planning staff	Wind monitoring tower application
January 2011	Landowners meeting Oaky Valley residents	Project information and questions
March 2011	Public Open Day	Public meeting with approx. 60 attendees; also involved media release and advertisement, newsletter #1, information booklet
March 2011	Traditional Owners	Preliminary meeting and discussion with group representatives
July 2011	TRC councillors, planners and media	Site inspection
July 2012	TRC (Mayor, CEO, Planners)	Submissions received on project Key issues – noise, crop dusting, shadow
September 2012	Public Open Day	Public meeting with approx. 150 attendees; also involved media release and advertisement, newsletter #5
September 2012	Public Site Inspection	Guided trips of the actual wind farm site
Sep/Oct 2012	Media releases	Addressing issues and questions raised at the September 2012 Open Day
November 2012	Website	Launch of dedicated website www.mtemeraldwindfarm.com.au
February 2013	Traditional owners	Initial meeting in respect of cultural heritage management plan

2.4 Alternative Sites

Information Request 5

Question

Detail any alternative sites considered for the development, the characteristics of those sites, and why they were not chosen.

Response

Site Location

The most critical aspects in the development of any energy generation project are access to both a fuel source and an electricity network. The amount of available energy in the wind increases cubically with an increase in wind speed, thus selecting a site with as good a wind resource as possible is highly preferential. While a site may have an extremely good wind resource and can produce a very high amount of electricity it is useless unless the power can be transmitted and used. To this end proximity to an electricity network capable of accepting and being able to transport the electricity generated to a customer base is of the utmost importance.

A review of the wind speeds through the country show the better wind resources to be available in some of the more remote and less populated parts of the country. This contrasts with the majority of the population being located along the eastern seaboard and hence this is where the strongest parts of the electricity network are located.

The region of the Atherton Tablelands in Far Northern Queensland is one area where wind speeds are comparable with some of the best wind resources in the country. For this reason the Tablelands is home to one of the earliest commercial wind farms built in Australia, being Windy Hill which commenced operating in 2000.

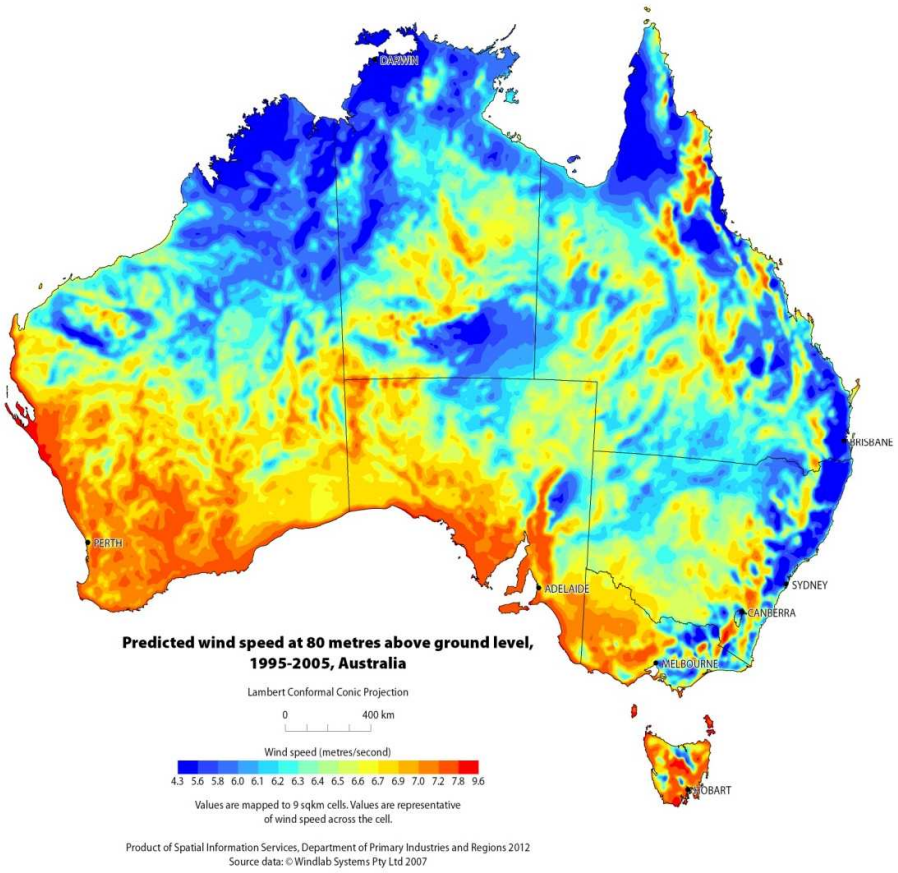

Figure 1: Mean Wind Speed at 80 m Above Ground Level (1995-2005)
(source: Spatial Information Services, Department of Primary Industries and Regions 2012. Source data: Windlab Systems Pty Ltd 2007)

In 2009, Transfield Services was approached by land owners in the Tablelands region to investigate the potential for a wind farm to be located on their land. Subsequent preliminary investigations of the subject land indicated the site to possess a quality wind resource and with a high voltage powerline crossing the site, a high likelihood of quality electricity network access.

A review of the region using available information from the Queensland Government Department of Mines and Energy confirms the area to have a high quality wind resource suitable for further investigation.

Further investigation was conducted into other locations within the region with particular attention to the southwest of the subject land.

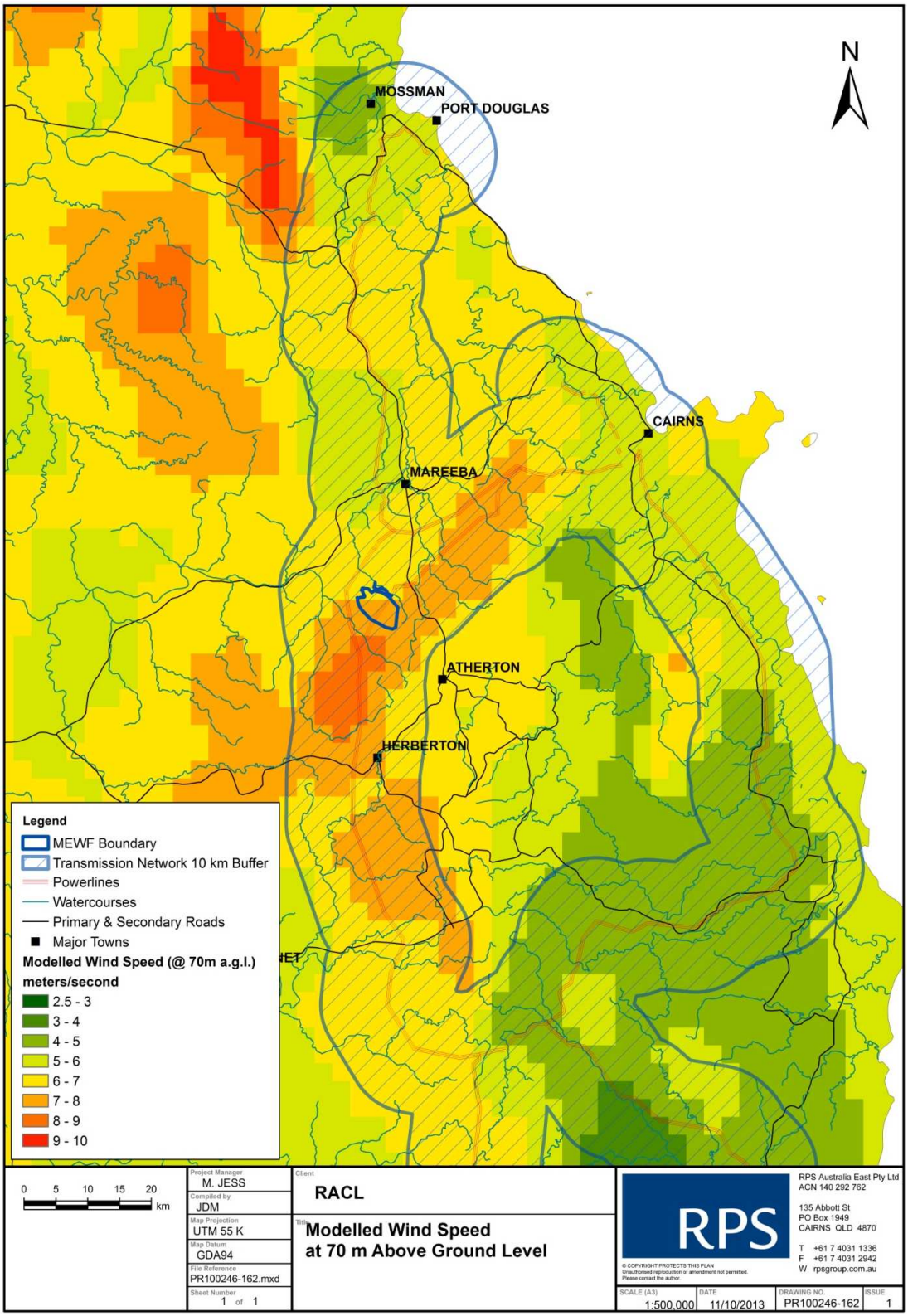

Figure 2: Wind Speed at 70m above ground surface

The subject land was considered to be a more favourable option for development due to:

- Transmission - access to the 275kV electricity transmission line which traverses through the centre of the property;
- Constructability – the high wind resource area to the southwest of the subject land would seem to be more rugged and require additional civil costs to construct and have a larger disturbed area; and
- Site access – closer proximity to Kennedy Highway council sealed roads. Additional road upgrades would be required to access areas to the southwest.

Negotiations were undertaken to secure an appropriate lease agreement with the owner to enable further planning studies to be conducted and to seek approval for the installation of onsite wind monitoring masts to validate the expected wind resource.

Wind Farm Design

A variety of design options were considered during the conceptual stage of the wind farm development. The overall objective at this time was to identify the layout of the project to maximise electricity generation and deliver significant savings in greenhouse gas emissions whilst being commercially viable and socially and environmentally responsible.

An initial turbine layout was produced allowing for the orientation of the prevailing winds and turbine spacing relative to the size of the turbines chosen at the time, to maximise the generation of the land available. The turbine used for this concept shared common characteristics of a 90m rotor and a 2 MW capacity as generally available to the market at the time.

This concept layout provided for 100 wind turbines located across the site.

Adjustments to the layout and the number of turbines was then performed with consideration given to constructability, environmental constraints and issues relevant to the local community especially noise and visual.

Following consultation with surrounding residents amendments were made to the turbine layout to reduce both the noise and the visual impact at the respective homes. Most notably this included:

- Moving the turbines off the top of the western ridgeline to further within the property to screen a significant portion of the turbine from views to landowners to the west of the site;
- Removal of turbines in the northeast of the site at the request of owners within this view shed; and
- Removal of turbines in the southeast corner to significantly reduce the size of turbines visible to the residents of Rangeview.

The result of the modifications provided for a preferred project layout incorporating 75 wind turbines in 2012.

Consistent with the commercial market for wind turbines in Australia and internationally, larger 3 MW class wind turbines are now the most common being installed. These turbines have rotor diameters above 100m and as such require additional spacing between turbines, thus reducing the overall number of turbines on site. While the overall tip height of turbines would increase by 5m to 10m the reduction in number and increased spacing is thought to reduce the visual aspect of the wind farm.

The use of larger turbines reduced the preferred layout to a total of 70 wind turbines. Following detailed environmental investigations the wind turbine layout design has been further modified to a currently preferred total of 63 turbines.

These further reductions were in respect to:

- WTG 1 and 2 – remove to reduce fauna impacts due to avian species' utilisation of the Walsh Bluff area – 500m buffer zone allowed for around Walsh Bluff;
- WTG 62 – residential impacts (noise, visual) to neighbouring residences; and
- WTG 40, 41, 42 and 43 – reduction of impacts to montane heathland zone greater than 900m asl in Wet Tropics bioregion.

Construction Alternatives

The supply of concrete will most likely be provided by concrete batching plants already approved or established in the area, however the viability of installing an on-site temporary facility would be investigated by a suitably qualified supply contractor who would also be responsible for the approval of such a facility.

Subject to its suitability, the material made available from site excavations would be utilised for access track and hardstand area construction thus reducing or eliminating the amount of material required from outside sources. If any additional material is required, it would be sourced from existing facilities it the immediate region.

The type of crane used for the installation of the wind turbines may be either a track based crawler able to access all turbine sites including steep access or a conventional rubber wheel mounted crane which would necessitate a higher standard of access track to reach all sites. Depending on the nature of the individual turbine site it may be necessary to vary the construction procedures particularly where the site is constrained by vegetation or slope.

Minor clearing of vegetation may be required for the installation of turbines, including selective pruning or removal of identified trees to allow for laydown and assembly of turbines blades and rotors. Alternatively, components can be delivered to the turbine site as required for erection with blades installed individually. This would reduce the clearing required with the objective to minimise or avoid removal of mature trees or particular species of significance.

2.5 Turbine Noise Impacts

Information Request 6

Question

Provide an A3 plan showing numbered receptors, the most current aerial/satellite imagery for the area, the current cadastral boundaries, and the six noise contour modelling scenarios, plus further wind speed increments to 12 m/s.

Response

To remove any confusion around background levels and their application to noise limits, the wind farm layout has been determined to adhere to the minimum noise requirement of 40dBA, under the maximum noise emission from the turbines.

Attachment 5 – Appendix F shows the noise contour modelling for three proposed wind turbine scenarios, using the maximum noise levels for each of the turbines under consideration.

Information Request 7

Question

Please justify the turbine layout in the context of current New South Wales and Victorian wind farm turbine noise requirements.

Response

Under the requirements of Planning Scheme Amendment 01/11 – Wind Farms – Mareeba Shire Planning Scheme 2004, a proposed wind farm will be designed, constructed and operated in accordance with recognised standards for the assessment of environmental noise. In relation to recognised standards, *New Zealand Standards 6808:2010 Acoustics – Wind farm noise* (NZS6808:2010) and *Queensland Environmental Protection (Noise) Policy 2008* (EPP 2008) are specifically noted in the planning scheme amendment.

As such, these standards have been used as the basis for noise compliance.

The relevance of the New South Wales or Victorian requirements is not considered applicable.

Information Request 8

Question

The Noise Assessment report designates the Rangeview development as a rural living locality (as defined by the SA Wind Farms - Environmental Noise Guidelines). It has not applied that designation to other areas previously subdivided and developed as rural lifestyle lots, and not suitable for, or used for primary production. Please provide further justification for this, given the development history of those rural lifestyle lots (e.g. vacant lots on SP196700, 198648, 210202 and 231871).

Response

A review of the Atherton Shire Planning Scheme (Map 5 and 5a) shows the area known as Rangeview to be classified as "Rural Residential". All other properties in the surrounds to the project site are designated as "Rural" under both the Atherton Shire Planning Scheme and Mareeba Shire Planning Scheme.

The classification of surrounding properties in respect of the noise evaluation has been made in respect of the planning classifications.

Information Request 9

Question

Please provide separate estimates of the number of people who will be living within 2km and 3km of a turbine, when the area is fully developed.

Response

Using the current 63 wind turbine layout the estimated population of residents in proximity to the wind farm is shown below.

Information on population numbers is based on the data for Tablelands Regional Council in Census 2011, (2.5 persons/household) unless otherwise noted.

The request to provide estimates of the population when the area is fully developed is considered to be an unreasonable request.

Distance for WTG	Number of Receptors	Est. Population
1000	0	0
2000	9[1]	73[1]
3000	46[2]	185[2]
4000	68[3]	740[3]
5000	110[4]	1,624[4]

1 – includes Springmount Waste Facility and backpacker accommodation (50 person)

2 - includes Springmount Waste Facility, backpacker accommodation (50 person) and Allowah Retreat (20 person)

3 - includes Springmount Waste Facility, backpacker accommodation (50 person), Allowah Retreat (20 person) and Lotus Glen Prison (500 person)

4 - includes Springmount Waste Facility, backpacker accommodation (50 person), Allowah Retreat (20 person), Lotus Glen Prison (500 person), 80% of Walkamin and 50% of Rangeview

Information Request 10

Question

The Noise Assessment report has nominated an indoors/outdoors noise reduction level of 10dB, and a 20dB reduction for air conditioned dwellings. Please provide further researched, and/or technical and legislative justification for this, as well as references to previous arguments used for the High Road Wind Farm proposal.

Given the difficulty of deriving an appropriate 'generic' outdoor/indoor value, the applicant should provide individual field assessments of any dwellings in question.

Response

Environmental Protection (Noise) Policy 2008; Schedule 1 Acoustic Quality Objectives:

Column 1	**Column 2**	**Column 3**			**Column 4**
Sensitive receptor	**Time of day**	**Acoustic quality objectives (measured at the receptor) dB**			**Environmental value**
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
dwelling (for outdoors)	daytime and evening	50	55	65	Health and wellbeing
dwelling (for indoors)	daytime and evening	35	40	45	Health and wellbeing
	night-time	30	35	40	Health and wellbeing in relation to the ability to sleep

The Environmental Protection (Noise) Policy 2008 in Schedule 1 notes an acoustic objective of 50dBA for a dwellings outdoors and 35dBA for a dwelling indoors during the daytime and evening; a difference of 15dBA. While not specifically noting a night-time outdoor value, given the structure of the dwelling will not change from daytime and evening to night-time it is practical to assume the indoor/outdoor 15dBA reduction will remain.

The nomination of an indoor/outdoor noise reduction level of 10dBA, with windows open and 20dBA with windows closed has been made on a conservative basis.

To understand the concept of noise reduction from outdoors to indoors, one must understand the way in which a sound travels.

Sound travels as a wave from its emission source outward through the environment, the energy of the sound is reduced as the wave interacts with various components of the environment including the air through which it travels. The sound is either reflected, absorbed or passes through these elements. Thus, whenever a sound wave contacts an obstacle such as a building the sound level is reduced as it passes. Even if the physical structure of the building had zero

impact (i.e. no absorption and no reflection) the very fact the sound travels the distance from outside to inside will reduce is level due to the absorption by the air through which it travels.

The concept of certain frequencies of sound having a higher value inside than outside is thus not possible. Due to the structure of the sound and the various frequencies making it up, and the nature of the object through which it passes, certain frequencies of the sound are absorbed and reflected more than others. In this way, certain frequencies may be more noticeable indoors even though the actual sound level is lower.

In estimating the reduction of sound level through various buildings and their components, extensive testing has been conducted to actually measure the reduction through various structure types. Appendix B of *Australian Standard AS3671-1989 Acoustics – Road traffic noise intrusion – Building siting and construction*, provides values for Sound Reduction for a range of standard construction types, and a method for the estimation of a room's overall sound reduction.

Using the values and methods outlined in *AS3671*, the following examples are provided with estimates for both windows open and windows closed. For an air conditioned residence it is assumed the windows are closed.

Example 1 - Corner bedroom (two external walls)

Room size - 4m x 4m

Ceiling height – 2.7m

Windows – 2 windows 1.8m wide x 0.9m high located centrally in each external wall

Roof – 0.5mm corrugated iron, timber framework

Ceiling – 10mm gypsum plasterboard

Walls – timber stud wall, clad externally with 9mm timber/hardwood/fibro sheet; internally with 10mm plasterboard

Windows – 6mm horizontal sliding glass (density 16kg/m^2); no allowance for screens/curtain/blinds

Overall Sound Reduction:

31dBA windows closed

20dBA windows open

Example 2 - Central bedroom (one external wall)

Room size - 6m x 4m

Ceiling height – 3m

Windows – 2 windows 1.8m wide x 0.9m high located centrally in external wall

Roof – 0.5mm corrugated iron, timber framework

Ceiling – 10mm gypsum plasterboard

Walls – conventional brick veneer

Windows – 6mm horizontal sliding glass (density 16kg/m^2); no allowance for screens/curtain/blinds

Overall Sound Reduction:

32dBA windows closed

23dBA windows open

Example 3 - Central lounge room (one external wall)

Room size - 8m x 4m

Ceiling height – 3m

Doors – 6m wide x 2.4m high located centrally in external wall

Roof – 0.5mm corrugated iron, timber framework

Ceiling – 10mm gypsum plasterboard

Walls – timber stud wall, clad externally with 9mm timber/hardwood/fibro sheet; internally with 10mm plasterboard

Doors – 10mm glass in aluminium frame (density 23kg/m^2); no allowance for screens/curtain/blinds

Overall Sound Reduction:

34dBA doors closed

20dBA doors open

Information Request 11

Question

Please indicate which existing dwellings within 3km of a proposed turbine are air-conditioned.

Response

Given the information provided in Information Request 10 it is not deemed necessary to respond to this question.

Information Request 12

Question

Show the calculated regression analysis lines on the Background Noise Level v Wind Speed graphs for the six receptors.

Response

The calculated Background noise level v the wind speed graphs along with the calculated regression lines are contained in Figure 3 to Figure Y. It should be noted for Receptor 5 (Figure 3) the calculation of the best fit is based on a reduced data set. An obvious local noise source making a continuous noise at approximately 50 dB(A) and 57 dB(A) (Refer to Figure 3 from the noise report) was excluded from the background analysis.

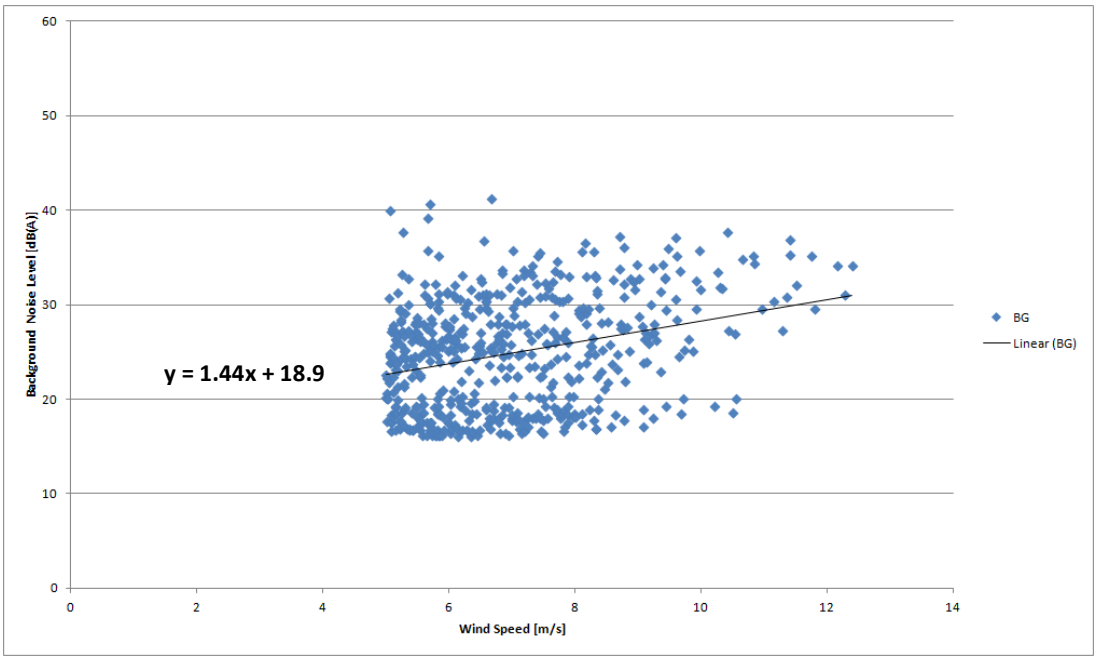

Figure 3: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R5

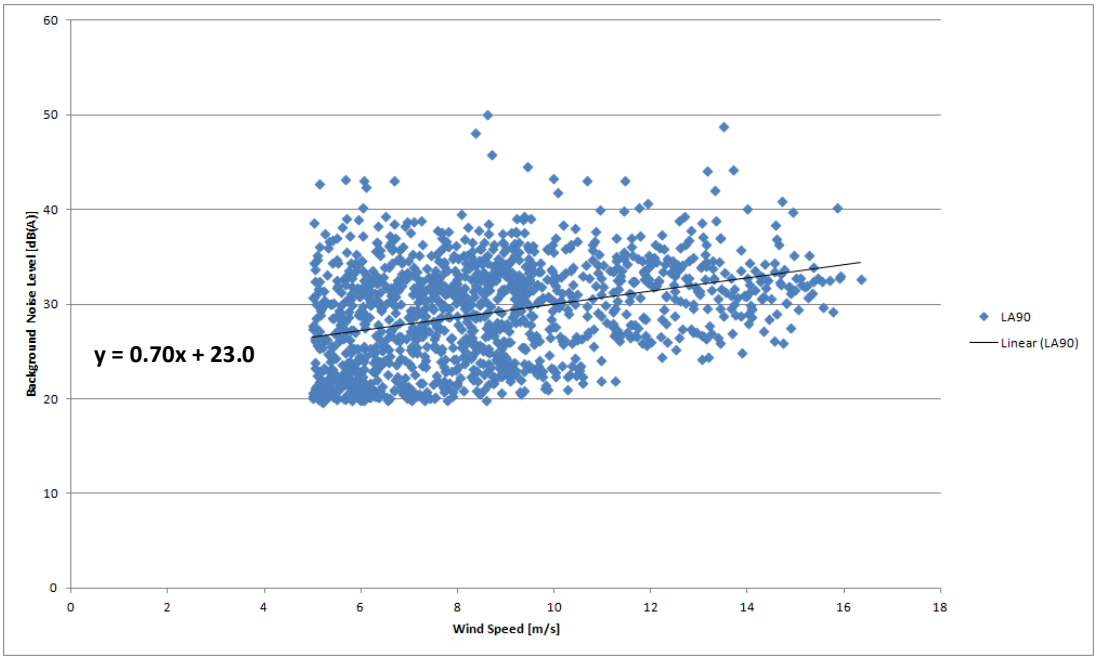

Figure 4: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R6

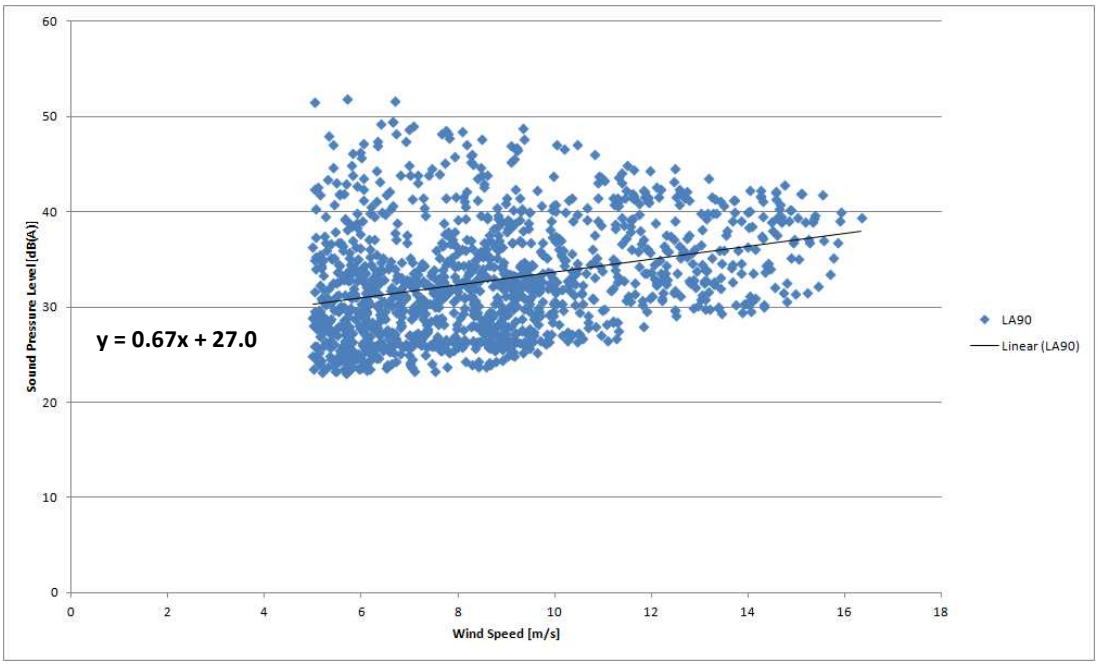

Figure 5: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R16

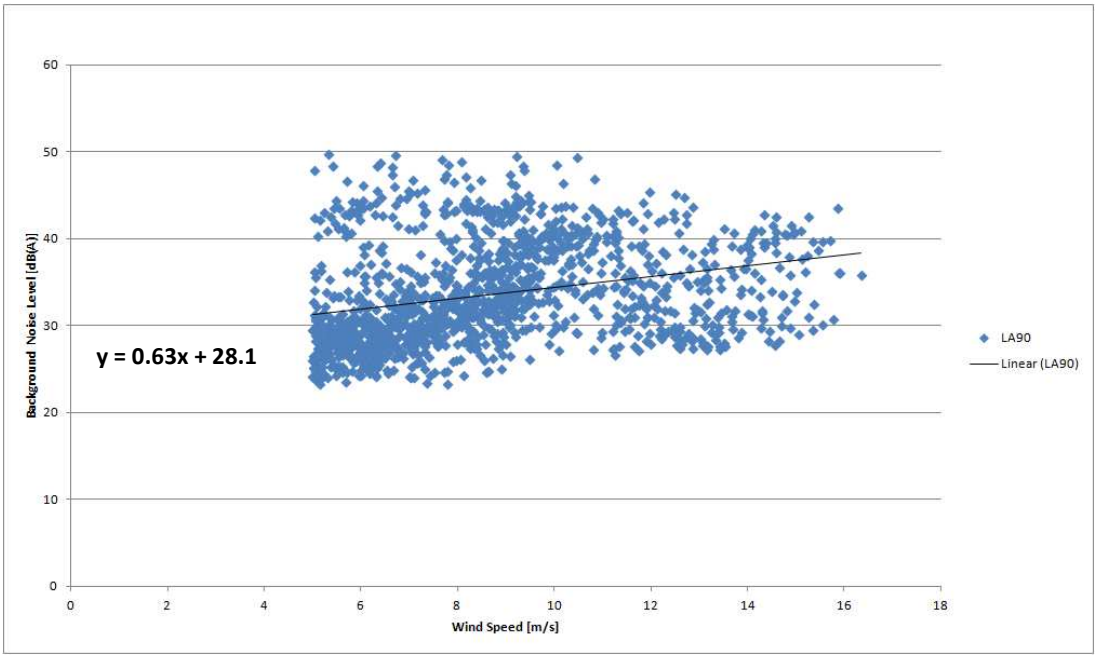

Figure 6: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R26

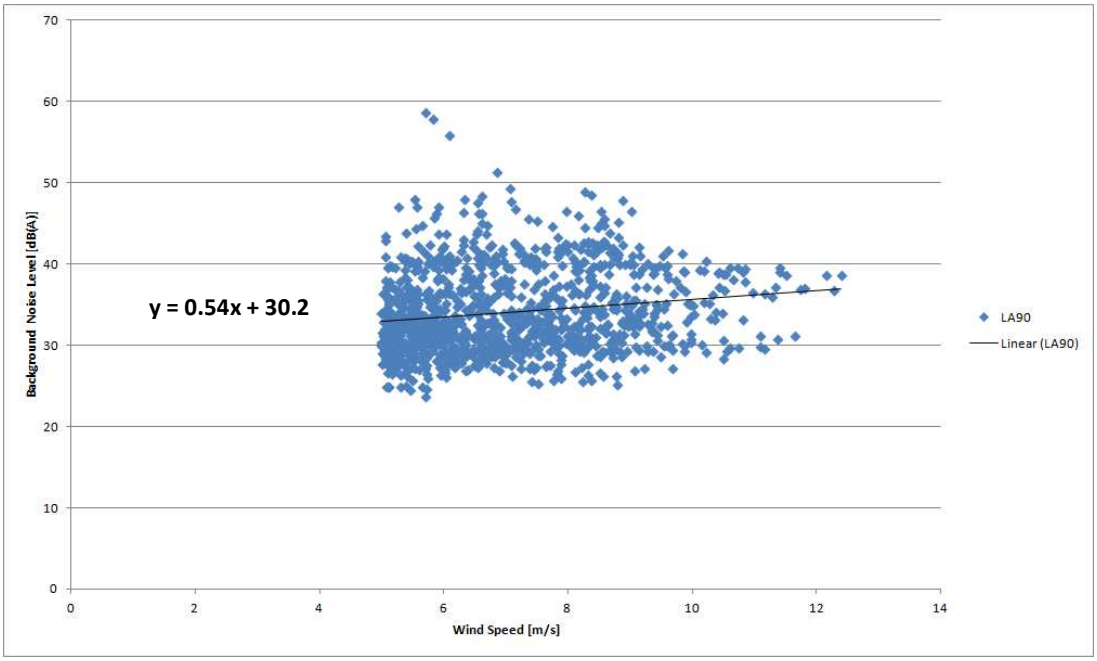

Figure 7: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R31

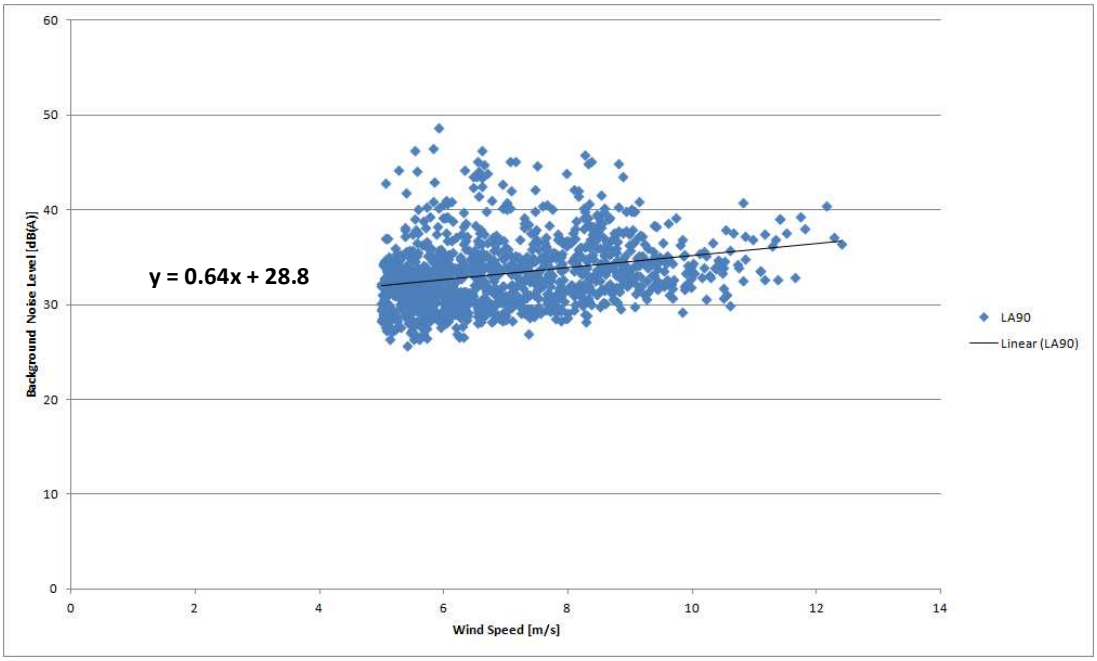

Figure 8: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R32

Information Request 13

Question

The Background Noise Level v Wind Speed graphs for R06 and R16 are identical. Please rectify?

Response

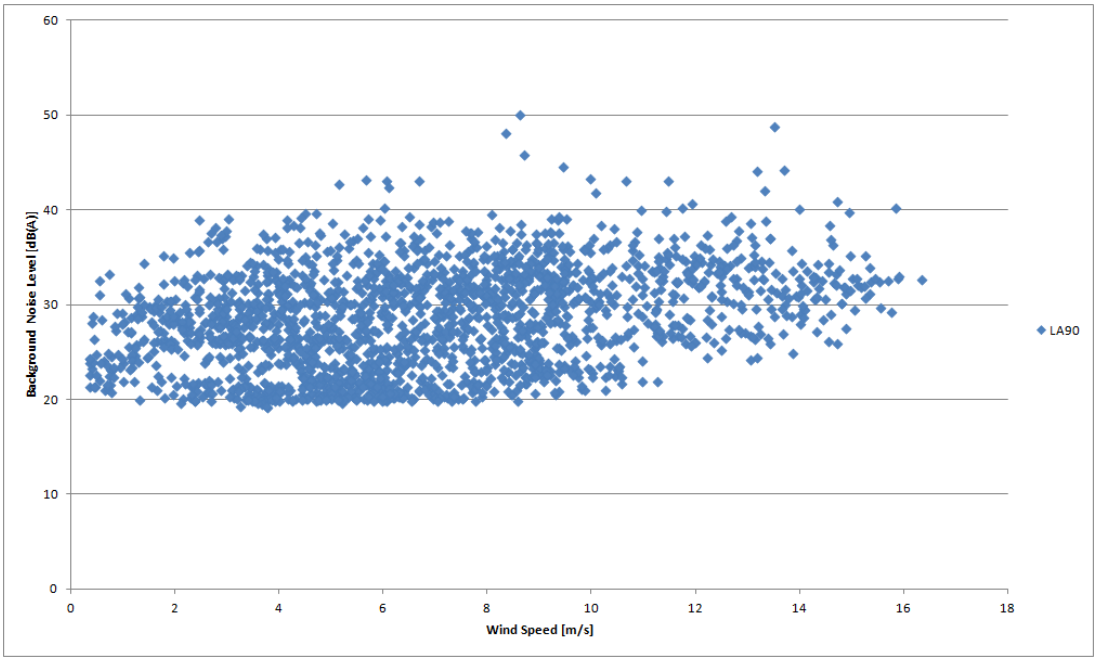

Figure 9: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R6

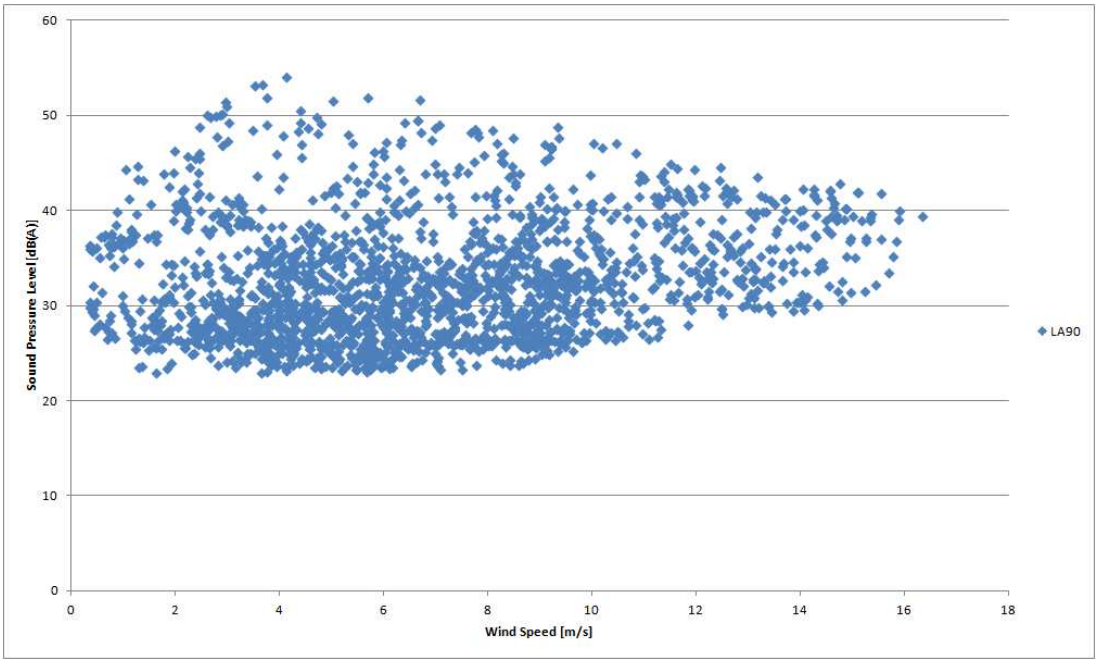

Figure 10: Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R16

Information Request 14

Question

The body of the noise report refers to six monitoring locations, but the conclusion mentions seven. Please clarify?

Response

The conclusion should state;

A noise survey was conducted over a 14 day period at five locations and a 28 day period at one location.

Information Request 15

Question

Please provide an explanation as to why noise levels are not based on hub height wind speeds in accordance with the relevant guidelines and standards.

Response

Wind turbine suppliers provide guaranteed sound power data for a range of wind speeds up to rated power (maximum noise level). In some cases this data is provided on a 10m agl basis and others as a hub height value. It is important to note the wind speed data (and hence the wind farm sound levels) and the background data collected at respective locations are synchronised to the same date and time. In this way the comparison of wind farm noise and corresponding background noise can be made each location.

Latest noise reporting has incorporated hub height wind speeds as the basis for assessment, with the table below presenting the information used for modelling.

Sound power levels, L_{AW} dB, vs wind speed for candidate turbine models

Wind Speed (m/s)	10m AGL standardised	6	7	8	9	10		
	Hub Height	8.4	9.7	11.1	12.5	13.9		
REPower 3xM104		103.7	105.3	105.6	105.6	105.6		
Siemens SWT-3.0-101		104.5	106.5	107.0	107.0	107.0		
Siemens SWT-3.0-108		104.5	106.5	107.0	107.0	107.0		
Extrapolated integer hub height wind speed (m/s)		**8**	**9**	**10**	**11**	**12**	**13**	**14**
REPower 3xM104		102.9	104.6	105.4	105.6	105.6	105.6	105.6
Siemens SWT-3.0-101		103.6	105.6	106.7	107.0	107.0	107.0	107.0
Siemens SWT-3.0-108		103.6	105.6	106.7	107.0	107.0	107.0	107.0

Earlier reporting used a common base of 10m agl wind speeds. Under this assessment both the site wind speeds and the corresponding noise emission from the prospective wind turbine were based on 10m data.

Information Request 16

Question

Given the weak correlation between monitoring mast wind speeds and the background noise at receptors, please provide further validation and justification for the assumed linear relationship.

Response

At many wind farm locations both the dwellings and the wind turbine are in the same wind field. For instance the difference in elevation between the turbine and the dwelling may only be of the order of 100m. However, in this instance the difference in elevation between the wind farm area and its surrounds is several hundred metres. This change in elevation causes a significant increase in wind speed as the wind passes over the site, hence the wind speed at the wind turbines would be higher than measured at dwellings.

Background noise measurements are synchronised on a time scale with actual wind speeds recorded at on-site monitoring towers. Knowing the site wind speed allows the sound power level for the wind farm to be estimated and directly compared with the pre-existing background levels.

To remove any confusion around background levels and their application to noise limits, the wind farm layout has been determined to adhere to the minimum noise requirement of 40dBA, under the maximum noise emission from the turbines.

Information Request 17

Question

Both AS4959-2010 and the draft National Wind Farm Development Guidelines set out the requirements for background monitoring. In particular, section 6.3.1 of AS4959-2010 notes that where regression analysis does not identify the expected relationship (as appears to be the case here), further investigations are necessary. It also notes that, in consultation with Council, consideration should be given to possible seasonal variations in background noise levels prior to commencement of monitoring.

The existing data is not considered to be a satisfactory reference base to evaluate the effect of any future wind farm noise emissions against.

On that basis:

- ***provide additional, more comprehensive, and seasonally varied, background monitoring for representative dwellings in consultation with Council officers***
- ***provide separate day night (10pm - 6am) background noise analysis for each receptor***

Response

To remove any confusion around background levels and their application to noise limits, the wind farm layout has been determined to adhere to the minimum noise requirement of 40dBA, under the maximum noise emission from the turbines.

The seasonal variability of background noise is indeed a valid point. This was not highlighted in the noise report as the measurements were obtained mid-year at a time known to likely experience the lowest background noise levels.

Initially a background noise level study was programmed to commence in the month of November, however the program was suspended as the ambient noise levels were strongly dominated by cicada and other insect noise.

The background noise monitoring was carried out during a period of the year expected to have the lowest background noise levels.

The report provided the background noise level verses time of day for various wind speed categories for each sensitive receptor.

An analysis of the background data collected at each receptor with a day and night breakdown is contained in Figures 11 to 16. A summary of the data is provided in the table below. Each of the calculations for best-fit have been re-calculated for all hours, day and night.

Site	Case	y = ax + b in db(A) y – sound level x – wind speed	Monitoring period	Calculated background in dB(A)	
				5 m/s	10 m/s
R5	All hours	1.44x + 18.9	3/6/2011 – 19/6/2011	26.1	33.3
	Day	1.03x + 19.8		25.0	30.1
	Night	2.01x + 6.61		16.7	26.7
R6	All hours	0.70x + 23.0	19/5/2011 – 2/6/2011	26.5	30.0
	Day	0.46x + 26.6		29.0	31.3
	Night	1.34x + 13.7		20.4	27.1
R16	All hours	0.67x + 27.0	19/5/2011 – 2/6/2011	30.4	33.7
	Day	0.40x + 29.3		31.3	33.3
	Night	1.05x + 23.5		28.7	34.0
R26	All hours	0.63x + 28.1	19/5/2011 – 19/6/2011	31.3	34.4
	Day	0.73x + 28.1		31.7	35.4
	Night	0.62x + 26.5		29.7	32.7
R31	All hours	0.54x + 30.2	3/6/2011 – 19/6/2011	32.9	35.6
	Day	0.58x + 30.3		33.2	36.1
	Night	0.40x + 30.6		32.6	34.6
R32	All hours	0.64x + 28.8	3/6/2011 – 19/6/2011	32.0	35.2
	Day	0.62x + 29.4		32.5	35.5
	Night	0.62x + 28.0		31.1	34.2

It is noted the reported linear fit for sites R26 and R31 in the original report contained transcription errors and these have been corrected in this revision. The transcription errors have no effect on the overall assessment nor outcome of the report. Table 3 from the original noise report is reproduced below showing the changes and extended to a wind speed of 12 m/s.

Monitoring Location	R06	R16	R26	~~R31~~ R32
Similar Locations	**R05, R06**	**R1 to R4 R7 to R19 R79 to R81 R116 to R121**	**R26, R49, R78**	**R20 to R25 R27 to R48 R50 to R77 R82 to R115 R122 to R123**
Background noise level [dB(A)] at 5 m/s	26.5	~~30.4~~ 30.3	~~31.6~~ 31.3	32.0
Background noise level [dB(A)] at 6 m/s	27.2	31.0	~~32.3~~ 31.9	32.6
Background noise level [dB(A)] at 7 m/s	27.9	31.7	~~33.0~~ 32.5	33.3
Background noise level [dB(A)] at 8 m/s	28.6	32.4	~~33.7~~ 33.2	33.9
Background noise level [dB(A)] at 9 m/s	29.3	33.0	~~34.4~~ 33.8	34.6
Background noise level [dB(A)] at 10 m/s	30.0	33.7	~~35.1~~ 34.4	35.2
Background noise level [dB(A)] at 11 m/s	30.7	34.4	35.0	35.8
Background noise level [dB(A)] at 12 m/s	31.4	35.0	35.7	36.4

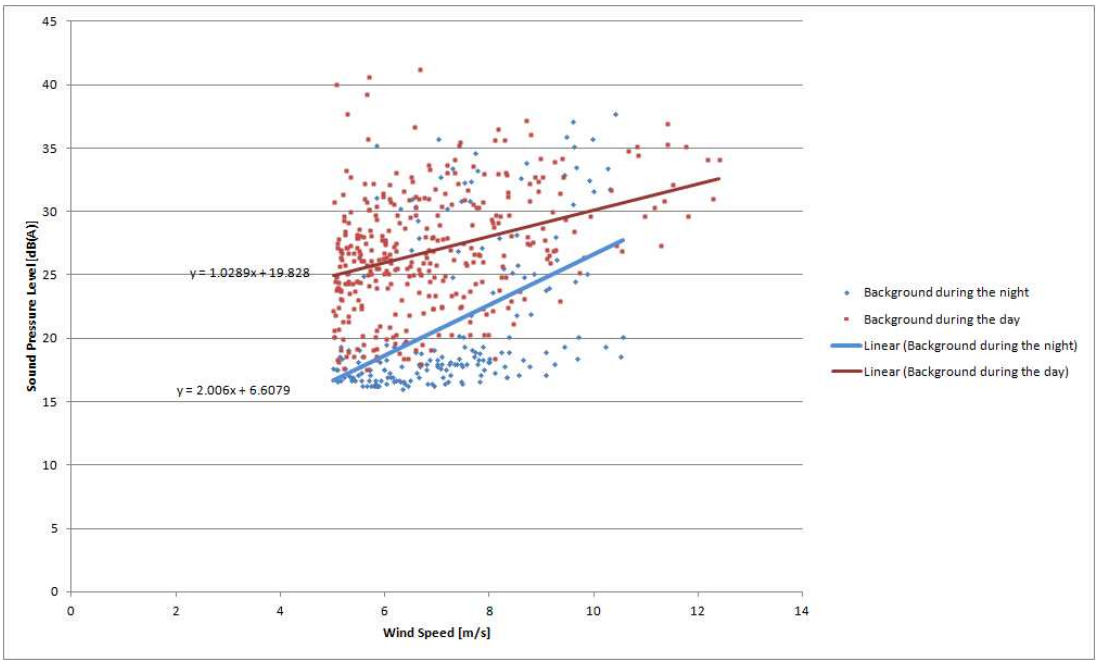

Figure 11: Day and Night Assessment of Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R5

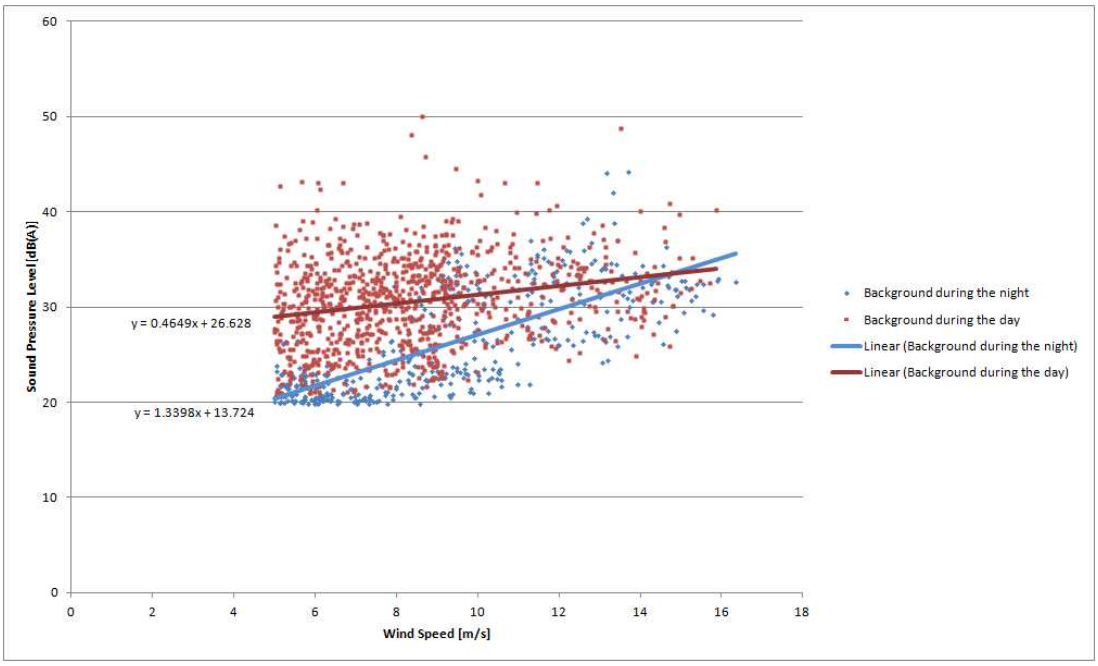

Figure 12: Day and Night Assessment of Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R6

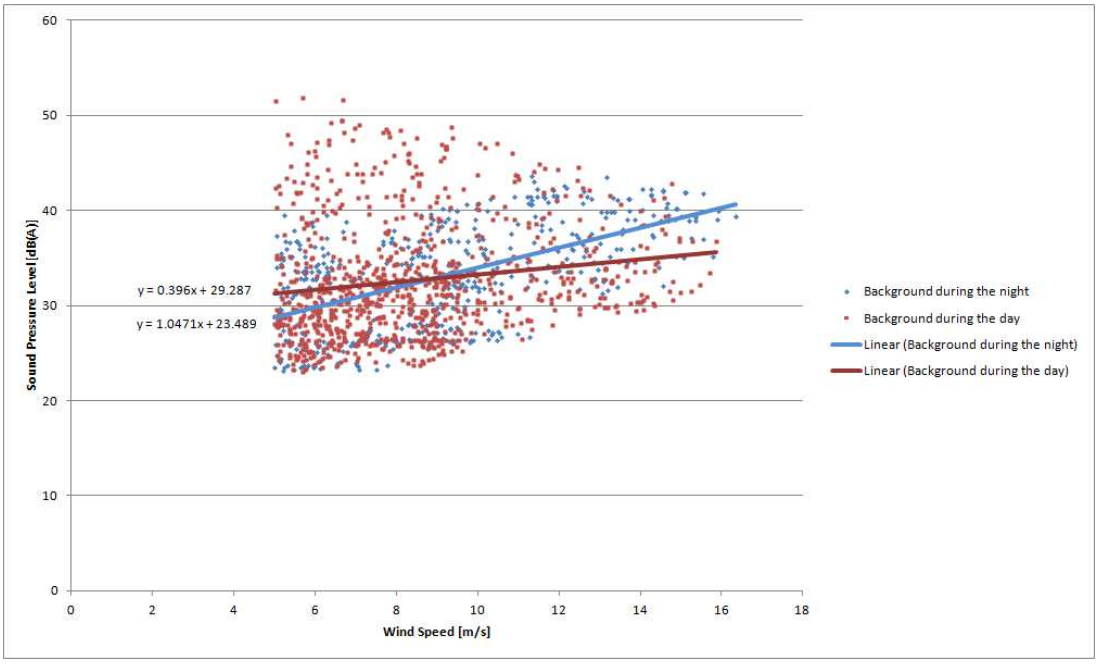

Figure 13: Day and Night Assessment of Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R16

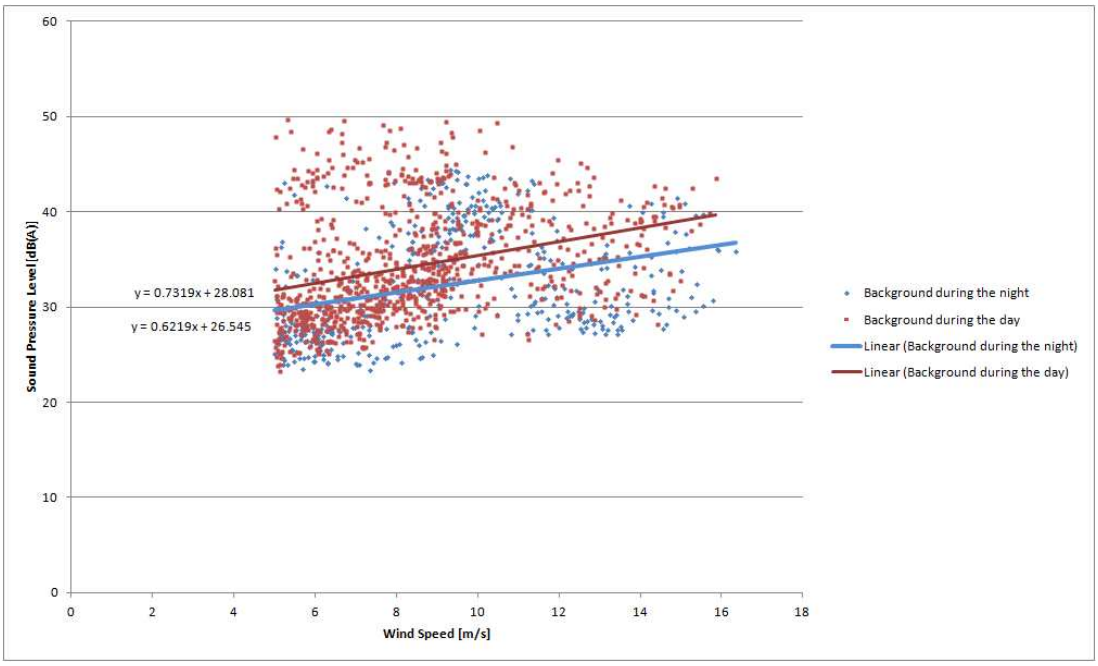

Figure 14: Day and Night Assessment of Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R26

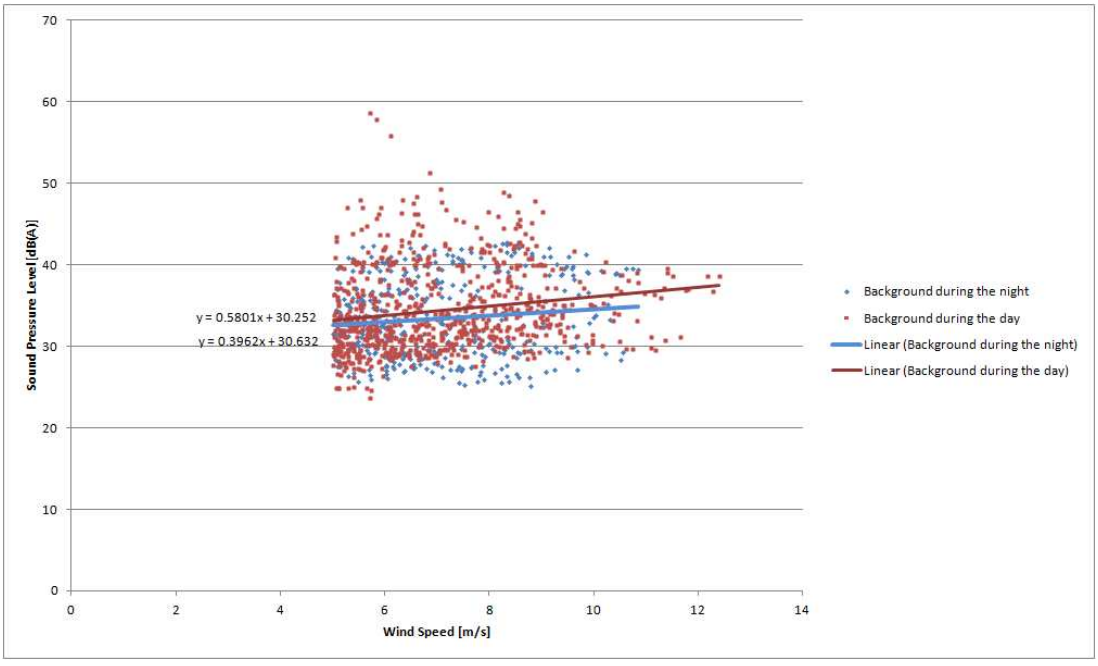

Figure 15: Day and Night Assessment of Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R31

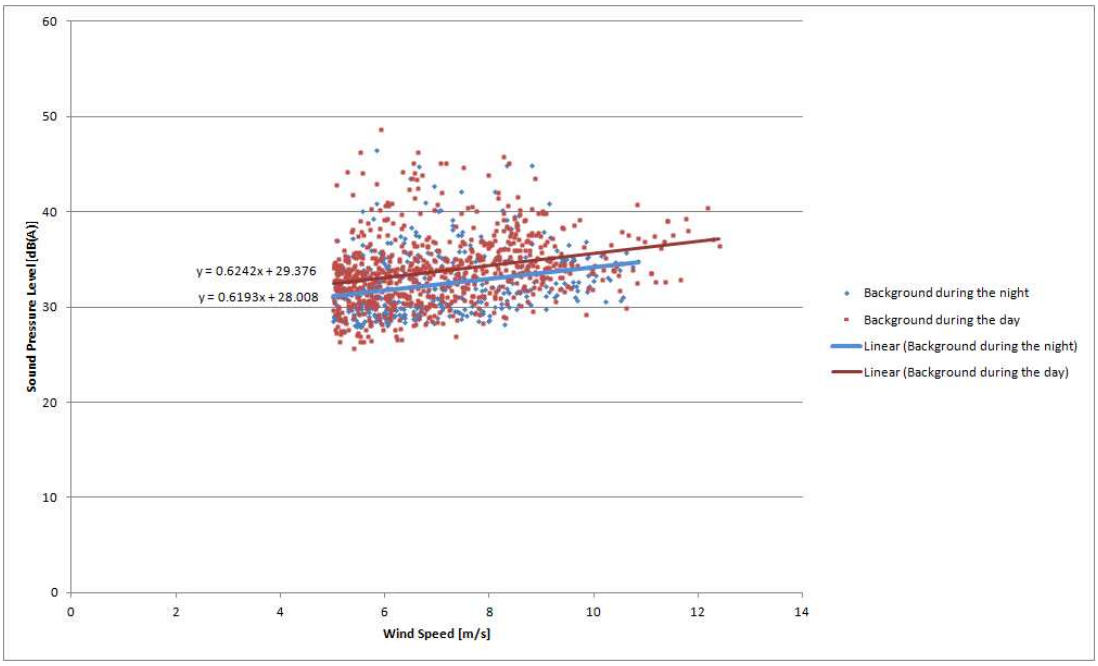

Figure 16: Day and Night Assessment of Background Noise Level v Wind Speed (at 10m AGL) and Linear Fit for R32

Information Request 18

Question

AS4959-2010 defines a receiver as including the location of potential future noise sensitive development such as an occupied dwelling permitted under the planning scheme. The draft National Wind Farm Development Guidelines also identify areas where permitted noise sensitive development may occur within the life of the wind farm as a noise-sensitive receiver. There are a number of vacant rural lifestyle lots external to the site that could be potentially impacted by turbine noise. In addition, both Lotus Glen Prison and the Springmount accommodation camp are capable of housing large numbers of people.

On that basis, please justify why those lots and facilities have not been included in the requested background monitoring.

Response

Background Monitoring

Background monitoring at a potential dwelling site is not practical in that the site itself would be significantly changed through the construction of the dwelling and modification to the surroundings to render any data invalid.

NZ6808:2010 recommends background noise monitoring be undertaken at noise sensitive locations where predicted wind farm noise levels exceed 35 dBA.

Lotus Glen Prison (Receptor R88) and Springmount Accommodation Camp (R90) were not considered for background monitoring as the maximum estimated wind farm noise levels were 29dBA and 34dBA respectively.

Initial modelling in 2011 indicated only receptors R5, R26 and R78 would fall within this category. Due to the close proximity of R26 and R78, and the unconcerned nature of residents at R78, R26 was used for monitoring. Additional monitoring was conducted at R6, R16, R31 and R32 due to

the relative proximity to site and concern of residents. Background monitoring was conducted at locations R5, R6, R16, R26, R31 and R32 in May – June 2011.

Earlier monitoring was conducted in November – December 2009 at receptors R11, R26 and R49 to provide some reference data for the wind farm design.

Future Development

Figure 17 shows the 40dBA wind farm noise contour (under maximum wind turbine noise conditions) in relation to the neighbouring properties to the wind farm land.

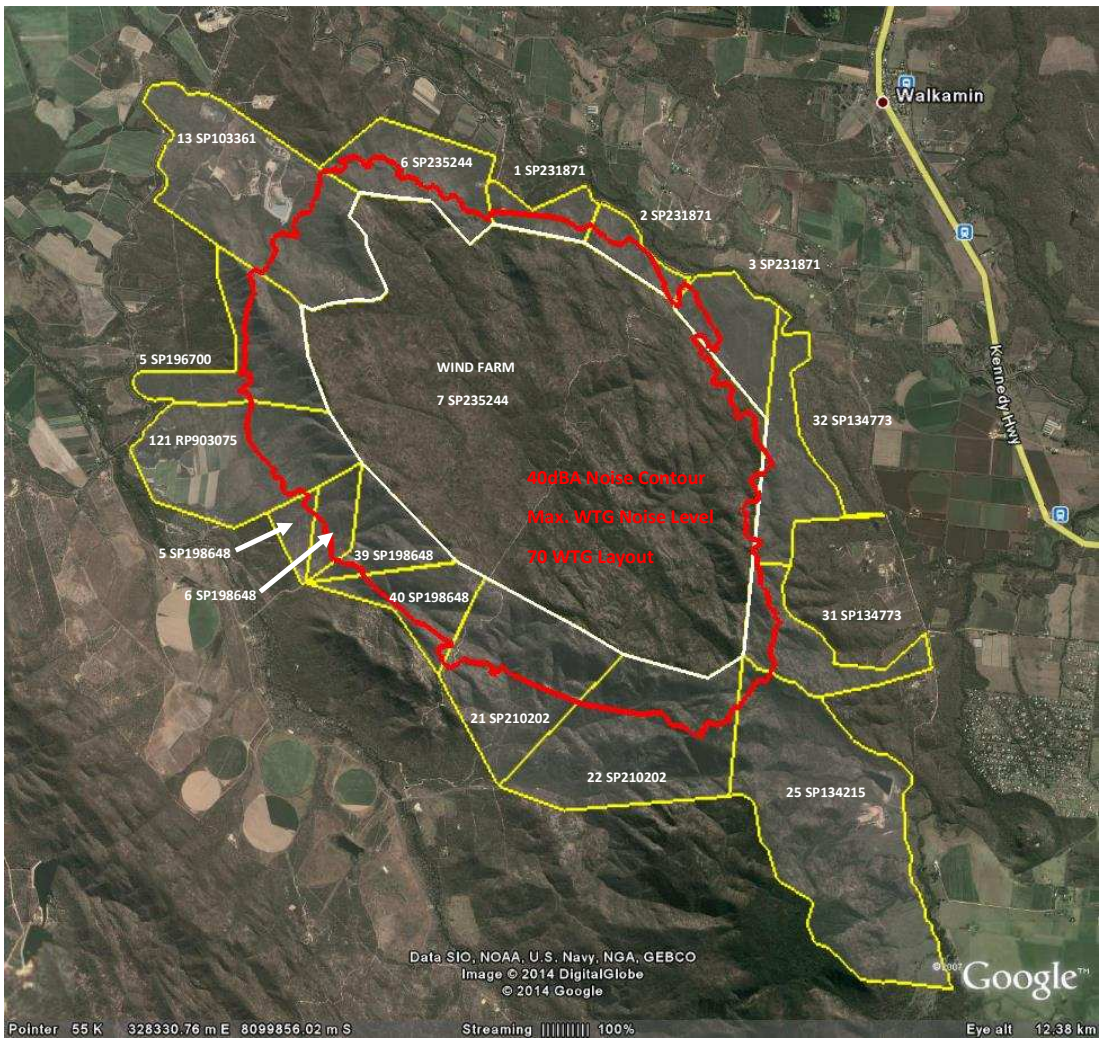

Figure 17 – Noise Zone – 40dBA Contour (Max. Noise) and Neighbouring Properties

The vacant properties identified as potentially experiencing a wind farm noise level over 40dBA under maximum wind turbine noise levels are shown in the table below.

Property Description	Property Area (ha)	Noise Zone Area (ha)	Noise Zone Distance (m) from WF boundary	Notes
Lot 5 SP178237	228.9	35.7	560	Area subject to +40dB is within 1000m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Springmount Rd) to zone edge is 1300m.
Lot 7 SP198648	65	46.1	1302	Common boundary is small. Distance is from northern corner of property. Distance from road access (Cascade Cl) to zone edge is 450m.
Lot 39 SP198648	117.4	105.9	1132	Area subject to +40dB is within 1200m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Cascade Cl) to zone edge is 450 - 750m
Lot 40 SP198648	133	87.6	1179	Area subject to +40dB is within 1200m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Cascade Cl) to zone edge is 750 - 1200m
Lot 21 SP210202	333.7	178.5	1190	Area subject to +40dB is within 1200m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Lemontree Dr) to zone edge is 1400 - 1700m
Lot 22 SP210202	434.9	117.9	727	Area subject to +40dB is within 800m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Lemontree Dr) to zone edge is min. 1500m
Lot 25 SP134215	663.3	9.8	618	Area subject to +40dB is within 800m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Anderson Rd) to zone edge is min. 2200m
Lot 3 SP231871	137.7	17.5	331	Area subject to +40dB is within 350m of common boundary of wind farm. Road access via Kippen Dr.
Lot 2 SP231871	61.5	29.4	342	Area subject to +40dB is within 350m of common boundary of wind farm. Road access via Kippen Dr.

For the properties located to the west and south of the proposed wind farm the areas subject to greater than 40dBA are predominantly described as steep and rugged terrain, and hence would prove difficult for construction of a dwelling. For these properties more preferential locations for construction are available closer to the public road access (Cascade Close, Lemontree Drive, Springmount Rd) outside of the +40dBA noise zone.

For the lots to the east of the site (lots 2 and 3 SP231871) along Kippen Drive large proportions of the land would remain outside of the +40dBA noise zone.

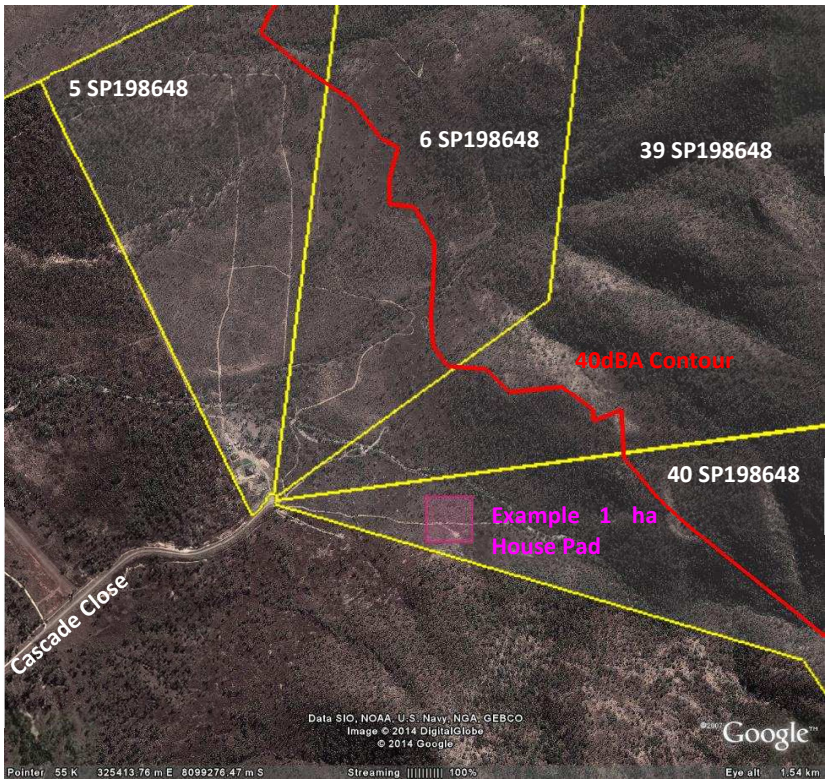

Figure 18 – Noise Zone – 40dBA Contour (Max. Noise) and Neighbouring Properties on Cascade Close

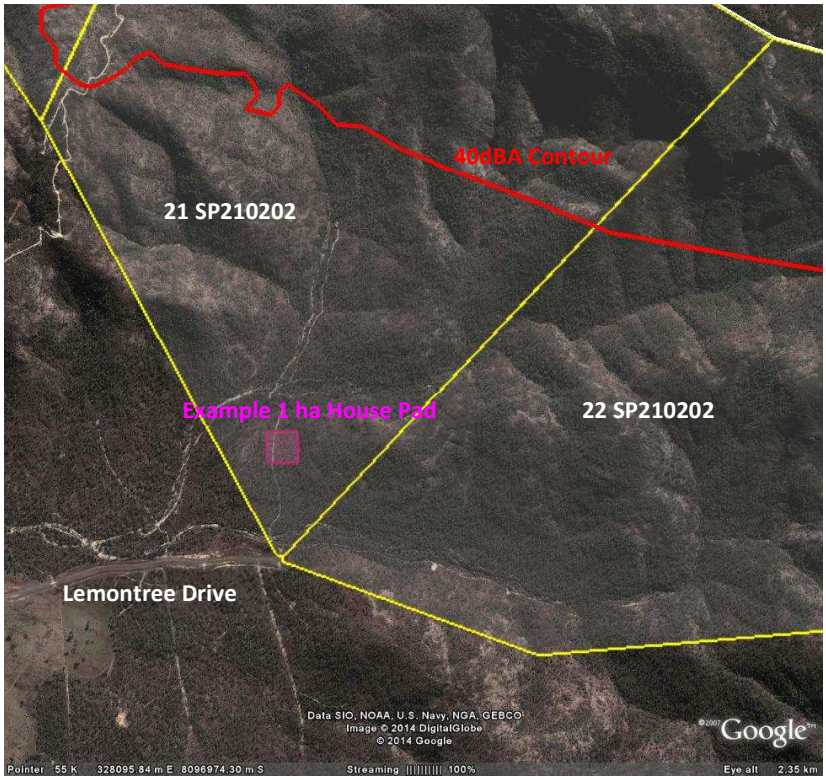

Figure 19 – Noise Zone – 40dBA Contour (Max. Noise) and Neighbouring Properties on Lemontree Drive

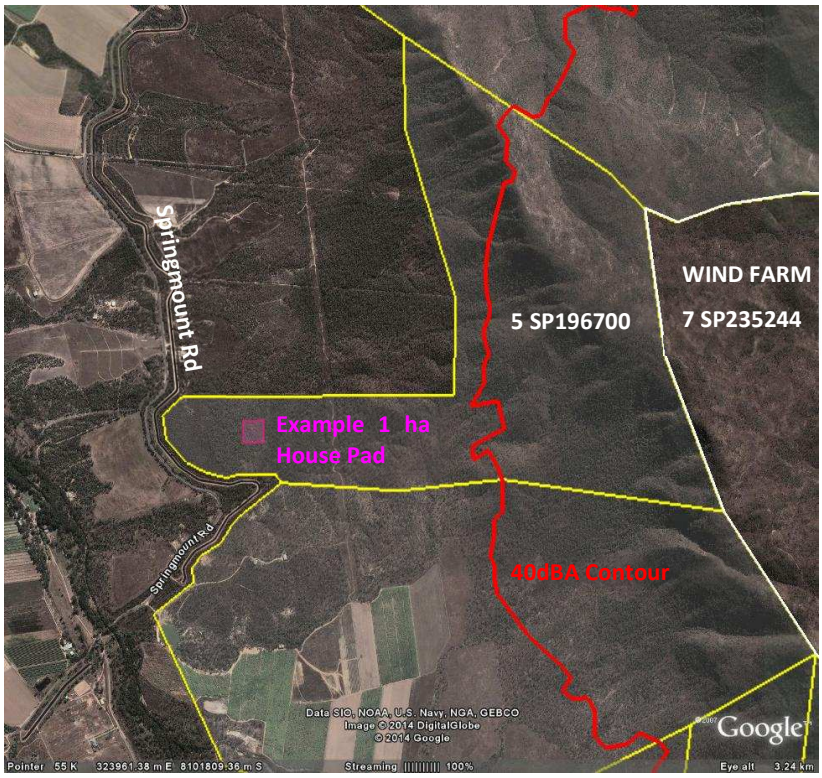

Figure 20 – Noise Zone – 40dBA Contour (Max. Noise) and Neighbouring Properties on Springmount Road

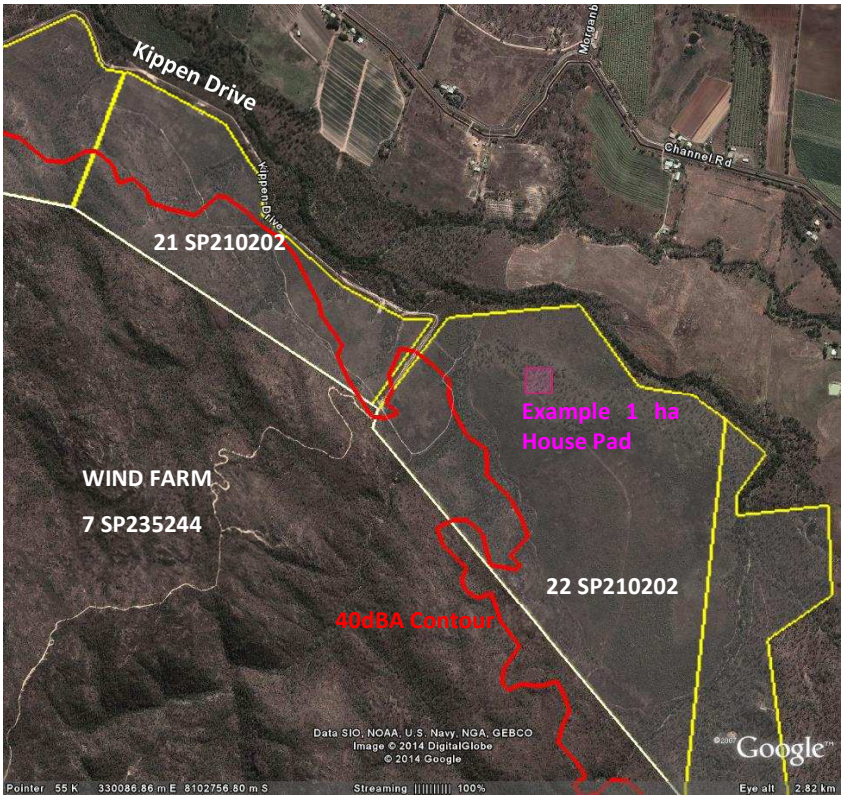

Figure 21 – Noise Zone – 40dBA Contour (Max. Noise) and Neighbouring Properties on Kippen Drive

Information Request 19

Question

The specified geographical location of the wind monitoring tower in the p 31 Analysis of Meteorological Data is within the High Road site. Please confirm if this wind data relates to High Road or Mt Emerald.

Response

This is an error within the report the location should be 329088E 8100271S.

Information Request 20

Question

Provide 12 months of continuous, time indexed, wind direction and speed data for the two Mt Emerald monitoring masts, and equivalent Figure 18 - Analysis of Wind Data plots.

Response

Please refer to **Attachment 6**; 2 year Data Verification Report for tower 9530 and tower 9531.

Information Request 21

Question

The Parsons Brinkerhoff analysis suggests that the wind patterns on the plateau could be complex. In that context, further justify the use of a single 130 degree wind direction 'worst case' modelling scenario, particularly for receptors such as 26, 78 and the prison.

Response

The selection of the single 130 degree wind direction represents the most common wind direction for the site. This will result in enhanced noise levels for all receptors generally downwind of the wind turbines. For a single wind turbine the increase is greatest immediately downwind reducing to zero perpendicular to the direction of the wind. For multiple wind turbines in a complex terrain it is likely that all receptors downwind and within ±60^{o} of the wind direction would experience enhanced noise levels, i.e. encompassing the receptors noted above.

The calculated noise levels at a wind speed at various wind speeds with the wind blowing generally in the direction of these sites is shown in below. The modelled noise level is shown for all wind turbines operating at normal operating noise levels. These cases do not occur often and the likelihood of wind more than 5m/s between 180 ± 10 degrees is low, typically fewer than 8 hours annually (<0.1%).

Site	Wind Direction	Maximum Calculated Noise Level [dB(A)] for Sites with Wind Direction							
		5m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
R26	180	30.6	35.8	38.5	40.0	40.9	40.8	41.1	41.5
R78	180/260	21.1 (260)	36.4 (180)	39.3 (180)	40.9 (180)	41.7 (180)	41.8 (180)	42.4 (180)	43.1 (180)
R88 - Lotus Glen Prison	180/130	21.7 (180)	26.2 (180)	27.9 (130)	29.3 (130)	29.8 (180)	29.6 (180)	29.8 (180)	30.1 (180)

Information Request 22

Question

Please verify that the modelling results are based on the largest and noisiest turbine that may be utilised on the site, for both audible and low frequency modelling. Provide manufacturer evidence that the sound power levels used in the modelling are valid.

Response

Sound Power Levels provided by the manufacturer are subject to strict warranties. Should the levels be found to be in breach of those warranted, the supplier is subject to substantial penalties enforceable under the contract.

The validation of the sound power levels form part of performance testing undertaken during initial operation of the turbines.

Latest noise reports show the make and model of turbines under consideration and the respective noise levels as provided by the manufacturer.

Information Request 23

Question

Provide an accuracy value for the noise modelling results in 1 km increments, and further information about comparisons of modelled v operational noise levels for similar, previously established wind farms.

Response

The key component of variance in the accuracy of noise modelling when compared to operational noise levels comes from the noise emission of the wind turbine.

During the contract negotiations for wind turbine supply, manufacturers are required to supply guaranteed wind turbine sound power levels. It is a requirement of the contract for these guaranteed sound power levels not to be breached. A detailed performance testing regime is undertaken during the operational phase of the wind farm to determine if the wind turbines are operating in accordance with their contractual obligations. Should a breach be found modifications to the operating performance of the turbine can be made to adhere to guaranteed levels, however this comes with a loss of turbine performance and as such incurs a large penalty enforceable under the contract.

For this reason it is widely accepted for manufacturers to supply guaranteed sound power levels with an added margin above actual operating sound power levels.

Noise modelling undertaken as part of the approvals process, uses the guaranteed sound power levels rather than the actual field performance data.

As an example, one of the wind turbines under consideration, REPower 3xM104 has a guaranteed maximum sound power level of 105.6dB(A), while actual performance testing reached 104.2dB(A).

Information Request 24

Question

Given the weak correlation between monitoring tower wind speed and receptor background noise, and the situation where turbine noise may be increasing more rapidly than background noise, please explain why the receptor noise level calculations do not exceed beyond 10 m/s.

Response

To remove any confusion around background levels and their application to noise limits, the wind farm layout has been determined to adhere to the minimum noise requirement of 40dBA, under the maximum noise emission from the turbines.

Beyond a wind speed of 10m/s (at a height of 10m above ground) the wind turbine has already achieved its maximum sound level, with noise emission decreasing as wind speeds increase further, due to the feathering of the blades to maintain optimum rotational speed. However, background noise levels will continue to increase with the increase in wind speed and as such the gap between wind farm noise and background will also increase.

Please refer to Information Request 15 for further explanation.

Information Request 25

Question

Demonstrate how the development will achieve the requirements of Part 2 and 3 of the Environmental Protection (Noise) Policy 2008. The report should also consider the Department of Environment and Resource Management guidelines - Planning for Noise Control.

Response

Part 2 and 3 of the Environmental Protection (Noise) Policy 2008, relate to the application of the policy and the setting of appropriate acoustic quality objectives for sensitive receptors. The applicable acoustic quality objectives are outlined in Schedule 1 of the Policy, with the objectives for a dwelling shown below.

Column 1	**Column 2**	**Column 3**			**Column 4**
Sensitive receptor	**Time of day**	**Acoustic quality objectives (measured at the receptor) dB**			**Environmental value**
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
dwelling (for outdoors)	daytime and evening	50	55	65	Health and wellbeing
dwelling (for indoors)	daytime and evening	35	40	45	Health and wellbeing
	night-time	30	35	40	Health and wellbeing in relation to the ability to sleep

Information Request 26

Question

Provide further justification for not considering wake effects in the modelling, given the Parsons Brinkerhoff recognition of the issue.

Response

The reference to wake effects in the Parsons Brinkerhoff report was made in respect of the impact it will have on the generation of energy from the wind turbines.

Sound Power Levels provided by the manufacturers are based on actual test measurements and thus include the impact of wake effects on the values recorded.

Information Request 27

Question

Please provide a description of the infrasound and low frequency modelling process and further justification of the turbine noise levels used in the modelling, such that the predictions can be confirmed.

Response

Updated noise modelling (**Attachment 5**) incorporates a detailed assessment of infrasound and low frequency noise.

Section 5.5 of NZS6808:2010 provides the following comments regarding low frequency noise and infrasound.

> *5.5.1 Although wind turbines may produce some sound at (ultrasound and infrasound) frequencies considered to be outside the normal range of human hearing these components will be well below the threshold of human perception.*
>
> *5.5.2 Claims have been made that low frequency sound and vibration from wind turbines have caused illness and other adverse physiological effects among a very few people worldwide living near wind farms. The paucity of evidence does not justify at this stage, any attempt to set a precautionary limit more stringent than those recommended in 5.2 and 5.3.*

Notwithstanding these comments, further consideration of low frequency noise and infrasound from wind turbines is considered as part of the assessment, to address the reference to inaudible noise included in Section 6.4 S5(b) of the PSA 01/11 wind farm code.

<u>Prediction Methods</u>

The ISO9613-2:1996 prediction method used for assessment of broadband A-weighted noise levels, has been developed using octave-band algorithms for octave band centre frequencies from 63 Hz to 8 kHz. The nominal lower frequency limit for the method therefore does not encompass the low frequency noise region of the sound spectrum, defined by the *Queensland EPA EcoAccess draft document Guideline: Assessment of low frequency noise* (LFN Guideline) as 20 Hz to 200 Hz for low frequency noise and below 20 Hz for infrasound.

Moreover, the method does not extend to the prediction of noise levels inside residential dwellings whereas the LFN Guideline nominates assessment of such levels indoors. On this basis, ISO9613-2:1996 is not preferred for prediction of either $L_{pAL,F}$ noise levels for the low frequency noise region nor L_{pG} noise levels for the infrasound region.

Alternatively, guidance provided in the Danish EPA document *Statutory Order of Noise from Wind Turbines - Translation of Statutory Order no. 1284 of 15 December 2011* (Danish EPA) has been developed specifically to provide a suitable planning stage assessment of low frequency wind

farm noise inside dwellings, using the $L_{pAL,F}$ descriptor. The Danish EPA method is therefore used here to assess predicted levels of low frequency noise.

Regarding prediction of G-weighted noise levels we are not currently aware of any reliable, validated methods for predicting how infrasound levels propagate away from any particular source, including wind turbines. However, while the Danish EPA method has not been developed specifically for assessment of G-weighted noise levels, the indoor one-third octave band noise levels predicted using the method for the frequency range 10 Hz to 160 Hz can be used to estimate indicative levels of G-weighted noise. In the absence of a suitable prediction method tailored to G-weighted noise levels, results of the Danish method are used to provide estimates of G-weighted noise levels.

Information Request 28

Question

Please provide researched and/or technical information about probable outdoor/indoor low frequency attenuation effects.

Response

As noted above in Information Request response 27 the Danish EPA method is used to predict indoor noise levels.

Information Request 29

Question

Please explain the basis for the low frequency 60dB limit, and if that is an outside limit.

Response

The Low frequency limit proposed is 50 dB(Linear) indoors based on the then current draft Queensland Ecoaccess Guideline. This has recently been replaced and the new low frequency goal is 55 dB(Z). In this instance the Z and linear weighting are the same, hence the low frequency goal has been increased.

To convert the indoor noise level goal to an outdoor noise level goal 10 dB was added to the indoor level for account for the facade reduction, making the external noise level goal 60 dB(Linear). Using the updated guideline the goal would now become 65 dB(Z).

2.6 Visual Impact Assessment

Information Request 30

Question

The visual assessment provided is not considered sufficiently comprehensive for a project of this magnitude, and which has been the subject of considerable public comment to date.

The visual impact elements of the application will be assessed in accordance with the draft National Wind Farm Development Guidelines C.4.1-4.3.

Please provide a more comprehensive assessment that conforms with the contents, structure and methodology of those nominated provisions of the guidelines. The assessment should also consider the visual impacts of the required access road up the eastern escarpment of the site. Further information will be requested about that access road (see design).

Response

A detailed Landscape and Visual Impact Assessment (LVIA) (**Attachment 7**) undertaken by Green Bean Design (GBD) involved a comprehensive evaluation of the landscape character in which the Mount Emerald wind farm and ancillary structures would be located, and an assessment of the

potential landscape and visual impacts that could result from the construction and operation of the wind farm, taking into account appropriate mitigation measures. The assessment was based on 70 turbines with a maximum blade tip height of 130.5m from ground level to tip of blade and a maximum rotor diameter of up to 110m. Whilst the final turbine model has not yet been determined from a visual impact assessment perspective the minor differences between the candidate models is unlikely to materially affect the outcome of the LVIA. A summary of this assessment is provided below.

The LVIA was prepared with regard to a number of existing planning and industry guidelines that relate to the assessment and determination of potential landscape and visual impacts with specific regard to wind farm developments. These guidelines include the:

- Draft National Wind Farm Development Guidelines;
- Wind Farms and Landscape Values National Assessment Framework; and
- Auswind Best Practice Guidelines.

Whilst none of these guidelines are mandatory the LVIA adopted their key elements including the following methodologies:

- Desktop study addressing visual character and identification of view locations within the
- Surrounding area;
- Fieldwork and photography;
- Preparation of ZVI (zone of visual influence)diagrams;
- Assessment and determination of landscape sensitivity;
- Assessment of significance of visual impact; and
- Preparation of photomontages and illustrative figures.

Please refer to document;

Attachment 7 - Landscape Visual Impact Assessment

Information Request 31

Question

Number the turbines shown in the photomontages and provide a ground level (AHD) for the turbines visible in those montages.

Response

Photomontages included in **Attachment 8 - Trueview Photosimulations** include wind turbine numbering and ground level data.

Further montage and visual simulations have been prepared and are included as;

- **Attachment 9 - DTM Simulations**
- **Figures 16 – 48 of Attachment 7 - Landscape Visual Impact Assessment**
- **Attachment 10 - Access Road Visual Simulations**

Information Request 32

Question

Number or name each of the main ridges and valleys on the Mt Emerald Plateau to assist with assessment of visual impact.

Response

Photomontages included in **Attachment 8 - Trueview Photosimulations** include ridgeline identification.

Further montage and visual simulations have been prepared and are included as;

- **Attachment 9 - DTM Simulations**
- **Figures 16 – 48 of Attachment 7 - Landscape Visual Impact Assessment**
- **Attachment 10 - Access Road Visual Simulations**

Information Request 33

Question

Explain the rationale for the selection of viewpoints.

Response

Viewpoints were selected to represent uninvolved residential dwellings and public view locations from surrounding road corridors. Whilst it is possible for any residential dwelling with a view toward the project turbines to be potentially affected it is not feasible or practical to prepare a photomontage for each and every residential dwelling within the project viewshed.

The photomontages locations have been selected to represent views from:

- Residential dwellings and occupied buildings within 2 km of the wind turbine locations;
- Local road corridors;
- Residential areas and urban localities; and
- Highways.

The photomontages locations have also been selected to provide representative views from a range of varying distances which illustrates the potential influence of distance on the magnitude of visual effects.

Final selection of viewpoints follows the on-site inspection and collection of photography from a range of prospective sites throughout the district.

The final number of representative viewpoints used by respective consultants is:

- TRUESCAPE – 10 viewpoints
- GREENBEAN – 13 viewpoints

The locations of these viewpoints are shown below.

- **Page 2 of Attachment 8 - Trueview Photosimulations**
- **Figure 16 of Attachment 7 - Landscape Visual Impact Assessment**

Information Request 34

Question

Provide a viewshed analysis showing houses and other sensitive receptors which will be within view of various numbers of turbines

Response

Residential Dwellings within 2km of a wind turbine

The Landscape Visual Impact Assessment (LVIA) identified a total of 11 uninvolved residential view locations within the Mount Emerald wind farm 2 km viewshed. Unoccupied residential dwellings have been included and assessed as part of this LVIA where structures and buildings were considered to be habitable at the time of the field work.

An assessment of each potential residential view location indicated that for the Mount Emerald wind turbine design layout:

- 1 of the 11 residential view locations has been determined to have a nil visual significance;
- 1 of the 11 residential view locations has been determined to have a low visual significance;
- 2 of the 11 residential view locations have been determined to have a low to medium visual significance;
- 2 of the 11 residential view locations have been determined to have a medium visual significance;
- 5 of the 11 residential view locations have been determined to have a medium to high visual significance; and
- 0 of the 11 residential view locations has been determined to have a high visual significance.

The field assessment for the majority of residential view locations was undertaken from the closest publicly accessible location, with a conservative approach adopted where there was no opportunity to confirm the actual extent of the available view from areas within or immediately surrounding the residence. It is anticipated that some visibility ratings will be less than those determined subject to a process of verification from private property.

Residential Dwellings beyond 2km of a wind turbine

The majority of residential dwellings located beyond a 2 km distance from the wind turbines are unlikely to be significantly impacted by the wind farm development and have been determined to have an overall low to medium and medium visual significance between 2 km and 5 km of the wind turbines. The localised influence of topography, as illustrated in the ZVI diagrams, has some direct impact on the extent and nature of views between the 2 km and 5 km viewshed.

Future Residential Dwellings

In general existing residential dwellings in the vicinity of the wind farm are located below surrounding ridgelines and where exposed tend to include a degree of shelter from windbreak planting or tree planting around dwellings. The tendency to locate residential dwellings in sheltered situations also acts to limit the extent of available views across the surrounding landscape for the majority of residential view locations, although there are a small number of dwellings that appear to have been located on properties to take advantage of distant and panorama views.

Potential future planning considerations for residential dwellings will be able to take advantage of any approved layout design for the Mount Emerald wind farm when determining the optimal location for residential dwellings on individual portions of land to minimise views toward wind turbines if desired.

In some circumstances future residential dwellings could be located to take advantage of local topographic features in order to screen views toward wind turbines or implement in advance mitigation measures such as tree planting for windbreak and/or screening purposes.

Should residential dwellings be constructed on existing portions of land immediately adjacent to the wind farm site, there is likely to be an associated visual impact not only with additional residential structures within the landscape but also a range of domestic infrastructure associated with it.

Towns and Localities

There are a small number of towns and localities within the Mount Emerald wind farm viewshed. These generally occur along, or in proximity to the Kennedy Highway corridor and to the east of the wind farm project area. Views toward the Mount Emerald wind farm project site from towns and localities are partially restricted by a combination of landform, vegetation and built

structures within urban areas. Overall the Mount Emerald wind farm will have a very low to low visual impact on the majority of residential dwellings within surrounding towns and localities.

For further information refer to **Section 8 and Figures 11 – 13 and 15 of Attachment 7 - Landscape Visual Impact Assessment.**

Information Request 35

Question

Relate the typical turbine height to the height of existing powerline pylons on the skyline.

Response

Generally the height of the existing powerlines is approximately 40m, although this varies across the site depending on the design and function of the powerline towers. The turbine dimensions used in the LVIA has a hub height of 80m with rotor diameter of 101m for an overall tip height of 130.5m.

As new turbines come onto the market, it is possible the final turbine selected may exceed, in minor respects, the assessed turbine dimensions. Minor increases in size are unlikely to alter the determination of visual significance for residential view locations included in the LVIA.

Where possible the location of the powerline towers and the on-site 80m monitoring tower have been identified in the photomontages.

Information Request 36

Question

Identify which ridges (as per 32) are on the skyline when viewed from the north, east, south-east, southwest and west.

Response

Viewpoint locations and identified ridge lines are shown in the figure below.

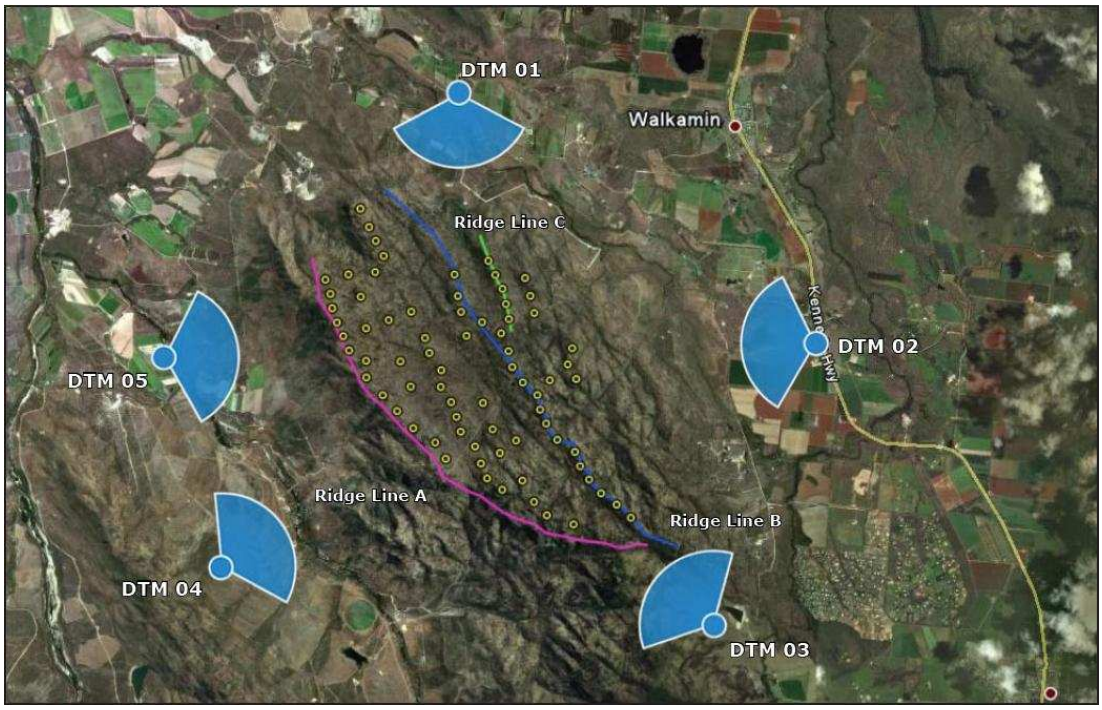

Figure 22 – Digital Terrain Model – Viewpoint Locations and identified Ridge Lines

Document **Attachment 9 - DTM Simulations** shows the simulations prepared for each of these viewpoint locations.

Information Request 37

Question

Nominate the number of turbines which will be visible on the skyline as seen from the above view directions stipulated in 36, and the total length in km (north to south) of the visible array of skyline turbines, relative to the total length of visible skyline ridge (above RL 500).

Response

Viewpoint	# WTG visible	Length of view	Height of view	Length of visible array	Height of visible array	Wind farm in field of view
		(km)	(km)	(km)	(km)	%
DTM 01	29	5.4	2.4	2.9	0.3	7.0
DTM 02	60	6.6	2.9	3.3	0.4	6.7
DTM 03	2	7.2	3.2	0.2	0.2	0.1
DTM 04	27	6.4	2.9	2.6	0.3	4.5
DTM 05	26	6.3	2.8	2.5	0.4	5.2

Notes

1 – calculations performed using the 75 wind turbine layout originally proposed. Reduction in wind turbines will reduce the calculations.

2 – if any part of the WTG is visible it is included

3 - Primary Human Field of View recognised as 124^{O} horizontal and 55^{O} vertical

4 – Calculation based on location of viewpoint and centre of wind farm site 32800E 8101000N

5 – height of array based on difference between lowest RL and highest RL plus the tip height of WTG (130.5m). No allowance made for terrain or obstacle screening.

Document **Attachment 9 - DTM Simulations** shows the simulations prepared for each of these viewpoint locations.

Information Request 38

Question

For each of the view directions stipulated in 36, provide one 'zoomed-in' photomontage showing the scale and prominence of the mountain range and turbines, as they would be perceived by viewers. Zoomed-in images are needed because the photomontages presented are panoramic, and minimize the apparent scale of landscape features and turbines.

Response

Document **Attachment 9 - DTM Simulations** shows the "zoomed-in' simulations prepared for each of these viewpoint locations.

Information Request 39

Question

Assess visibility from, and impacts on, any existing tourist developments/facilities (e.g. Allawah Retreat spa lodges).

Response

Allawah Retreat is included in assessment (**Attachment 7 - Landscape Visual Impact Assessment**) as location R60.

The visual significance at this location was considered to be NIL given the views toward wind turbines from the main dwelling and cabins will be screened by rising landform and ridgeline topography to the west of the occupied area.

The Landscape Visual Impact Assessment (LVIA) includes photomontages (**Attachment 7 - Landscape Visual Impact Assessment**, **Figures 22 to 25)** which represent the expected views from this location and confirms screening effect of local landform.

The LVIA provides for an assessment of visibility for dwellings and developments surrounding the proposed wind farm development to a distance of approximately 10km.

Information Request 40

Question

It is noted that the application has not assessed views from any residences (there are 10 within a 2km radius). Analysis should be provided as to which residences are likely to experience significant, moderate or minor impacts on their visual amenity.

Response

The Landscape Visual Impact Assessment (LVIA) provides for an assessment of visibility for dwellings and developments surrounding the proposed wind farm development to a distance of approximately 10km.

Please refer to Question 34.

Information Request 41

Question

Please provide estimates of the number of residents within the various viewsheds.

Response

The Landscape Visual Impact Assessment (**Attachment 7 - Landscape Visual Impact Assessment** - **Section 8)** includes a breakdown of surround viewsheds in proximity to the wind farm and an analysis of the significance.

Estimates of the respective population numbers is based on the data for Tablelands Regional Council in Census 2011;

- U01 - Atherton – population 6,700
- U02 - Tolga – population 878
- U03 - Rangeview (Tolga West) – population 1,150
- U04 - Walkamin – population 255
- 2.5 persons/household

Viewshed	75 Wind Turbine Layout	63 Wind Turbine Layout
	Estimated Population	
Within 2km	98[1]	73[2]
L01	38	38
L02	28	28
L03	5	5
L04	10	10
L05	38	40
L06	8	8
L07	35	35
L08	50	50
L09	20	43[3]
L10	5	5
U01	6,700	6,700
U02	878	878
U03	1,100	1,100
U04	255	255
F01[4]	500	500
F02[4]	0	0
F03[4]	0	0

1 – includes backpacker accommodation (50 person) and Allowah Retreat (20 person)

2 - includes backpacker accommodation (50 person)

3 - includes Allowah Retreat (20 person)

4 – F01 Lotus Glen Prison (500 person), F02 Tableland Mill, F03 Springmount Waste Facility

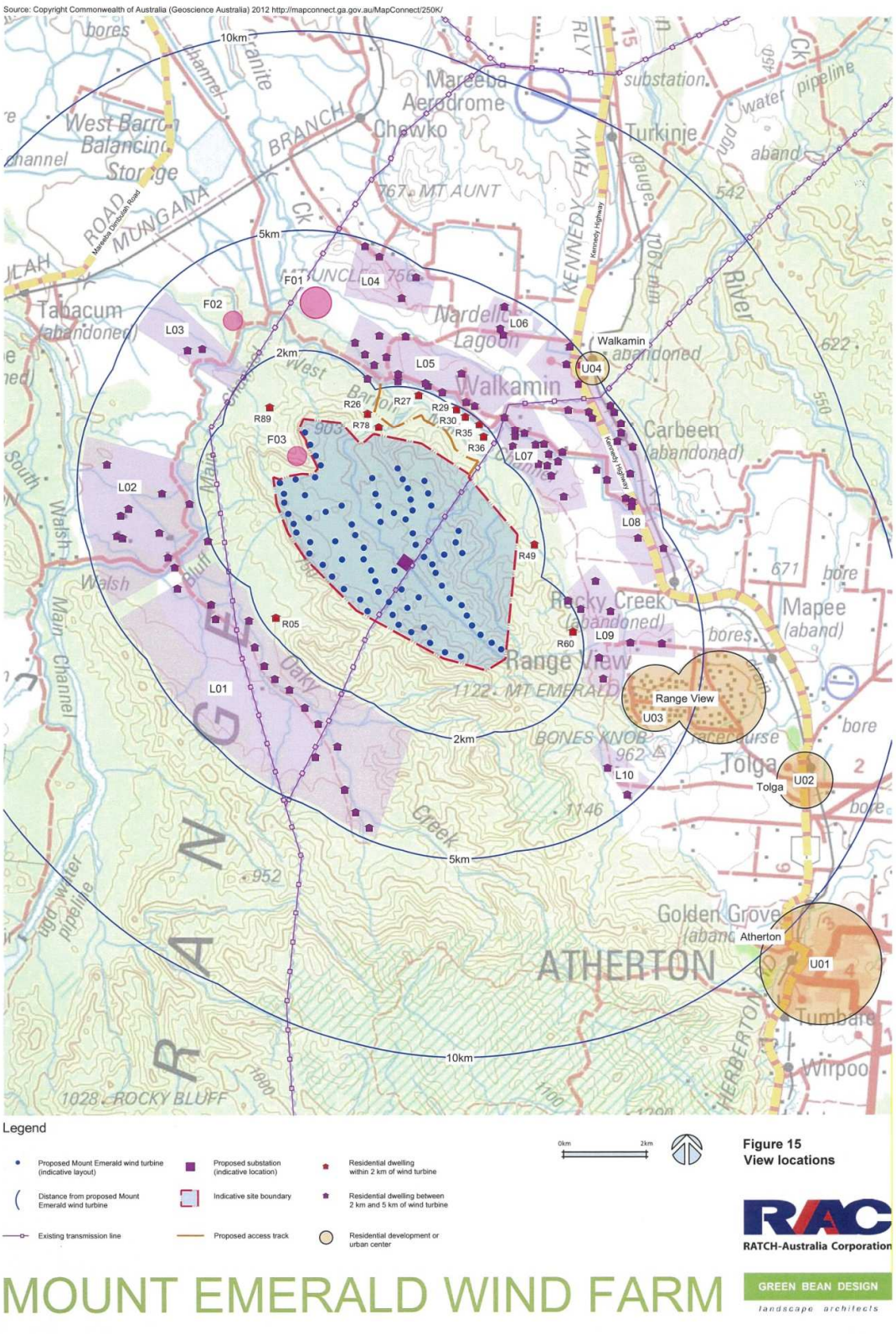

Figure 23 – View Locations

2.7 Shadow Flicker

Information Request 42

Question

Provide an A3 version of the Shadow Flicker Map with:

- ***(i) better colour contrast between the 1-10 to 30-50hr categories,***
- ***(ii) numbered receptors, and***
- ***(iii) the current cadastral boundaries***

Response

Please refer to document **Attachment 11 - Shadow Flicker Assessment** for response.

Information Request 43

Question

There are a number of vacant rural lifestyle lots external to the site that could be potentially impacted by unacceptable (i.e. more than 30hrs pa) shadow flicker impacts. Please identify these lots, and indicate how these impacts will be addressed, given that development conditions requiring retrofitting or buffering of dwellings on land that is not the subject of the application cannot be lawfully imposed.

Response

Figure 24 below uses the information contained in **Attachment 11 - Shadow Flicker Assessment** to show the impact of shadow flicker on the neighbouring properties to the wind farm.

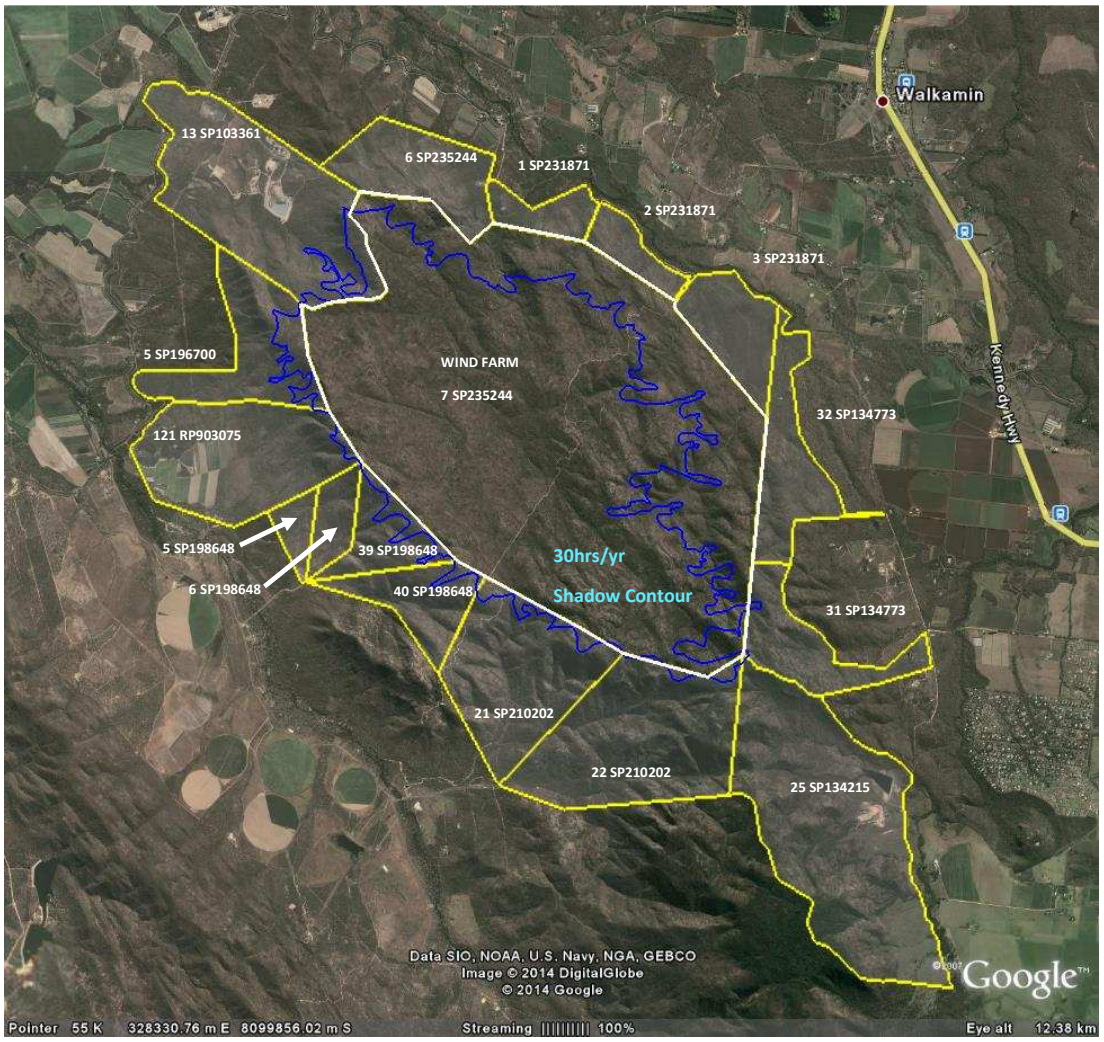

Figure 24 – Shadow Zone – 30 hours per year

The vacant properties identified as potentially experiencing more than 30 hours of shadow flicker are shown in the table below.

Property Description	Property Area (ha)	Shadow Zone Area (ha)	Shadow Zone Distance (m) from WF boundary	Notes
Lot 5 SP178237	228.9	35.7	560	Area subject to +30hrs shadow is within 600m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Springmount Rd) to zone edge is 1800m.
Lot 39 SP 198648	117.4	24.7	454	Area subject to +30hrs shadow is within 500m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Cascade Cl) to zone edge is 1200m
Lot 40 SP 198648	133	8.4	487	Area subject to +30hrs shadow is within 500m of common boundary of wind farm. Topography of land in this zone is not considered probable for dwelling construction. Distance from road access (Cascade Cl) to zone edge is 1600m
Lot 21 SP 210202	333.7	17.5	290	Area subject to +30hrs shadow is within 300m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Lemontree Dr) to zone edge is 2000m
Lot 22 SP 210202	434.9	6.3	195	Area subject to +30hrs shadow is within 2000m of common boundary of wind farm. Topography of land in this area is not considered probable for dwelling construction. Distance from road access (Lemontree Dr) to zone edge is 2600m

All of these properties are located to the west and south of the proposed wind farm. The areas on these properties subject to greater than 30 hours per year of shadow flicker are predominantly described as steep and rugged terrain, and hence would prove difficult for construction of a dwelling. For these properties more preferential locations for construction are available closer to the public road access (Springmount Rd, Cascade Close, Lemontree Drive) outside of the 30 hours per year shadow zone.

2.8 Flora and Fauna Assessment

Information Request 44

Question

Please provide the following additional information:

- ***a) EPBC Protected Vegetation Communities - discussion on the occurrence (or otherwise) of EPBC protected vegetation communities identified by the Protected Matter Report.***
- ***b) Regional Ecosystems Mapping - the Appendix D2 amended mapping is difficult to interpret. Please provide appropriate shading.***
- ***c) Queensland Herbarium (HERBECS) database - Please define the search area. The search area should be extended to a 25km radius, or the centre point of the search area should be located to best capture relevant habitats.***
- ***d) Field Survey - Please clarify the location of the high intensity and low intensity sites and show these on Appendix A2.***
- ***e) Queensland Museum and Birds Australia Atlas databases - If these were searched, then that data should be provided. If they were not searched, then searches should be provided.***
- ***f) Wildnet (Wildlife Online) database - The data base search area should be increased to 25km, or the centre point of the search area should be located to best capture relevant habitats.***
- ***g) Known & Expected species assemblage - The species listing in Appendix I2 is incomplete. Not all species listed in the site profiles are reported in Appendix I2 and vice versa.***
- ***h) Conservation Significant species - There are inconsistencies in the discussed flora species. Not all species are conservation significant in the context of the report (e.g. eucalyptus lockyeri). Conservation significance should be clearly defined.***
- ***i) The likelihood of occurrence is only addressed for the EPBS search tool results, and not for the WildNet and HERBRECS search results. Species that are listed to occur in the WildNet and HERBRECS search results are noted in the literature review but no reason is given for their exclusion from consideration. Further discussion is required about the likelihood of occurrence.***
- ***j) Weed species - Comprehensive discussion of legislative requirements should be provided. There are inconsistent levels of discussion (e.g. grader grass v lantana). The possible beneficial project consequences should be discussed in relation to weed and feral species.***
- ***k) The data sources for all fauna species listed in Appendix B1 should be provided.***
- ***l) The correct species status under the EPBC Act and the Nature Conservation Act should be provided for all species.***
- ***m) Biodiversity status should be provided for Regional Ecosystems.***

Please provide sufficient/additional/further detail and discussion about the following:

- ***n) the likelihood of occurrence of the EPBC Act protected vegetation communities***
- ***o) the likelihood of occurrence of all relevant conservation significant species***
- ***p) species profiles (life history information) for conservation significant species and identification and assessment of potential impacts, including known threatening processes***
- ***q) existing habitat values of the site in the context of both conservation significant and other flora and fauna species***
- ***r) Wildlife/connectivity corridors should be discussed at internal site, local and landscape levels, including any possible consequences that may arise from the project. Discussion should include all fauna and plants.***

s) ***Ridgelines (particularly when associated with rock pavements) have been identified as being ecologically significant. The construction and operational impacts on these areas need to be clearly identified, what proportion will be impacted, and what the possible impacts on Homoranthus porteri, Plectranthus amoenus and Grevillea glossadenia will be.***

t) ***Back on Track species and/or regionally significant species***

Response

A comprehensive Environmental Impact Statement (EIS) has been prepared as part of the requirements for project approval under the *Environment Protection and Biodiversity Conservation Act* (EPBC). The EIS has been prepared in accordance with the specific requirements and guidelines provided by the federal Department of the Environment (DOTE) and provides information about the action and its relevant impacts, to allow the Minister to make an informed decision.

The EIS includes a range of flora and fauna investigations, the nature and level of investigation undertaken is related to the likely extent and gravity of the potential impacts.

It is considered the EIS provides the additional information required to answer the questions outlined above.

At the present time the EIS is currently awaiting acceptance by the Department of the Environment for release to the public. Due to the size of the EIS it has not been included as an Attachment to this response however; it will be provided separately as a stand-alone document once released by the Department of the Environment.

Information Request 45

Question

If the Civil Aviation Authority has any lighting requirements in relation to the proposal, then fauna assessments must consider the effects of this requirement.

Response

CASA is responsible for regulating civil aircraft operations, including operational safety in and around aerodromes and along air traffic routes. In relation to wind farms, CASA has two concerns:

- the penetration of wind turbines into the obstacle limitation surface (OLS) and the Procedures for Air Navigation Services (PANS-OPS) around an aerodrome; and
- the potential for wind farms to be a hazard to aviation operations.

The OLS is the airspace around an aerodrome, defined by an imaginary surface, which is maintained free of obstacles to permit the safe arrival of aircraft under a visual approach. Similarly, the PANS-OPS surface is to safeguard an aircraft from collision with an obstacle when using an instrument approach.

In September 2009, AC 139-18(0) Obstacle Marking and Lighting of Wind Farms was withdrawn after Civil Aviation Safety Regulations 1998 (CASR) ASR 139 (Aerodromes) was found not to be applicable to areas located away from aerodromes regulated under CASR 139.

Revisions to AC 139-18(0) may incorporate a requirement to provide obstacle lighting for structures 150m or more above ground level, unless an aeronautical study can show that the structure will not be an obstacle.

The Mount Emerald wind turbines do not exceed the 150m tip height threshold and, in accordance with current CASA guidelines, will not require night time obstacle lighting.

Information Request 46

Question

Demonstrate how the development will achieve the requirements of Part 3(7) - Environmental Values and Acoustic Quality Objectives of the Environmental Protection (Noise) Policy 2008: The environmental values to be enhanced or protected under this policy are - (a) the qualities of the environment that are conducive to protecting the health and biodiversity of ecosystems, in the context of any impacts on fauna.

Response

It is anticipated the health and biodiversity of the ecosystem in the context of fauna will be assessed and determined under the provision of the *Environment Protection and Biodiversity Conservation Act* (EPBC).

To address the requirements of the EPBC Act and to allow determination to occur in this respect, a comprehensive EIS has been prepared.

The concept of wind farm noise has been addressed throughout the EIS in respect of the various species under investigation.

2.9 Further Reports

Information Request 47

Question

The application's flora and fauna assessment identifies a need for further surveys, investigations and studies and these should be provided. The proposed development is a controlled action under the federal EPBC Act and is required to be assessed by environmental impact statement. A copy of that EIS should be provided.

This information is considered to be integral to assessment of the project.

Response

A comprehensive Environmental Impact Statement (EIS) has been prepared as part of the requirements for project approval under the *Environment Protection and Biodiversity Conservation Act* (EPBC). The EIS has been prepared in accordance with the specific requirements and guidelines provided by the federal Department of the Environment (DOTE) and provides information about the action and its relevant impacts, to allow the Minister to make an informed decision.

The EIS includes a range of flora and fauna investigations, the nature and level of investigation undertaken is related to the likely extent and gravity of the potential impacts.

At the present time the EIS is currently awaiting acceptance by the Department of the Environment for release to the public. Due to the size of the EIS it has not been included as an Attachment to this response however; it will be provided separately as a stand-alone document once released by the Department of the Environment.

Information Request 48

Question

Provide social and economic impact assessment of the proposal that addresses both local and regional considerations.

Response

It is expected the proposed wind farm will bring positive benefits (direct and indirect) to the local, regional and national economies throughout the life-cycle of the project. The phases will typically see such benefits that can be broadly described as the design & development, construction & commissioning, operation and decommissioning phases of the project.

At a direct level, wind farm development generates employment opportunities within the local area during construction and maintenance phases of the project. It is anticipated workers and contractors required for the project will include plant operators, truck drivers, mechanics, welders, fencers, electricians, labourers and other individuals typically used in a civil construction context.

The economic impact assessment undertaken of the Mount Emerald wind farm proposal by Cummings Economics **Attachment 12 - MEWF Economic Impact Report**, determined that the local benefits to the Tablelands economy would be in the order of $30m from a $382m project with a projected 300 jobs to be created directly and indirectly (flow on effects) from the construction. The 'Review of the Australian Wind Industry 2011 Report, estimates the total direct employment generated by wind farm construction (based on recent study for Hallett wind farms) is 0.7 jobs per MW locally. Mt Emerald has been designed to generate approximately 225MW, which equates to a total of 158 local jobs directly, for the construction period, which is expected to last 24 months from project commencement.

Cummings Economics also estimates that during the operating phase, annual benefits will be of the order of 57 additional jobs (including flow-on effects) and about $5.6m per annum addition to the Tablelands' Gross Regional Product.

2.10Substation

Information Request 49

Question

Provide further details about the proposed substation, including an indicative layout, dimensions and area, ad any proposed fencing.

Response

Attachment 13 shows a preliminary configuration of the switchyard and collector substation works to enable the wind farm to be connected to the existing electricity grid network.

The general location of the works is shown in **Attachment 1**.

2.11Traffic Impact

Information Request 50

Question

Hansen Road is used extensively by the Arriga mill. Please provide evidence that Bundaberg Sugar has been consulted as part of the Traffic Impact Assessment process.

Response

Please refer to the **Attachment 14** for a copy of correspondence from RPS, dated 9 April 2014. The attached correspondence provides evidence of ongoing consultation with MSF Sugar Limited, the current owners of the sugar mill since 2012, previously operated by Bundaberg Sugar.

Feedback from consultation with MSF Sugar Limited raised the concern of potential conflict between cane haul traffic, using Hansen Road and Springmount Road during the crushing season, and heavy vehicle traffic using the same roads during the construction phase of the proposed development. However, it is their view that these potential conflicts can be appropriately managed and mitigated by establishing a communication protocol between the construction contractors and the operations management at the Mill, such that the mill is given appropriate advanced warning (nominally 24 hours) of scheduled heavy vehicle movements upon Hansen and/or Springmount Roads.

It is recommended that a communications protocol between the MEWF and Sugar Mill be implemented in the Construction Environmental Management Plan, with the requirement to provide a 24 hour notification to the sugar mill of scheduled heavy vehicle movements upon Hansen and/or Springmount Roads during the construction phase of the wind farm.

Information Request 51

Question

Demonstrate that the vertical profiles of Hansen and Springmount Roads are capable of accommodating any proposed drop deck or low loader transport of turbine components.

Response

Sinclair Knight Merz (SKM) undertook a technical review of the Information Request questions 51 to 54. Refer to **Attachment 15** for a copy of their technical engineering response.

SKM assessed the transport route the turbine components would take along Hansen Road and Springmount Road to the site access at Kippen Drive. The assessment was based upon the critical dimensions obtained from wind turbine suppliers.

Of the 9 vertical profiles reviewed, only **one (1)** location (Eastern Approach to Granite Creek Causeway, Chainage 5775) on Hansen Road has some possible vertical crest issues for low loaders.

It was recommended that a detailed survey of that section of road be undertaken and a detailed reassessment be undertaken of the potential conflict during detailed design.

It is anticipated Council will require this reassessment to be undertaken as a condition on the development approval, requiring detailed design to the submitted (by the Proponent or EPC Contractor) for approval.

Information Request 52

Question

Further justify the 40 single unit truck trips per tower, and indicate if the traffic figures take into account the possible external sourcing of road base material and concrete.

Response

Sinclair Knight Merz (SKM) undertook a technical review of the Information Request questions 51 to 54. Please refer to **Attachment 15**, page 4 for a copy of their technical engineering response.

The traffic figure of 40 single-unit truck trips per tower has been based on ENERCON Specification E-82 – Access Roads and Crane Platforms (77m Steel Tower) and possible external sourcing of road base and concrete. Clause 2.3 of the E-82 specification states that *"Use approx. 20 trucks to transport the crane accessories to the crane"*. On top of these, it was assumed that there would be another 20 truck trips per tower for road base and material during construction of the access road and Hansen Road pavement rehabilitation if required due to the heavy vehicle loading. This 40 single-unit truck trips per tower from the original specification did not include various tower components including the foundation construction and the concrete towers.

Based on the new information provided regarding the transport of concrete and other wind tower components, the calculation of truck trips has been revisited. Therefore, the new calculation for all road base materials and all tower components including foundation construction, steel tower and blades were considered for the traffic generation for the wind farm.

This earlier assumption was 40 single-unit truck trips during construction per tower through the road network for the 2 year construction period, making it 6,400 truck movements through the access during the construction phase. It was also assumed that a maximum of six semi-trailers (adapted to carry the propeller blades) per tower during construction. A maximum of 80 wind towers were planned to be constructed, equating to 960 truck movements through the access during the construction phase. However, it should be noted that MEWF revised the number of towers to 75 for the new calculation of vehicle movements.

The new calculation details various vehicle types and calculates the trips generated by those various types of vehicles during different activities and phases of the construction period. For calculation purposes it is assumed that pavement rehabilitation of entire length of Hansen Road will be required due to the heavy loading. It is assumed that 150mm gravel overlay will be required for Hansen Road. A detailed pavement impact assessment should be carried out before construction activities. Table 2 of the SKM Report (located in **Attachment 15**) shows a summary of vehicles movements during the 2 year construction and wind towers installation period. Details of these calculations are attached also provided in this report.

It should be noted the external sourcing of materials for the road base and the tower foundation will be undertaken within the in the first 6 months, so there will be increased activities in the first six months during the construction period.

This leads to the new figure of Annual average daily traffic (AADT) of 79 (arriving loaded and leaving the site empty) during different phase of the project. It was assumed for calculation purpose that there will be 300 days of working days per year, which may vary in reality depending on other circumstances and weather condition.

It was also assumed that there was 12 working hours per day and peak hour traffic generation during construction and operation is 12% of the AADT which equates to approximately 10 vehicles per hour in the peak hour. Note that the inclusion of the new information regarding the transport of concrete and other wind tower components equates to only 2 additional vehicles per hour in the peak hour.

Information Request 53

Question

Provide details on anticipated worker numbers and further justification of the 30 worker vpd figure.

Response

Sinclair Knight Merz (SKM) undertook a technical review of the Information Request questions 51 to 54. Please refer to **Attachment 15**, page 6 for a copy of their technical engineering response.

It was assumed in the previous report that a total of 30 vehicles per day (vpd) will be generated for workers during construction. It was also assumed that eight hour working days with daily traffic volumes during construction not generating typical peak hours but is instead spread equally over this working period.

Following further revisions regarding Kippen Drive, internal access road construction within Wind Farm site and various construction activities relating to wind tower foundation construction, crane assembly, tower installation and energy commission; the anticipated worker numbers have been recalculated with a total number of anticipated workers estimated as 154 people per day.

It should be noted it is assumed that a 30-seater bus will bring in workers to site from nearby towns, and there will be some workers coming to site by individual vehicles. A maximum of 30 worker vehicles per day was assumed in the previous report taking this into account.

Information Request 54

Question

Provide an estimate of the anticipated traffic increase of Hansen Road that will result from construction and operation of the development.

Response

Sinclair Knight Merz (SKM) undertook a technical review of the Information Request questions 51 to 54. Please refer to **Attachment 15**, page 7 for a copy of their technical engineering response.

The calculation of traffic generation for construction and operation of the development and the detail of the calculations is shown in the report.

Traffic calculations have also made allowance for a public viewing area, if such an area is required under the approval.

The report concludes there will be an increase of between 1.4 - 5.5% along Hansen Road during construction and 2 - 7 % for operations.

2.12Maintenance Depot

Information Request 55

Question

The p 17 references to the maintenance depot are noted. Please provide further information including a location, indicative layout, dimensions and area, indicative building numbers and sizes, access information, and any proposed fencing.

Response

An operations and maintenance building will be constructed adjacent to the substation compound. This building will house the wind farm operational infrastructure, including monitoring and communications equipment. Maintenance facilities would include a store, work area and staff amenities, supported with rainwater tanks and a septic system. Car parking for operations and maintenance staff will also be provided adjacent to the substation compound.

The final number and design of buildings is not known at this time however buildings will be subject to approval under council process. Information on the layout of the building has been provided by the relevant wind turbine manufacturers with the largest configuration shown below with an overall area of 460m^2 (approx. 27m x 17m).

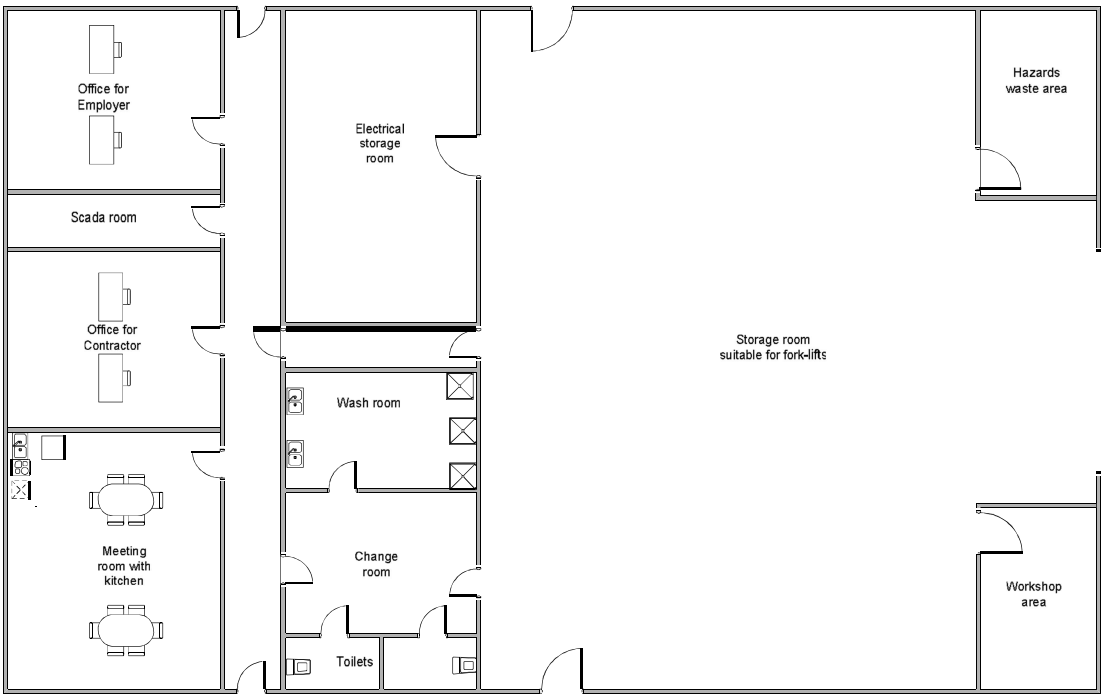

Figure 25 – Maintenance and Storage Facility – Example

2.13Design

Information Request 56

Question

Provide a conceptual design, including long and cross-sections, of any proposed access road up the eastern escarpment. This should include design details and criteria and treatments for matters such as: the proposed alignment, maximum grades, minimum radii, vertical curve requirements, extent of cut & fill, batter treatments, drainage, revegetation, etc. This will inform visual impact assessment, and the relevant management plans and operational manuals. The design should be overseen by an environmental engineer with expertise in this area.

This design should incorporate design guidelines for road construction in environmentally and visually sensitive locations, and should take account of the environmental and conceptual design is provided.

Response

Access to the site will be gained from the Kennedy Highway via Hansen Road, then the realigned Springmount Road/Kippin Drive intersection along Kippin Drive and then rising to the wind farm plateau. A preliminary access road design has been undertaken for the section of road from the end of Kippen Drive to the wind farm plateau. This design has been undertaken in accordance with road requirements supplied by wind turbine manufacturers and local engineering experience.

The preliminary design is included as **Attachment 16**.

Visual simulation of the Access Road is also provided as **Attachment 10**.

Information Request 57

Question

Further justify the proposed 10m width for construction access roads, given the identified environmental impacts.

Response

An allowance of 10m has been made for all roads throughout the site. The disturbance footprint includes the actual formed road surface (nominally 5m), with road shoulders and drains either side along with cut/fill batters.

Examples of road cross sections for flat, intermediate and steep terrain are provided (**Attachment 17**). For the examples shown the overall widths of disturbance are 7.5m, 9m and 15m respectively for varying terrains. Roads have been designed to reduce the amount of steep terrain and as such it is thought reasonable to assume an overall 10m clearance width for all internal roads.

Information Request 58

Question

The conceptual design should include typical cross sections for the turbine access tracks on the plateau. This design should also:

- ***detail construction treatments and materials, and take account of the environmental impact investigations***
- ***indicate if construction will involve the use of on-site soil and rock, or whether material will be imported***

Response

Examples of road cross sections for flat, intermediate and steep terrain are provided (**Attachment 17**).

2.14Construction

Information Request 59

Question

Provide the following:

a) size of expected workforce
b) where that workforce will be accommodated
c) a detailed description of the construction phases, methods, time frames, plant and machinery, operational limitations and cut-off points (e.g. wet ground conditions)
d) supply of water for construction
e) a detailed description of how the turbine components and associated construction materials and plant and equipment will be transported up the eastern escarpment of the site
f) the description should include the proposed construction methodology for the turbine access tracks, including environmental treatments, avoidance of environmental impact, use of imported material etc.
g) an indication of the volume of any required imported material, and the associated truck movements
h) if on-site material is to be used, where that material will be sourced from.

Response

a) The economic impact assessment undertaken of the Mount Emerald wind farm proposal determined a projected 300 jobs to be created directly and indirectly (flow on effects) from the construction. The 'Review of the Australian Wind Industry 2011 Report, estimates the total direct employment generated by wind farm construction (based on recent study for Hallett wind farms) is 0.7 jobs per MW locally. Mt Emerald has been designed to generate approximately 225MW, which equates to a total of 158 local jobs directly, for the construction period, which is expected to last 24 months from project commencement.

b) The construction works will be the subject of a detailed contract with a suitably qualified and experienced company. The obligation for determining where the workforce will be accommodated is not considered viable at this time. It is noted a number of options for accommodation are available in the surrounding district and it is expected some combination of this accommodation will be utilised.

c) Following planning and approval the proposed project program is developed under the following phases:

- Pre-construction;
- Construction;
- Operation and maintenance and;
- Decommissioning.

The estimated duration of each phase is shown below and the main activities associated with each phase are described further.

Project Phase	Duration
Pre-construction	9 months
Construction	24 months
Operation and Maintenance	20 – 25 years
Decommissioning	12 months

Pre-construction Phase

The pre-construction phase of the development would involve engaging contractors/turbine manufacturers, carrying out detailed site investigations, preparing detailed design and undertaking pre-construction works. This phase would be approximately nine months in duration.

Detailed Design and Contracting

Following the development approval process, a tender would be let for the Proposal's detailed design and construction. The successful tenderer would be responsible for the detailed design of the wind farm which would involve the final micro-siting of the wind turbines and site infrastructure within the boundaries imposed by the conditions of the project determination.

The detailed design process would also involve preparation of an Environmental Management Plan (EMP) for the construction phase. The EMP content would be determined by the Proponent's commitments, conditions of approval and any licensing requirements. The EMP would likely be subject to the approval of the DPI prior to works commencing. The EMP would be a component of the contract specifications for the design and construction contractor/s.

During this phase the community would be provided with details of the forthcoming construction activities. Community consultation will continue throughout the construction phase at key stages and the community will be advised of any changing circumstances. A dedicated community liaison officer will be employed by the Proponent to consult with the community and resolve issues that may arise.

Pre-construction Works

Prior to the main construction commencing, a number of enabling works and further site investigations would be undertaken by the selected Contractor, including:

- Geotechnical investigations at each wind turbine site to determine the required foundation;
- Upgrading existing roads and constructing new access roads within the project site, including upgrades at the Springmount Road/Kippen Drive intersection and installation of signage;

- Establishment of a temporary construction compound;
- Preparation works for siting of a mobile concrete batching plant (if required); and
- Detailed survey and pegging of infrastructure locations and exclusion areas (e.g. significant vegetation).

The final location for the construction site compound will be subject to discussions and agreement with the host landowner. In selecting the compound site, consideration would be given to logistical requirements, avoidance of endangered ecological communities and drainage lines, and limiting the visual and noise impact to nearby residences. The construction site compound would cover an area of approximately three hectares and would include storage and laydown areas of equipment, materials and machinery; site offices and amenities; and parking areas.

This area will be rehabilitated after construction.

Construction Phase

The main stages of the wind farm construction program and the associated activities are discussed below. It is anticipated the duration of the construction phase would be up to 24 months.

Access Roads, Hardstands and Cabling

Site access roads within the project site and crane hardstands will need to be constructed to a standard to support construction traffic and machinery. This will involve excavation of the road and hardstand areas to a suitable depth and the laying of all-weather road base. A proportion of the road base material would be sourced from excavations for turbine foundations, with the remainder sourced by the construction contractor from established facilities off-site in the local area.

For the construction phase, access roads will be constructed to an average width of 6m with some widening necessary at horizontal curves to allow for movement of large construction plant, including heavy lift cranes and long loads. For the operation phase, widened sections would be reduced to a width of 6m, with the redundant width from the construction phase rehabilitated.

Underground cable installation would initially involve excavation of trenches to nominal depths of 1 m along the designated cable routes. A ditch digger, or similar machine, would be used to excavate the trench at a width of approximately 0.5m. Excavated material would be stockpiled in windrows adjacent to the trench for subsequent backfilling. Cables would be laid and the trench backfilled and compacted, prior to rehabilitation with vegetation or suitable surface stabilising material. Cable routes would be marked with warning signs at the surface and works-as-executed drawings will be held in the project operations office.

Foundation Construction

If gravity foundations are required, the construction of the foundation for each wind turbine would involve the excavation of approximately 450m^3 of ground material to a depth of approximately 2.5m. Steel reinforcement would then be installed and concrete poured to form the foundation base. For purposes of this environmental assessment, it is assumed a gravity foundation would require up to 450m^3 of concrete.

Rock anchor foundations would involve the excavation of approximately 100m^3 of ground material to a depth of approximately 2.5m. Individual rock anchor cores would be drilled

into bedrock to a depth of approximately 20m, with rock anchor tendons grouted into place, stressed and secured at the surface.

Substation Civil and Electrical Works

The substation compound area will be approximately 4 hectares (i.e. 200m x 200m or similar dimensions). The compound yard would be surfaced with compacted gravel to form a hardstand. Reinforced concrete pads and footings would be constructed to support electrical infrastructure and buildings. Infrastructure to be installed within the substation yard includes the two units 33/275kV step-up transformers, switchgear and the operation facilities building.

Turbine Erection

The turbine components would be delivered to the project site on semi-trailers. Each tower would be delivered in three parts, and blades would be delivered in single units. Nacelles and turbine substations would also be delivered as individual loads.

The construction method would involve a small mobile crane (up to 200 tonne) for the erection of the bottom two tower sections and the assembly of the rotor unit. A larger 600-1,000 tonne crane would be required to erect the top tower section and install the nacelle and rotor unit. Turbine erection is expected to take approximately 2 to 3 days per turbine.

Wind Farm and Substation Commissioning

The wind farm would be commissioned progressively in 'strings' of turbines. Each string would comprise the number of turbines within a cable circuit. There will be six to eight strings of WTGs for the Proposal.

The wind farm substation would be commissioned in conjunction with Powerlink to ensure viable connections from the WTGs to the substation and the substation to the transmission line. Once the electrical system has been energised, the wind turbines would be put into service.

Operation and Maintenance

Once operational, the wind farm would be continuously monitored by staff. Operations staff would be responsible for wind farm operations management, environmental monitoring, routine servicing, malfunction rectification and site visits.

Maintenance would be undertaken on a routine basis, with major servicing undertaken approximately six-monthly on each wind turbine. Each major service visit would involve a number of service vehicles. Maintenance staff would also respond to problems as they arise, with turbine downtime dictated by the complexity of maintenance required. Unscheduled maintenance on equipment such as turbine blades may require the use of large cranes and associated equipment. This can result in a turbine being offline for several weeks whilst the appropriate equipment and materials are sourced.

After approximately 20 to 25 years of operation (or sooner if technology developments allow) the blades, nacelles and towers could be removed and replaced with more efficient component parts. Redundant equipment would be removed from site for recycling and new components installed on existing or new foundations. Refurbishment could extend the life of the Proposal for a further 20 years.

Decommissioning

At the end of the operational life of the Proposal, the turbines and all above-ground infrastructures would be dismantled and removed from the site. This includes all the

above-ground electrical and substation infrastructure. Foundations would be cut back to below cultivation depth and soil profiles re-established over the footing.

Internal access roads, if not wanted by the landowner, would be removed and the land rehabilitated to as close as possible to the original condition. All decommissioning would be the responsibility of the wind farm owner and would be governed by the conditions of project approval, with decommissioning clauses included in landowner leases. Decommissioning of wind farm infrastructure would take up to 12 months.

d) Water requirements

The construction phase of the project will require water for the following uses:

- Moisture conditioning of earth fill;
- Equipment washdown;
- Dust suppression;
- Potable water for site personnel; and
- Fire fighting.

The potential sources of water would depend on the water quality requirement for each application. Water for moisture conditioning of fill and for dust suppression can be sourced from sedimentation basins which may be built to settle silted run-off from construction areas, or from external sources. It is estimated about 20 kilolitres (kL) per day (or two 10kL water cart loads) would be sufficient for moisture conditioning and dust suppression.

Potable water will be required for the consumption of the construction workforce and site visitors. The estimated potable water requirement during construction is estimated to reach a maximum of 17kL per day, based on a peak number of approximately 250 personnel, if the average daily consumption is conservatively assumed to be 70L per person. (On average, per capita household water consumption in Australia is 285L per day, according to the Australian Water Association www.environment.gov.au/node/22261. Assume ¼ of this for site requirements).

As there is no supply at the project site, potable water will be delivered by tankers. Potable water requirements during the operational phase will drop dramatically as the number of permanent staff on site is estimated to be 15.

Water storage tanks will be provided within the construction compound (during construction) and control building compound (during operation) for bulk potable water storage. Provisions will also be made to allow collection and storage of rainwater from the roof of site buildings. Water will be made available in site storages for fire emergency response.

e) Access to the site will be gained from the Kennedy Highway via Hansen Road, then the realigned Springmount Road/Kippen Drive intersection along Kippin Drive and then rising to the wind farm plateau. A preliminary access road design has been undertaken for the section of road from the end of Kippen Drive to the wind farm plateau. This design has been undertaken in accordance with road requirements supplied by wind turbine manufacturers and local engineering experience.

The preliminary design is included as **Attachment 16**.

f) Access to the individual turbine sites will be provided by a series of tracks used for both construction and operation activities. These roads will comprise a formed roadway of approximately 5m with additional clearance of for shoulders and drainage of up to 1m

each side. Roads will be designed to ensure minimal disturbance and will utilise existing tracks and cleared areas where ever possible. An internal road layout has been determined with this in mind, and is shown in the proposed site layout. Ultimately the road layout will be dependent upon the final location of the turbines and subject to engineering, environmental and cultural heritage factors.

While the site is characterised by a number of defined watercourses, the proposed layout is sympathetic to these values, by seeking to minimise the number of waterway crossings and utilising existing crossings where practically possible. It is important to note that all waterways contained within the site are seasonal and generally flow only during the wet season. During the dry season minor pools may remain in the Granite Creek tributary at the lower northern part of the site, depending on the duration and intensity of the season. There are currently approximately 6km of tracks traversing the site providing access to the Powerlink High Voltage Transmission Line, these will be used to link with the additional turbine access tracks and therefore minimise further disturbance.

In designing the access tracks, particular attention will be given to the management of stormwater drainage to minimise erosion and sediment transport. Excavated topsoil will be stockpiled during the construction of the access tracks and later used in the rehabilitation of the site. The stockpiles will be stabilised to prevent dust generation and loss of material. At the conclusion of the construction phase, any tracks not required for subsequent operation and maintenance of the wind farm will be restored and revegetated.

g) Gravel and aggregates will be required by the Proposal for the following:

- Concrete for WTG foundations, hardstands and building slabs;
- Pavement material for upgrading of existing or construction of new access roads; and
- Surface overlay for hardstands, and some of the drainage channels and outlet structures.

For a worst case scenario of using all gravity foundations for the maximum 70 WTGs, the concrete requirement is estimated to be 31,500m^3 (based on the conservative estimate of 450m^3 concrete required per foundation), which would require an estimated 20,000m^3 of aggregates. Rock anchor foundations are likely for the majority of WTG locations, therefore the concrete requirement may reduce significantly as this type of foundation requires only about 100m^3 of excavation. If the concrete requirement for the Proposal will be provided by an external supplier, this supplier will source its own aggregate requirement. If the Proponent establishes an on-site batching plant, aggregate will be delivered in bulk to the project site from local sources.

Internal roads will also be built, and the existing site access road upgraded, to take construction loads. This would require an estimated 60,000m^3 of crushed quarry material or natural gravel for the placement of two pavement layers over subgrade on an average 6m formation width for an estimated combined length of 40km. Fill for road subgrade construction, if required, will be sourced from suitable materials won from the excavation of foundations.

The above estimates of gravel or crushed quarry material requirements for road construction and upgrade are considered to be conservative. The condition of existing roads will be assessed prior to the commencement of construction to more accurately establish the extent of upgrading required.

It is anticipated the aggregate requirement for concrete batching, and the gravel and/or crushed quarry material for access road pavement construction or upgrade, can be adequately sourced from operating quarries in the area, with preference given to sources in close proximity to the project site to reduce transport costs and traffic impacts.

h) Subject to its suitability, the material made available from site excavations would be utilised for access track and hardstand area construction thus reducing or eliminating the amount of material required from outside sources. If any additional material is required, it would be sourced from existing facilities it the immediate region.

Information Request 60

Question

Provide an assessment of the anticipated construction noise impacts, their duration and the proposed management of that noise.

Response

It is proposed for construction activities to be undertaken under a *Noise and Vibration Management Plan.* The provision of this plan will be developed jointly between the project owner and the relevant construction contractor.

The *Noise and Vibration Management Plan* will contain the following information.

Purpose

The purpose of the Noise and Vibration Management Plan is to manage noise and vibration effects during construction activities, in order to minimise impacts to nearby residents, livestock and native flora and fauna, and to meet statutory requirements.

Scope

The Noise and Vibration Management Plan applies to all activities associated with site construction and installation of;

- wind turbines;
- substation;
- electrical reticulation; and
- road and hardstand construction.

This Plan does not address OH&S obligations with regard to noise impacts on construction workers, which is addressed in the OH&S Plan.

Responsibilities

All employees and Subcontractors are responsible for undertaking the actions listed in this Noise and Vibration Management Plan. It is the responsibility of Project Manager and Site Manager that this management plan is implemented and each Subcontractor site supervisor's responsibility that this plan is adhered to by their personnel. Landowner communication and response to complaints regarding noise is also the responsibility of the Project Manager or delegate.

Procedures

1) Construction equipment must be equipped with proprietary noise abatement devices such as mufflers and enclosures, where practical treatment is available. Noise abatement devices will be maintained in an efficient condition and operated in an efficient manner. Machinery and vehicles will be maintained in accordance with manufacturer's specifications. Machinery and vehicles will be in good repair.

2) Normal working hours for noisy construction activities should be between 7:00am and 6:00pm Monday to Saturday. However, due to the nature of the work outside these hours may be required. This may be required for WTG Erection work to allow for lower wind conditions and also for the concrete pouring work for WTG footings to accommodate the hours of cooler ambient conditions. Wherever practical, no noisy construction work will be undertaken on Sundays or public holidays.

3) The use of horns and engine brakes will be avoided when approaching or departing the sites.

4) The use of sirens is not permitted on site, except in the event of an emergency or as required under the OH&S Plan.

5) Equipment emitting high noise levels will be situated to maximise the distance to the nearest residence, livestock and/or native fauna, where feasible.

6) Care should be taken when dropping materials from a height and when loading/unloading.

7) Care shall be taken when operating vibration equipment near gas lines.

8) A log of complaints will be maintained. Any noise related complaint will be responded to be site management in the first instance.

2.15Aeronautical Assessment

Information Request 61

Question

Provide written confirmation from the Civil Aviation Safety Authority: (i) that it has no requirements in relation to the proposal, or (ii) that details any requirements it has in relation to the proposal, particularly in relation to lighting. If there are lighting requirements, then the required fauna assessments must consider the effects.

Response

CASA is responsible for regulating civil aircraft operations, including operational safety in and around aerodromes and along air traffic routes. In relation to wind farms, CASA has two concerns:

- the penetration of wind turbines into the obstacle limitation surface (OLS) and the Procedures for Air Navigation Services (PANS-OPS) around an aerodrome; and
- the potential for wind farms to be a hazard to aviation operations.

The OLS is the airspace around an aerodrome, defined by an imaginary surface, which is maintained free of obstacles to permit the safe arrival of aircraft under a visual approach. Similarly, the PANS-OPS surface is to safeguard an aircraft from collision with an obstacle when using an instrument approach.

In September 2009, AC 139-18(0) Obstacle Marking and Lighting of Wind Farms was withdrawn after Civil Aviation Safety Regulations 1998 (CASR) ASR 139 (Aerodromes) was found not to be applicable to areas located away from aerodromes regulated under CASR 139.

Revisions to AC 139-18(0) may incorporate a requirement to provide obstacle lighting for structures 150m or more above ground level, unless an aeronautical study can show that the structure will not be an obstacle.

The Mount Emerald wind turbines do not exceed the 150m tip height threshold and, in accordance with current CASA guidelines, will not require night time obstacle lighting.

CASA have one current publication, AC 129-08(0) that sets out the reporting requirements for tall structures. It is accepted Council may place a condition of approval requiring Mount Emerald Wind Farm to notify the relevant agency in regard to the location of wind turbines, after determining the final layout and location after micro-sighting occurs on site.

Mount Emerald Wind Farm commenced consultation with representatives from CASA in April 2011. Advice received from the consultation recommended an approval will be required from the Mareeba Aerodrome Manager, who will advise and consult with CASA as necessary.

In November 2011, MEWF commenced liaison with Mr Ron Walmsley, Mareeba Airport Upgrade Coordinator (Tablelands Regional Council). The result of this referral was advice received from Mr Brett Nancarrow (Tablelands Regional Council), 22 June 2012. Please refer to **Attachment 18** for a copy of the correspondence.

The advice contained assessment from Air Services Australia and Mareeba Airport Upgrade Coordinator.

In summary, Air Services Australia advised:

- *'With respect to procedures promulgated by Airservices in accordance with ICAO PANS-OPS and Document 9905, at a height of 1179.5m (3870ft) AHD turbine number 34 will affect the VOR-A instrument procedure at Mareeba aerodrome however, at a maximum height of 1144m (3754ft) AHD turbine 34 will not affect the VOR-A instrument procedure nor any sector or circling altitude, nor any instrument approach or departure procedure at Cairns, Mareeba, and Atherton aerodromes.*
- *The remaining 74 wind turbines will not affect any sector or circling altitude, nor any instrument approach or departure procedure at Cairns, Mareeba and Atherton aerodromes.*
- *This development to a max height of 1179.5m AHD will not impact the performance of Precision/Non-Precision Nav Aids, HF/VHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links.'*

In summary, Mareeba Airport Upgrade Coordinator advised:

- *'Turbine 34 is not constructed in its proposed location and that any structure associated with the wind farm does not exceed a height of 3870 feet (1179.5m) AHD.'*

In response to this advice Mount Emerald Wind Farm moved the turbine in question and can confirm no other turbine tip height exceeds the height of 1179.5m AHD.

Information Request 62

Question

In addition, the applicant should address the recommendations of the Rehbein assessment and:

- ***(i) confirm if Airservices Australia have any concerns about impacts on radar and radio services***
- ***(ii) provide an opportunity for the Dept. of Defence to comment on the proposal***
- ***(iii) discuss the proposal with the Tablelands Regional Council to establish if it will have any impact on the development and expansion of Mareeba Airport, and***
- ***(iv) consult with agricultural farms and aerial spraying contractors in the area about potential turbulence impacts on aerial spraying.***

Response

(i) Please refer to our response to Information Request Question 61. In this response you will note our reference to Mr Brett Nancarrow's advice, located in **Attachment 18**.

Within the correspondence, Air Services Australia advised in relation to the Mount Emerald Wind Farm, '*the development to a max height of 1179.5m AHD will not impact the performance of Precision / Non – Precision Nav Aids, HF / VHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite / Links.'*

(ii) Further consultation with the Department of Defence will occur once the final layout of the turbines has been determined. Initial consultation has occurred on the location of the monitoring towers on site.

(iii) Please refer to our response to Information Request Question 61. In this response you will note our reference to advice received from Tablelands Regional Council, Urban and Regional Planning Group and the Mareeba Airport Upgrade Coordinator.

(iv) Mount Emerald Wind Farm commenced consultation with the only Tableland based aerial spraying contractor in September 2011. Please refer to **Attachment 19** for a copy of recent correspondence received from Atherton Tableland Air Service, whereby they confirm:

- *'the developers of the proposed Mount Emerald wind farm have undertaken consultation with me and made me aware of the perceived issues and impacts the project may have*
- *at this time, I am comfortable the Mount Emerald Wind Farm will not negatively impact our ability to continue to safely operate in and around the traditional areas in which we have previously serviced our customers and there should be no negative impact to the new farming development within these areas.'*

Information Request 63

Question

The applicant should also further justify the argument that aerial spraying will not be carried out in high wind conditions, given the apparent prevalence of high wind speeds on the Mt Emerald plateau at the same time that the surrounding farmlands are experiencing much lower wind speeds. The Windfarm Policy of the Aerial Agricultural Association of Australia may assist in identification of the relevant issues, and consultation with Tableland operators should be undertaken.

Response

Aerial Agricultural Association of Australia recommends consultation with local operators to better understand any likely impacts from wind farm proposals.

Mount Emerald Wind Farm commenced consultation with the only Tableland based aerial spraying contractor in September 2011. Please refer to **Attachment 19** for a copy of recent correspondence received from Atherton Tableland Air Service, whereby they confirm:

- *'the developers of the proposed Mount Emerald wind farm have undertaken consultation with me and made me aware of the perceived issues and impacts the project may have*
- *at this time, I am comfortable the Mount Emerald Wind Farm will not negatively impact our ability to continue to safely operate in and around the traditional areas in which we have previously serviced our customers and there should be no negative impact to the new farming development within these areas.'*

Information Request 64

Question

The town planning issues of development not impinging on, or restricting, the use of good quality agricultural land will also be of relevance here, and should be addressed.

Response

Given the site topography, and geological characteristics, the land is not considered Good Quality Agricultural Land under the Mareeba Shire Planning Scheme. No cultivation activities are undertaken on site and only limited stock grazing would be possible. Importantly, the establishment of the turbines will not prejudice the ongoing operation of the existing farmlands in proximity to the site due to their relatively benign physical impacts upon agricultural landscapes and their location generally along ridgelines.

2.16Sunwater Requirements

Information Request 65

Question

Provide Sunwater's detailed engineering design and legal requirements in relation to the required Kippin Drive siphon crossing upgrades and road dedication.

Response

Land described as Lot 905 on CP986501 is a large parcel of land, containing both open channel and underground infrastructure associated with the Mareeba-Dimbulah irrigation channel managed by SunWater. A portion of this land is primarily utilised as an access between Kippen Drive and Springmount Road, used by a number of properties located off Kippen Drive and contains a constructed gravel access road with associated table drains, concrete culverts, private tracks and a siphon beneath the surface of the land.

It is proposed to realign the access across Lot 905, in association with the proposed upgrade to the Springmount Road intersection and new site access from Kippen Drive (see Figure 26 for proposed location).

Mt Emerald Wind Farm Pty Ltd, on behalf of Tablelands Regional Council (now Mareeba Shire Council), made an application to open part of Lot 905 on CP896501 (in strata) as road, referred to in the road opening offer by DERM dated 9 December, 2011 (DERM ref: 2011/006477).

The part of Lot 905 on CP896501, which is included within the application, is proposed to be utilised for access purposes only, during both construction and operation and is required for legal access to the site from Springmount Road. Eventually, this section of the existing perpetual lease will be excised and opened as public road, managed by Mareeba Shire Council. As such, the inclusion of this section of land is a temporary measure, until such time as the area is created as road.

Please refer to the attached letter, dated 09 April 2014 (**Attachment 20**) from SunWater confirming SunWater's intention to enter into an agreement (Works and Surrender Deed) with MEWF for the partial surrender of the Perpetual Lease.

The agreement will, amongst other things, provide for:

- the performance by SunWater of certain protection works with respect to the water pipeline owned by SunWater and located within the Perpetual Lease;
- the dedication and use of the surrendered land as a road under the Land Act;
- the construction by MEWF of a road on the surrendered land;

- the provision by MEWF of other tenure acceptable to SunWater in respect of the Pipeline to replace the surrendered land; and
- payment by MEWF of all of the costs of the works and transactions contemplated by the agreement.

The details of the Pipeline protection works are still to be finalised by SunWater and will be advised following the completion of a SunWater engineering assessment.

SunWater is currently undertaking the preparation of a Works and Surrender Deed in conjunction with the preparation of a detailed specification for the Pipeline protection works. SunWater will be responsible for procuring any approvals required for the Pipeline protection works.

Upon finalisation of the SunWater engineering assessment and clarification of the pipeline protection works, MEWF will develop a detailed specification for the proposed road works, in association with the proposed upgrade to the Springmount Road intersection. MEWF will be responsible for procuring any approvals required for those road works. It is anticipated that Mareeba Shire Council will allow these works to be completed as part of responding to a condition of the development approval.

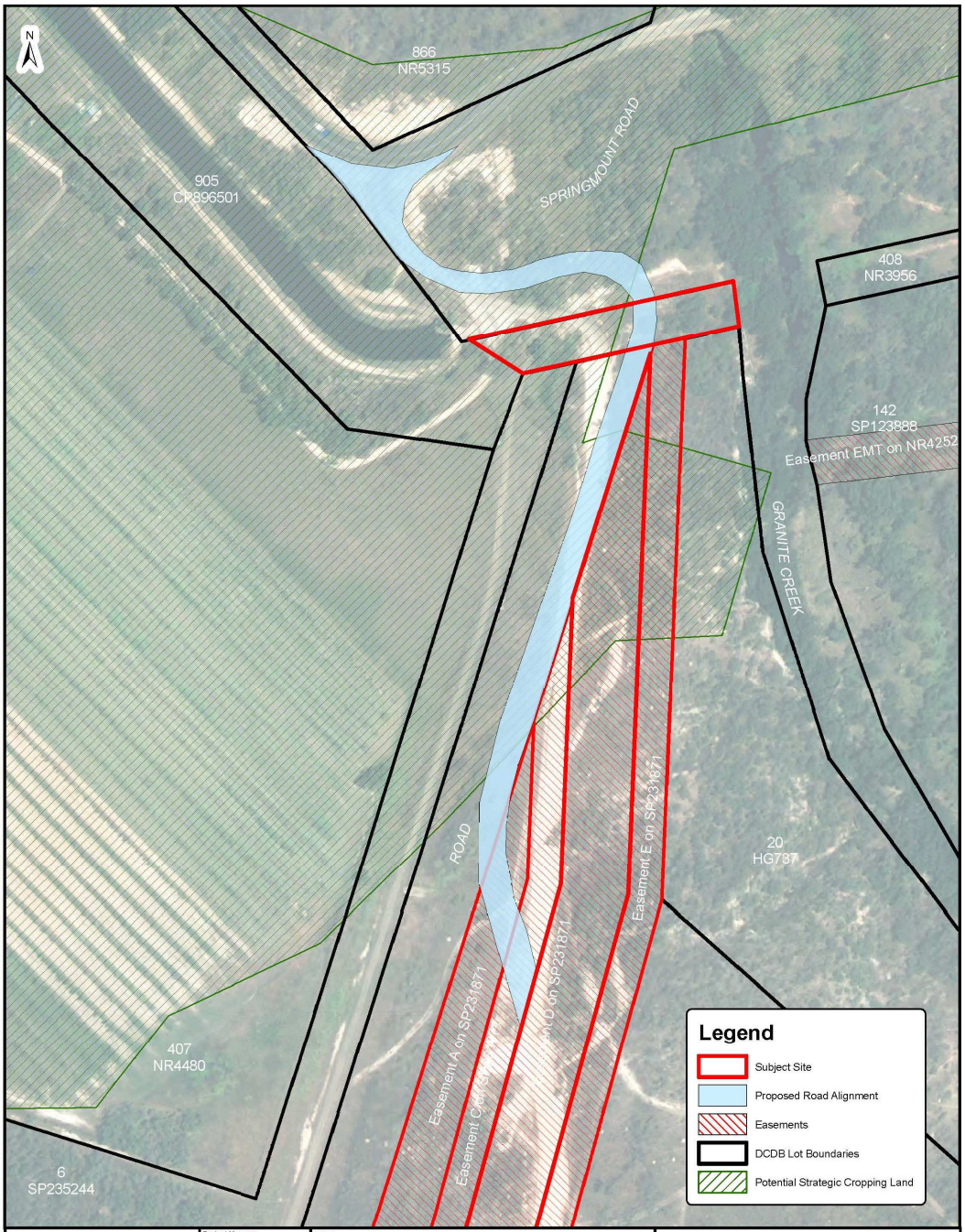

Figure 26 – Road Re-alignment and Construction

2.17Statement of Commitments

Information Request 66

Question

Provide draft copies for the various management plan and operational plan documents proposed under the statement of commitments. These should be prepared generally in accordance with the requirements of the Queensland Preparing Environmental Management Plans and the NSW Guideline for the Preparation of Environmental Management Plans.

Response

A preliminary Environmental Management Plan (EMP) (**Attachment 21**) has been prepared to inform the construction, operational and decommissioning activities proposed to be carried out on the Mount Emerald Wind Farm (MEWF). The preliminary EMP presents a framework for further development following the outcomes of the EIS/EPBC Act referral and Queensland Development Application processes. It should be recognised the commercial details of the construction and operation phases are yet to be finalised, therefore many system and operational details are currently not available.

The EMP aims to identify sources of actual and potential environmental harm identified through the EIS process and what actions, processes and/or strategies will be adopted to avoid, prevent or minimise the likelihood of environmental harm being caused. The EMP aims to provide for the review and 'continual improvement' in the overall environmental performance of the MEWF operations.

This EMP will form the basis from which detailed EMPs will be prepared by the construction, operational and decommissioning entities. This EMP will be an integral element of the detailed design phase and will form part of any contractual requirements.

The EMP aims to address the following matters:

a. Identification of environmental issues and potential impacts.
b. Environmental commitments - a commitment by senior management to achieve specified and relevant environmental goals.
c. Control measures for routine operations to minimise likelihood of environmental harm.
d. Contingency plans and emergency procedures for non-routine situations.
e. Organisational structure and responsibility.
f. Effective communication.
g. Monitoring of mitigation measures and residual impacts.
h. Conducting ongoing environmental impact assessments.
i. Staff training.
j. Record keeping.
k. Periodic review of environmental performance and continual improvement.

The following table provides a summary of the sections provided in the document.

Section	Section Name	Purpose
1	Introduction	• Provides a background to the Environmental Management Plan • Describes the purpose and scope of the EMP • Provides the site layout
2	Management Systems	This section outlines the proposed elements of an EMS: • RACL Environmental Policy • Project Responsibilities • EMP Frameworks • Training and Inductions • Reporting and Auditing • Complaints Procedure • Review and Update • Legislative Requirements
3	Detailed design	This section describes the preconstruction management actions that RACL will implement to mitigate against potential impacts during the construction, operational and decommissioning phases. This includes impacts to: • Flora • Fauna • Water Quality
4	Construction EMP	This Section identifies the environmental issues, potential impacts of the project and RACL's approach to minimise the likelihood of environmental harm from construction operations. This section addresses the following elements: • Flora • Fauna • Erosion and Sediment Control • Management of Flammable and Combustible Substances • Noise and Vibration • Air Emissions • Waste Management • Fire Management
5	Operational EMP	This Section identifies the environmental issues, potential impacts of the project and RACL's approach to minimise the likelihood of environmental harm from the operational wind farm. This section addresses the following elements: • Access and Landholder relationships • Flora management • Fauna Management • Erosion and Sediment Control • Management of Flammable and Combustible Substances • Noise • Waste management
6	Decommissioning EMP	This section identifies that activities to be undertaken decommission the project. IT includes the final land use options and rehabilitation programs. This section is addresses the following elements: • Access • Flora and Fauna management • Erosion and Sediment Control • Management of Flammable and Combustible Substances • Noise and Vibration • Air Emissions • Waste Management • Clean up and rehabilitation

The detailed EMPs to follow the project approval may contain project design modifications; however, basic elements will be adopted and presented in the form of the following stand-alone plans:

- Construction Environmental Management Plan (CEMP);
- Operational Environmental Management Plans (OEMPs); and
- Decommissioning Management Plan (DEMP).

Construction Environmental Management Plan (CEMP)

The CEMP will be prepared by the primary contractor, in consultation with the Proponent, based on the former's proposed work methods and the environmental outcomes required for the Proposal.

The main aim of the CEMP will be to avoid, minimise and manage any potential environmental impacts arising from construction activities for the Proposal. It will describe in a more detailed and site-specific manner the management measures to be carried out for the activities at various stages of construction. This will include the definition and allotment of responsibilities among the Proponent, the primary contractor and its sub-contractors. It will also cover the conduct of ongoing stakeholder engagement, system of notification and complaints management during construction.

Operational Environmental Management Plans (OEMPs)

An Operational Environmental Management Plan (OEMP) will be prepared by the Proponent to describe the environmental management measures to be implemented during the operational phase of the project. This plan will cover not only the operational and maintenance requirements of the wind farm but will also address ongoing monitoring and maintenance of the project site to minimise ecological impacts and to promptly respond to potential community amenity issues.

Decommissioning Management Plan (DEMP)

A Decommissioning Management plan (DEMP) will be prepared by the Proponent to describe the environmental management measures to be implemented during the decommissioning phase of the project. The plan will address the final land use options available and identify the rehabilitation programs to be implemented. This plan will also address any ongoing monitoring of the project site and cover ongoing stakeholder engagement system of notification and complaints management during decommissioning.

Noise and Vibration Management

The purpose of the Noise and Vibration Management Plan is to manage noise and vibration effects during construction activities, in order to minimise impacts to nearby residents, livestock and native flora and fauna, and to meet statutory requirements.

Please refer to IR Response 60 for further details in relation to the Noise and Vibration Management Plan.

Fire Management Plan

A fire management plan has been prepared to overview the approach to fire management during the Design, Construction and Operational Phases of the project.

Emergency Response Plan

An Emergency Response Plan will be prepared for the Operations Phase by the Operations Team during the Construction Phase. This Plan will detail the procedures to be followed in the event of a fire.

In the event of a fire all resources and expertise available on site are to be made available to the local Fire Brigade. Personnel on site will comply with directions given by the local Fire Brigade.

Personnel are only expected to fight small fires within their level of competence. The local Fire Brigade will be called immediately if the fire cannot be controlled.

2.18Design & Construction Implementation

Information Request 67

Question

Turbine, access road and service infrastructure location will depend on fine-scale and on-ground route and site selection, and will involve assessment against a number of potentially competing requirements

The relevant management plans will therefore have to include:

- ***assessment and decision protocols and frameworks***
- ***a mechanism for prior Council approval, including involvement of Council consultants***
- ***clear lines of consultation, communication, approval and authority, response times, etc.***

Response

It is recognised council as the assessment manager, will place a condition of approval requiring Mount Emerald Wind Farm to notify the location of turbines, roads and infrastructure after the determining the final layout and location after micro-siting occurs on site and prior to the commencement of construction.

2.19Third Party Advice

Information Request 68

Question

Third part advice has been obtained from the Department of Environment and Resource Management, and Queensland Health. Please respond to Queensland Health's views about use of the Victorian guidelines.

Response

We refer Council to the letter provided by Queensland Health dated 27 April 2012, whereby Queensland Health advised that *'Research into the potential health effects of wind turbines is ongoing and is being undertaken on an international scale. The National Health Medical Research Council (NHMRC) is currently reviewing its position on the possible health effects of wind turbines and aims to release a Public Statement by the end of 2012. Queensland Health would be likely to be guided by the NHMRC statement, resulting from this research.'*

Since this letter, the NHMRC released their draft Information Paper regarding evidence on the potential effects of wind farms on human health, February 2014. The Information Paper states ***'there is no reliable or consistent evidence that wind farms directly cause adverse health effects in humans'***. A copy of the NHMRC Media Statement is included in **Attachment 22**.

In regard to views raised by Queensland Health, the Victorian guidelines rely on a "2km setback". The separation or "setback" between wind turbines and adjacent dwellings should be determined through a scientific basis rather than by applying a pre-determined distance because a pre-determined distance does not reflect the attributes of a particular site and thus cannot account for the impact of topography, vegetation and other conditions on noise, blade flicker and other wind farm impacts.

Each site should be assessed on its own merits, with the specific turbine, topography and local conditions taken into account.

Generally, the key factor in determining the separation distance is provided by the adherence to specific noise guidelines and standards applicable to wind farms in Australia. By ensuring the noise level standards are met at the dwellings, the distance from turbines is sufficient to adequately cover any potential safety issues, regardless of the size of the turbines involved.

The requirement for consent to be given by landholders who fall within a mandatory distance is not considered appropriate or reasonable. Wind farm developments should comply with appropriate regulations and community consultation requirements, as any new infrastructure would do.

Applying a pre-determined setback distance or requiring landholder consent within a setback distance is arbitrary, has no scientific basis for addressing the impacts of wind farm development and is not required for any other infrastructure development.

3. DERM INFORMATION REQUEST

Question

Please demonstrate how your application meets Criteria Table F-1 of the Concurrence Agency Policy for Material Change of Use (MCU) – version 2 21 October 2009 (MCU Policy) and Part P of the Regional Vegetation management Code for Western Bioregions, 6 November 2009 (the Code) and the Regional Vegetation management Code for Coastal Bioregions, 6 November 2009 (the Code) by either providing information that meets the Acceptable Solutions (AS), OR if the AS cannot be met, provide an alternative solution to meet the Performance Requirements (PR).

Please address all performance requirements and in particular the following mentioned performance requirements.

Performance Requirement F1

To regulate the clearing of vegetation in a way that ensures the conservation of regional ecosystems, clearing as a result of the MCU only occurs where the applicant has demonstrated that the development has first avoided and minimised the impacts of the development.

Please provide evidence as to how the development meets this performance requirement.

Performance Requirement F2

Clearing as a result of the MCU assessed under this Table may occur only where the MCU can demonstrate that the level of conservation and biodiversity outcomes ensured by the development significantly exceeds the extent and value of the area proposed to be cleared. This can only be achieved by meeting the requirements of the Policy for Vegetation Management Offsets.

Please provide suitable offset for this development.

Performance Requirement F3

Clearing as a result of the MCU assessed under this Table may occur only where the MCU meets Part P, Performance Requirements 2-10 of the relevant code. Assessment against the Regional Vegetation Management Code for Western Bioregions, 6 November 2009 (the Code) and the Regional Vegetation Management Code for Coastal Bioregions, 6 November 2009 (the Code) found that the application in its current form does not meet the following:

PR P.3 Watercourses

The application will involve clearing native vegetation in a watercourse and within the relevant distance stated in The Code from the high bank of mapped watercourse with a stream order 1, 2, 3 and 4. Please provide further information on the control measures that will be employed to ensure that clearing does not affect bank stability, water quality and habitat by

demonstrating that these activities will be done in accordance with the relevant guidelines and standards.

PR P.5: Soil erosion

The application will involve clearing native vegetation within areas that are classified in the Coastal Code as Rudosols which are identified as unstable soils. Clearing native vegetation will also occur within areas that are classified in the Western Code as Rudosols that are identified as stable soils and Dermosols that are identified as unstable soils. Slope analysis was conducted using a digital elevation model and it was found that the slopes within the development foot print range from 1% to 30%. Please provide more further information on the erosion and sediment control measures that will be employed to ensure that clearing does not result in mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scalding and any associated loss of chemical, physical or biological fertility.

PR P.7 Conserving remnant vegetation that are endangered regional ecosystems and of concern regional ecosystems.

The application will involve clearing within an 'of concern' regional ecosystem identified as 7.12.57. Please provide further information on how clearing will be regulated in a way that conserves remnant vegetation that is an 'of concern' regional ecosystem by maintaining the current extent. Please note that maintain the current extent means:

- ***a) Not clear the regional the regional ecosystem; or***
- ***b) If subparagraph (a) is not reasonably practicable, ensure the structure and function of the regional ecosystem is maintained; or***
- ***c) If subparagraphs (a) and (b) are not reasonably practicable, provide an offset as a condition of the development approval.***

PR P.8 Essential habitat

The application will involve clearing native vegetation within an area that is mapped as essential habitat. Please provide further information on how clearing will be regulated in a way that prevents the loss of biodiversity by maintaining the current extent of essential habitat. Please note that maintain the current extent means:

- ***a) Not clear the regional the regional ecosystem; or***
- ***b) If subparagraph (a) is not reasonably practicable, ensure the structure and function of the regional ecosystem is maintained; or***

If subparagraphs (a) and (b) are not reasonably practicable, provide an offset as a condition of the development approval.

Response

At the time of lodgement of the subject Development Application with the Tablelands Regional Council, the proposed development triggered assessment against the provisions of the Vegetation Management Act, as it existed at that time.

This in turn resulted in the involvement of the Queensland Department of Natural Resources and Mines (DNR&M) as a Concurrence Agency to the Development Application. Following their preliminary assessment of the submitted application and supporting information, DNR&M issued an Information Request on 30th April, 2012, the focus of which was upon matters relating to the clearing of native vegetation.

Subsequent to receipt of this Information Request, amendments to the Sustainable Planning Regulation 2009 (SPR) came into effect, on Friday 2nd August, 2013, through the Sustainable Planning Amendment Regulation (No. 4) 2013. The effect of these amendments was, amongst other things, the creation of an exemption for clearing of native vegetation for community infrastructure, as listed in Schedule 2 of the SPR. Included within this Schedule are “operating works under the Electricity Act 1994”, which is further defined to include plant, electrical and

other property used for generating electricity or connecting supply to a transmission grid or supply network.

It has been determined the proponent of the proposed Mount Emerald Wind Farm is a 'generation authority" under the terms of the Electricity Act and can thus benefit from the exemption resulting from the 2013 amendments to the SPR.

Following extended negotiations between the proponent and DNR&M, and in response to perceived process difficulties, DNR&M advised, via correspondence dated 9th April, 2014 (**Attachment 23**), the most appropriate way of accessing the benefit of the exemption created from the SPR amendments was for the proponent to request DNR&M to assess the application in the absence of any of the information requested under the Information Request, as provided for under Section 278 of the Sustainable Planning Act (SPA). DNR&M would then not provide a response to the Assessment Manager (now Mareeba Shire Council), resulting in Council being obligated, under the provisions of Section 286 of the SPA, to determine the application as if DNR&M had no Concurrence Agency requirements.

On the basis of this advice, it is therefore the proponent's intent not to provide any of the information requested by DNR&M, and have formally requested DNR&M to assess the application on this basis – refer to attached Response to Information request.

Attachment 1

Wind Farm Layout

Attachment 2

Adjacent Land Uses

Attachment 3

Regional Context Map

Attachment 4

Receptor Locations

Attachment 5

Noise Impact Assessment

Attachment 6

2 year Data Verification Report

Attachment 7

Landscape Visual Impact Assessment

Attachment 8

Truescape Photosimulations

Attachment 9

DTM Simulations

Attachment 10

Access Road Visual Simulation

Attachment 11

Shadow Flicker Assessment Map

Attachment 12

MEWF Economic Impact Report

Attachment 13

MEWF Substation General Arrangement

Attachment 14

Discussions with MSF Sugar

Attachment 15

Technical Note – Traffic Impact Assessment TRC 51-54

Attachment 16

Access Road Design

Attachment 17

Internal Roads

Attachment 18

Aviation TRC Response

Attachment 19

Atherton Tablelands Air Services

Attachment 20

SunWater – Partial Surrender of Perpetual Lease

Attachment 21

Preliminary EMP

Attachment 22

NHRMC Media Release

Attachment 23

Referral Agency DNRM Letter to MEWF