In Victoria a permit is required to develop a

Wind Energy Facility

in a Farming Zone

Permit applications "must meet the requirements of Clause 52.32"

52.32 WIND ENERGY FACILITY

19/01/2006 VC37

Purpose

To facilitate the establishment and expansion of wind energy facilities, in appropriate locations, with minimal impact on the amenity of the area.

Scope

This clause applies to land used and developed or proposed to be used and developed for a wind energy facility.

Application requirements

An application must be accompanied by the following information, as appropriate:

✓ A site analysis and design response.

✓ Development plan(s) including the layout and height of the wind turbines and associated buildings and works, materials, reflectivity, colour, lighting, landscaping, connection to the electricity grid, access roads and parking areas.

✓ The location of all dwellings within a 500 metre radius of the site.

? Calculation of greenhouse benefits.

? Photomontages or other visual simulations illustrating the development from key vantage points.

no An assessment of the impact of the proposal on any avifauna listed under the Flora and Fauna Guarantee Act 1988 or Environment Protection and Biodiversity Conservation Act 1999.

? An assessment of the noise impact of the proposal based on the New Zealand Standard NZ6808:1998, Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators.

? An assessment of other potential amenity impacts such as blade glint, shadow flicker, electromagnetic interference.

✓ Impact upon any nearby airfields (within a 30 kilometre radius).

no Impact upon Aboriginal cultural heritage or European cultural heritage.

? An environmental management plan including any rehabilitation and monitoring.

Decision guidelines

Before deciding on an application, in addition to the decision guidelines of Clause 65, the responsible authority must consider, as appropriate:

? The views of the Sustainable Energy Association of Victoria about the contribution of the proposal to reducing greenhouse gas emissions.

? The effect of the proposal on the surrounding area in terms of noise, blade glint, shadow flicker and electromagnetic interference.

? The impact of the development on significant views, including visual corridors and sightlines.

? The impact of the facility on the natural environment and natural systems.

✓ The views of the Civil Aviation Safety Authority if within a 30 kilometre radius of an airfield.

? The Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, 2003.

NZS 6808:1998

New Zealand Standard

Acoustics –
The Assessment and Measurement of Sound from Wind Turbine Generators

1 Scope

1.1 "This Standard covers the prediction of sound from wind turbine generators (WTGs), the measurement of sound from WTGs, and the assessment of the received sound."

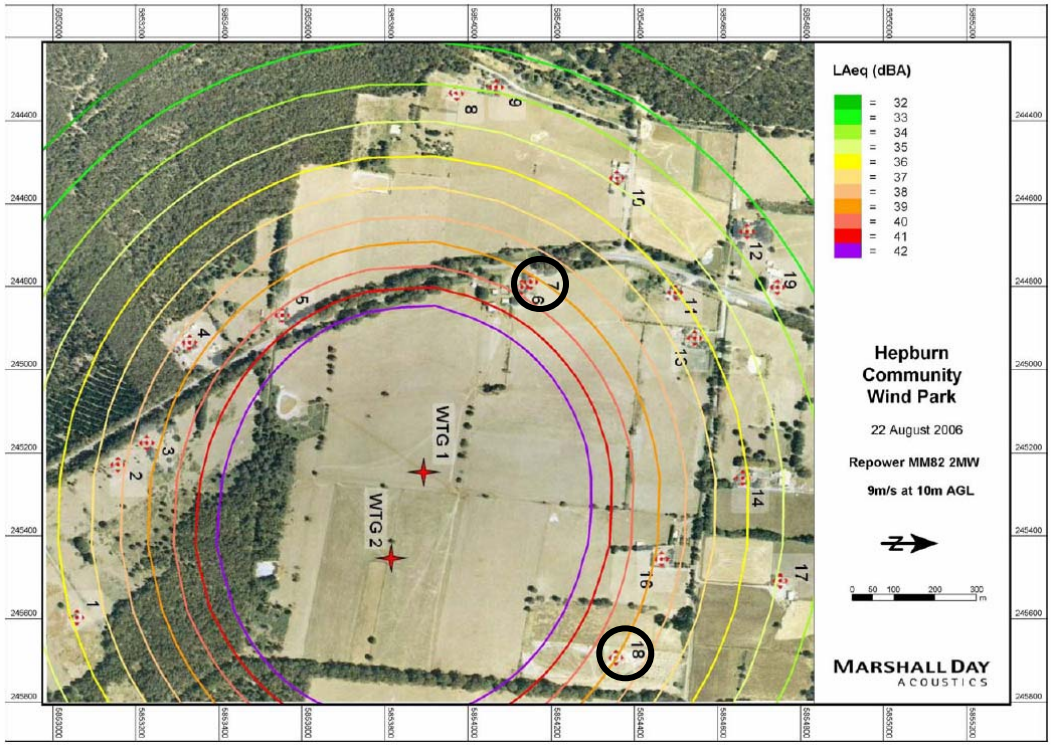
1.3 "This Standard deals specifically with the measurement of sound from WTGs in the presence of wind,…"

4 Preliminary Planning Issues – Pre-Installation

4.2.1 "It is recommended that, for each **location of interest**, (see 4.5.1) a WTG sound level (L_{eq}) prediction be carried out and, if warranted (see 4.5.1), the background sound level (L_{95}) be measured in accordance with NZS 6801."

4.5.1 "This Standard recommends that **background sound level measurements be carried out where predicted sound levels of 35 dBA or higher are calculated** for the relevant locations. It is recommended that measurement positions be selected to include locations at or within the nearest affected residential property boundary, (the notional boundary – if a rural property), and near the location of representative positions for any other residential locations within the vicinity of a WTG or windfarm."

The proponents have identified 24 "locations of interest" and found that sound measurements were warranted for 18 houses (where predicted sound levels of 35 dBA or higher were calculated).
NZS 6808:1998 requires background sound levels to be tested in all those locations. In contrast, for this application **only two sites were tested**, both on the north side of the development.



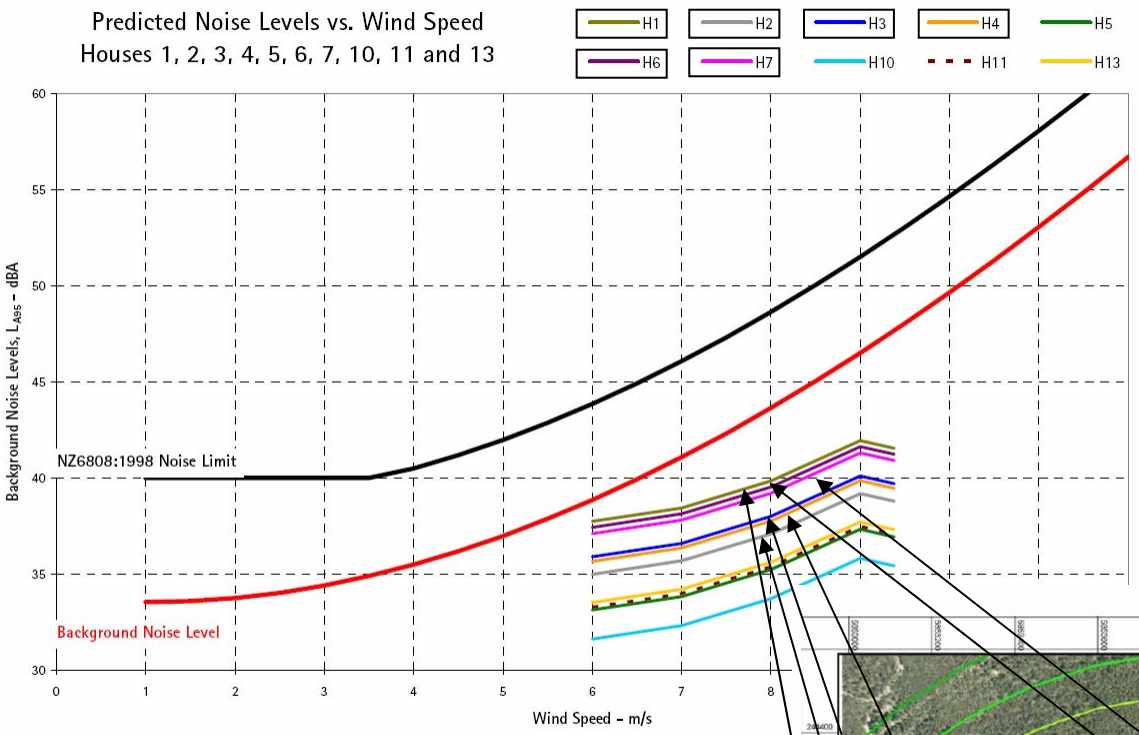


Figure H1 - Predicted WTG noise vs noise limits at House 7

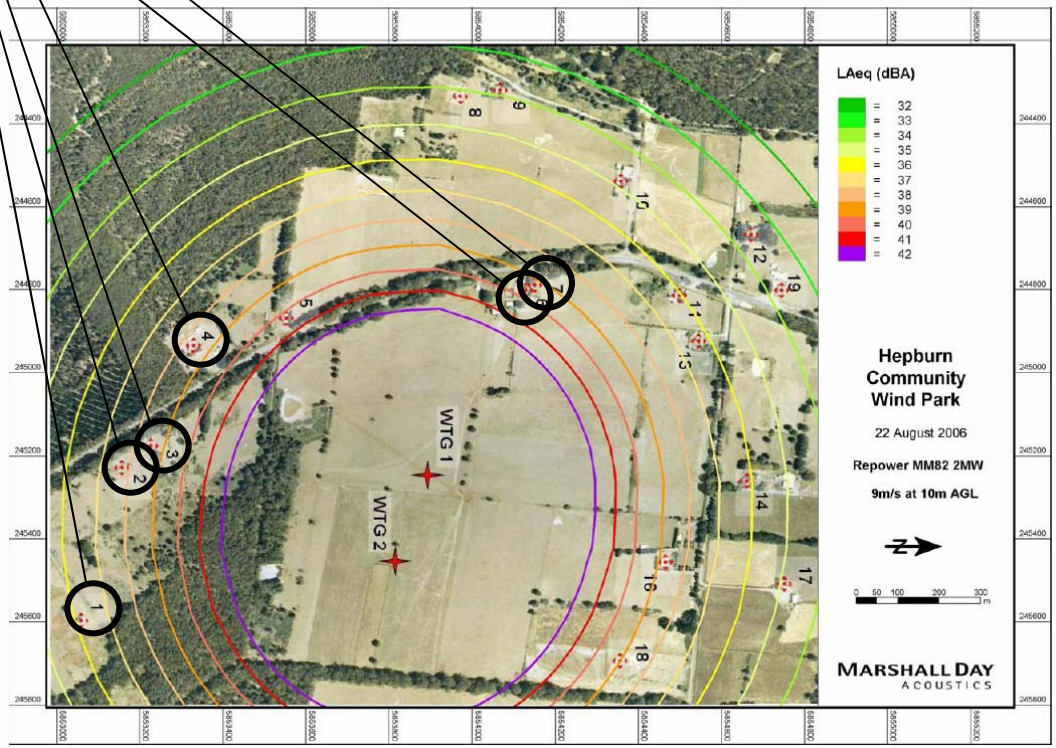
Without having measured actual noise impact the proponents attempted a ranking of 'relevant receivers'.

The proponents claim that property No 7 is representative of all other properties listed here. However:

#7 is located at the main road on the north-west side of Lennards Hill while most others are on the southern side on which also the WTGs are located;

#2 and 3 are sheltered from the road by an embankment;

#4, 12, 13 and certainly #1 are well removed from the road.



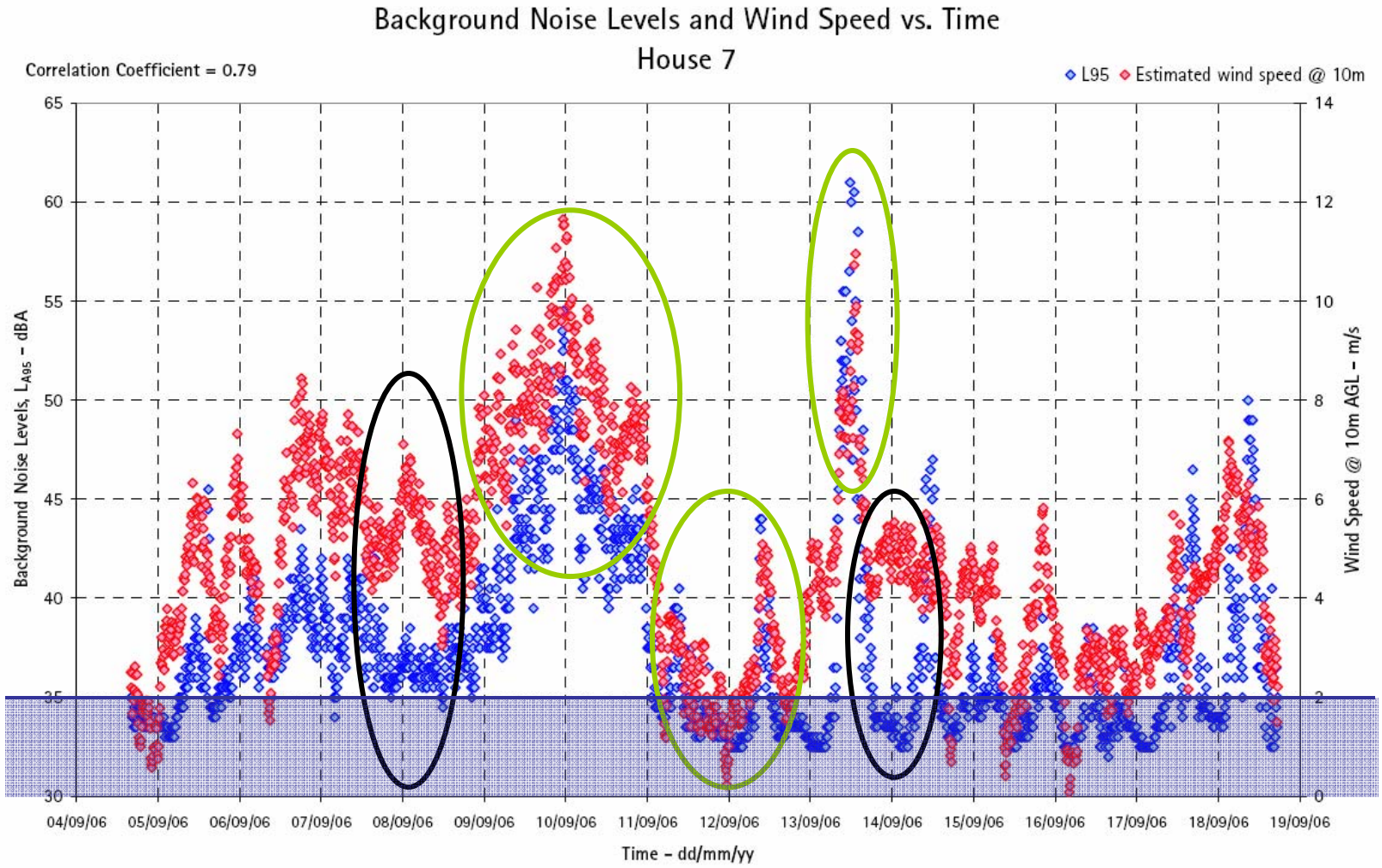


Figure G1 - Background Noise Level and Wind Speed vs Time – House 7

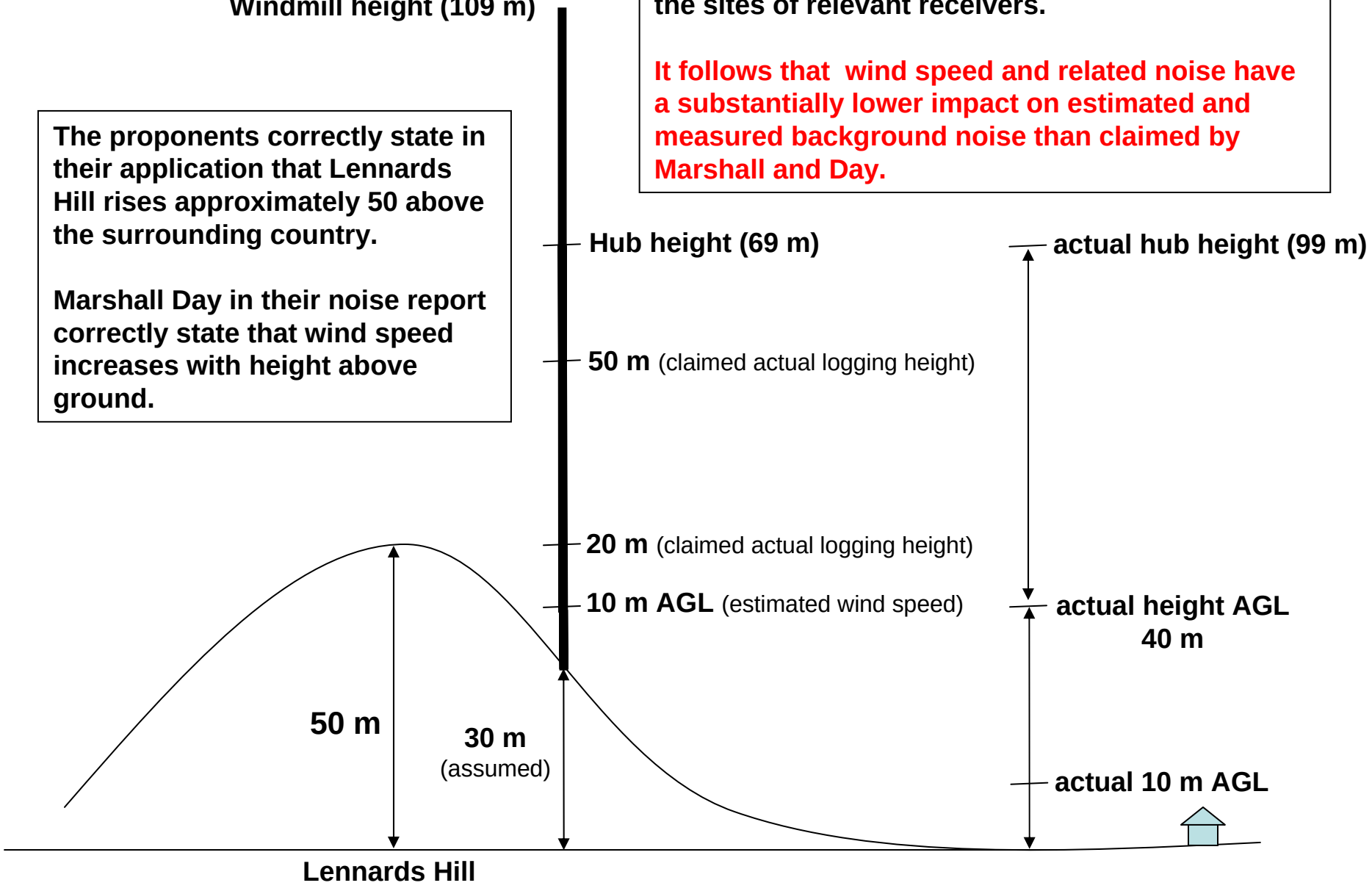
NZS 6808:1998
4.5.5 "It may be necessary to separately correlate background sound levels with wind speed for different wind directions and/or time of day."

Consequently, the wind measured at 10 m AGL at the windmill site represents wind at 40 m AGL at the sites of relevant receivers.

It follows that wind speed and related noise have a substantially lower impact on estimated and measured background noise than claimed by Marshall and Day.

The proponents correctly state in their application that Lennards Hill rises approximately 50 above the surrounding country.

Marshall Day in their noise report correctly state that wind speed increases with height above ground.



For the purposes of standardising measurements and avoiding confusion regarding whether wind is measured at hub height or any other height, *NZS6808:1998* as well as most noise specification reports for WTGs use data standardised to wind speed at a height of 10m AGL.

In order to convert wind speeds measured at a height of x_2 to that of a height of x_1 AGL, the following equation which describes a velocity profile in a turbulent boundary layer, is used:

$$V(x_1)\ m/s = \frac{V(x_2)}{\ln(x_2/Z_0)/\ln(x_1/Z_0)}\ m/s \qquad \text{Equation (1)}$$

Z_0 is the roughness factor which is dependent on the terrain and atmospheric stability. The wind data shows that a roughness factor of 0.2 is reasonable for this site.

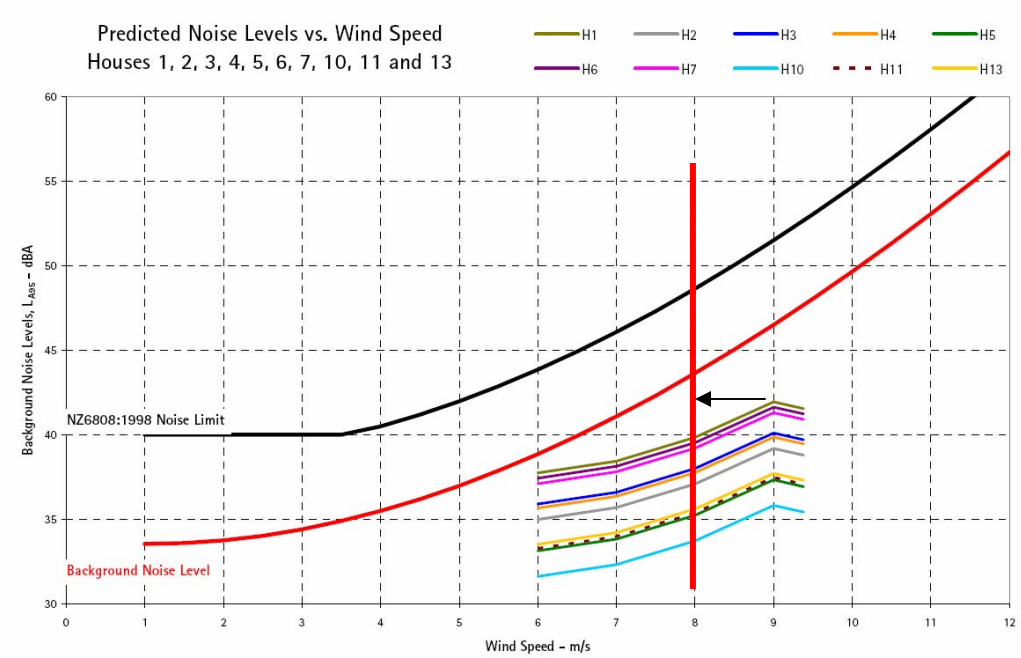


Figure H1 - Predicted WTG noise vs noise limits at House 7

Which wind data?
Why is 0.2 reasonable?

NZS 6808:1998

Additive Noise Effects

4.3.5

“The prediction of sound levels in the vicinity of a windfarm shall give an expected level of sound with all WTGs operating. For multiple WTGs, the resultant sound level at any location shall be calculated by considering the contribution of each individual WTG likely to be audible at the site and than adding these energy values by inverse logarithmic addition.”

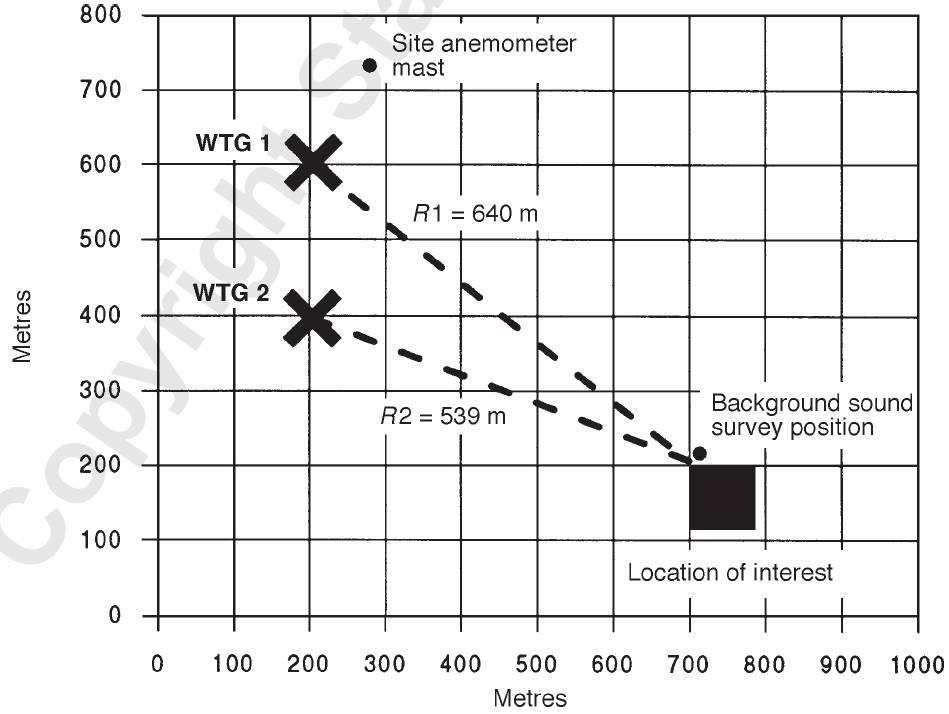


Figure A1 – Proposed site layout

Rain

NZS 6808:1998
6 Documentation
6.3 Background sound level measurement and assessment
(d) Atmospheric conditions. The windspeed and direction at the windfarm or WTG position shall be recorded, and where relevant, record the temperature, humidity, rainfall, cloud conditions etc.

AS 4959-200X (a currently proposed Australian Standard; draft March '07)
Acoustics – Measurement, prediction and assessment of noise from wind turbine generators
6.3.1 "Data points should not be included in analysis which may be adversely influenced by microphone wind effects, …or rain periods."

Wind Farms – Environmental noise guidelines (EPA South Australia)
"Rain periods during monitoring may also adversely affect the collected data. If rain was recorded in the vicinity during the collection period the developer must supply evidence that the affected data has not been used in the analysis.
The nearest weather station might not provide a sufficient indication of localised conditions in remote areas. A simple method might record rain using a local gauge or collection method that is regularly checked, and discard all data in periods where rain was detected."

The Marshall Day noise assessment states that:
"Daily rainfall data collected by Bureau of Meteorology at the Ballarat Station were reviewed and where rainfall is likely to have occurred, these data points were removed from the analysis."

Ballarat is located 45 km from the proposed development !

Sheltered Locations

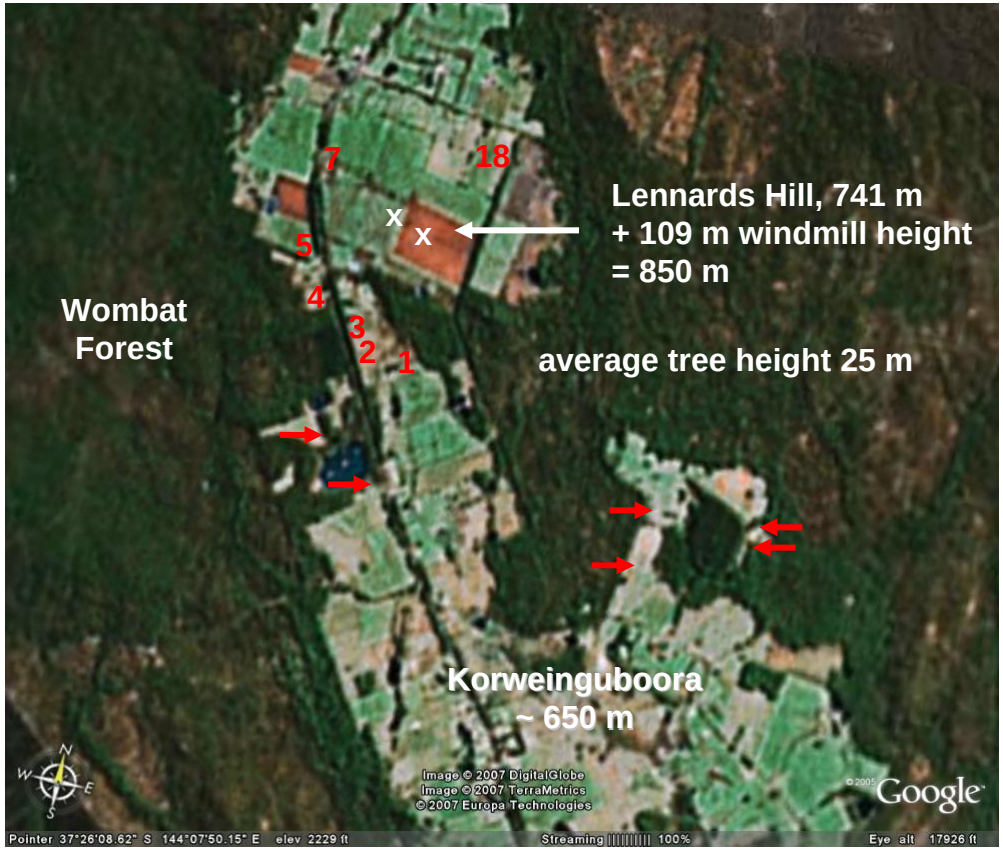
AS 4959-200X (a currently proposed Australian Standard; draft March '07)
Acoustics – Measurement, prediction and assessment of noise from wind turbine generators

6.2 Determination of relevant receivers

"…if a location is particularly sheltered and wind related background noise may be low even when wind speeds on the wind farm site itself are high, measurements should still be taken."

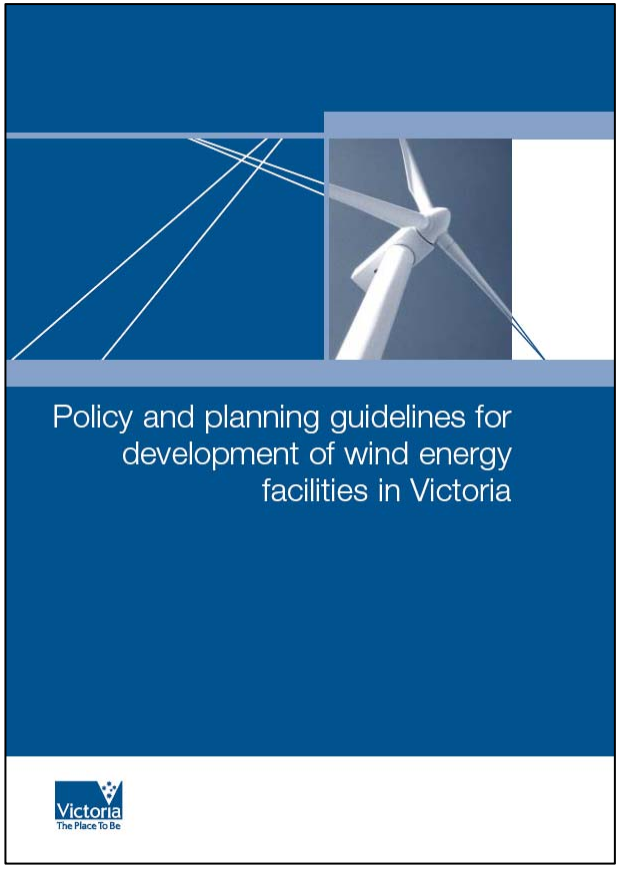
Also the
'Wind Farms - Environmental Noise Guidelines' (EPA South Australia) list as a special case

"…a receiver within 1500 m of the wind farm site that is in an area unlikely to be exposed to a windy environment."



A number of properties that are located within 1500 m of the proposed development are particularly sheltered from wind and yet are within line of sight of the WTGs. These clearly should have been considered for background noise measurements.
All of those are located within the Moorabool Shire and many have not been considered to be located within a 'visual corridor' identified by the proponents.

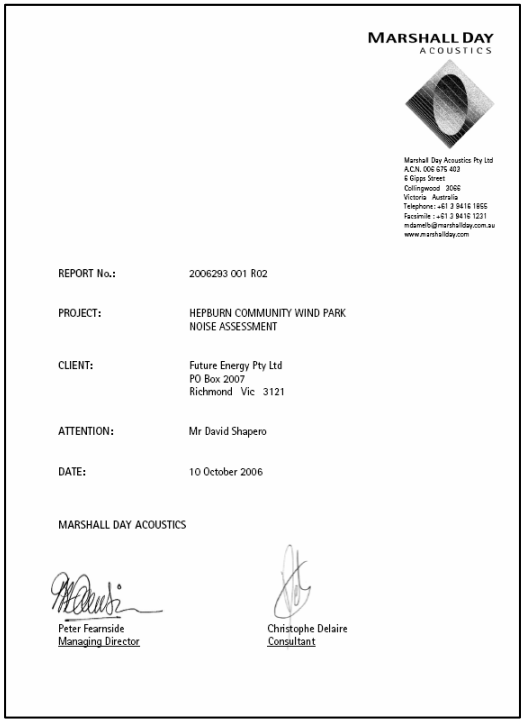
Greenhouse Benefits Calculation



In its 'Policy and planning guidelines for development of wind energy facilities in Victoria' the State Government states that:

"Wind speed… is the single most important factor affecting the financial viability of a wind energy facility." (p. 9)

"Wind energy facilities need to be located on sites that have strong, steady winds throughout the year…" (p. 15)



MARSHALL DAY
ACOUSTICS

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REPORT No.: 2006293 001 R02

PROJECT: HEPBURN COMMUNITY WIND PARK
NOISE ASSESSMENT

CLIENT: Future Energy Pty Ltd
PO Box 2007
Richmond Vic 3121

ATTENTION: Mr David Shapero

DATE: 10 October 2006

MARSHALL DAY ACOUSTICS

Peter Fearnside
Managing Director

Christophe Delaire
Consultant

***Marshall Day* state on page 3 of their report that: "…maximum impact of the wind turbines occurs at the single wind speed of 9 m/s, 10 m AGL where sound power of the MM82-2MW with a hub height of 69 m, is at its maximum."**

Greenhouse Benefits Calculation

REpower Systems

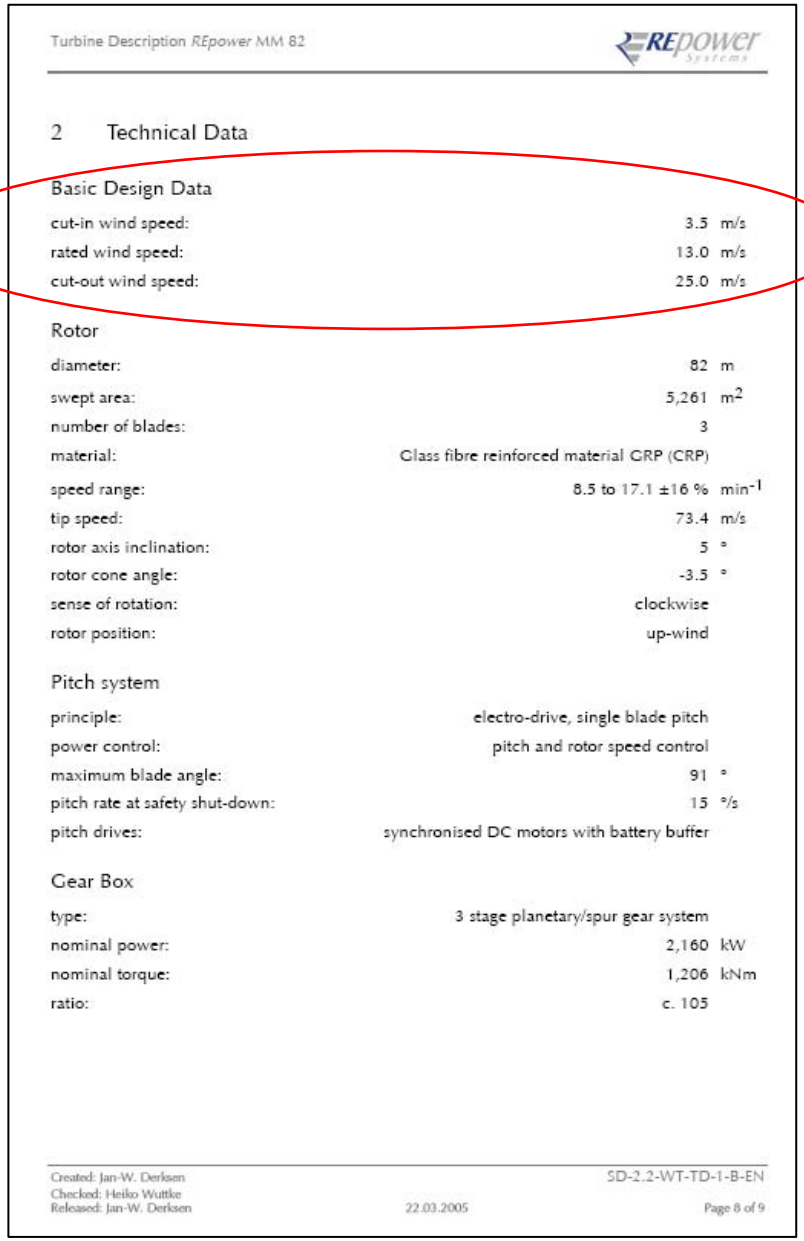
Turbine Description

REpower MM 82

The 'Policy and planning guidelines for development of wind energy facilities in Victoria' provide a 'guide to calculating greenhouse benefits of wind energy facility proposals.

"The term 'capacity factor' is used to describe the actual output of a wind energy facility…"
(Vic Gov 'Policy and planning guidelines…') relating to the %age of time for which 'rated wind speed' is achieved producing maximum power output.

According to the manufacturer, rated wind speed for the 69 m hub height model of the REpower MM82 is 13 m/s. Using Marshall Day's conversion formula (p.2 of their report) this equates to ~ 9 m/s at 10 m AGL.



Turbine Description *REpower* MM 82 — REpower Systems

2 Technical Data

Basic Design Data

cut-in wind speed:	3.5	m/s
rated wind speed:	13.0	m/s
cut-out wind speed:	25.0	m/s

Rotor

diameter:	82	m
swept area:	5,261	m^2
number of blades:	3	
material:	Glass fibre reinforced material GRP (CRP)	
speed range:	8.5 to 17.1 ±16 %	min^{-1}
tip speed:	73.4	m/s
rotor axis inclination:	5	°
rotor cone angle:	-3.5	°
sense of rotation:	clockwise	
rotor position:	up-wind	

Pitch system

principle:	electro-drive, single blade pitch	
power control:	pitch and rotor speed control	
maximum blade angle:	91	°
pitch rate at safety shut-down:	15	°/s
pitch drives:	synchronised DC motors with battery buffer	

Gear Box

type:	3 stage planetary/spur gear system	
nominal power:	2,160	kW
nominal torque:	1,206	kNm
ratio:	c. 105	

Created: Jan-W. Derksen
Checked: Heiko Wuttke
Released: Jan-W. Derksen
22.03.2005
SD-2.2-WT-TD-1-B-EN
Page 8 of 9

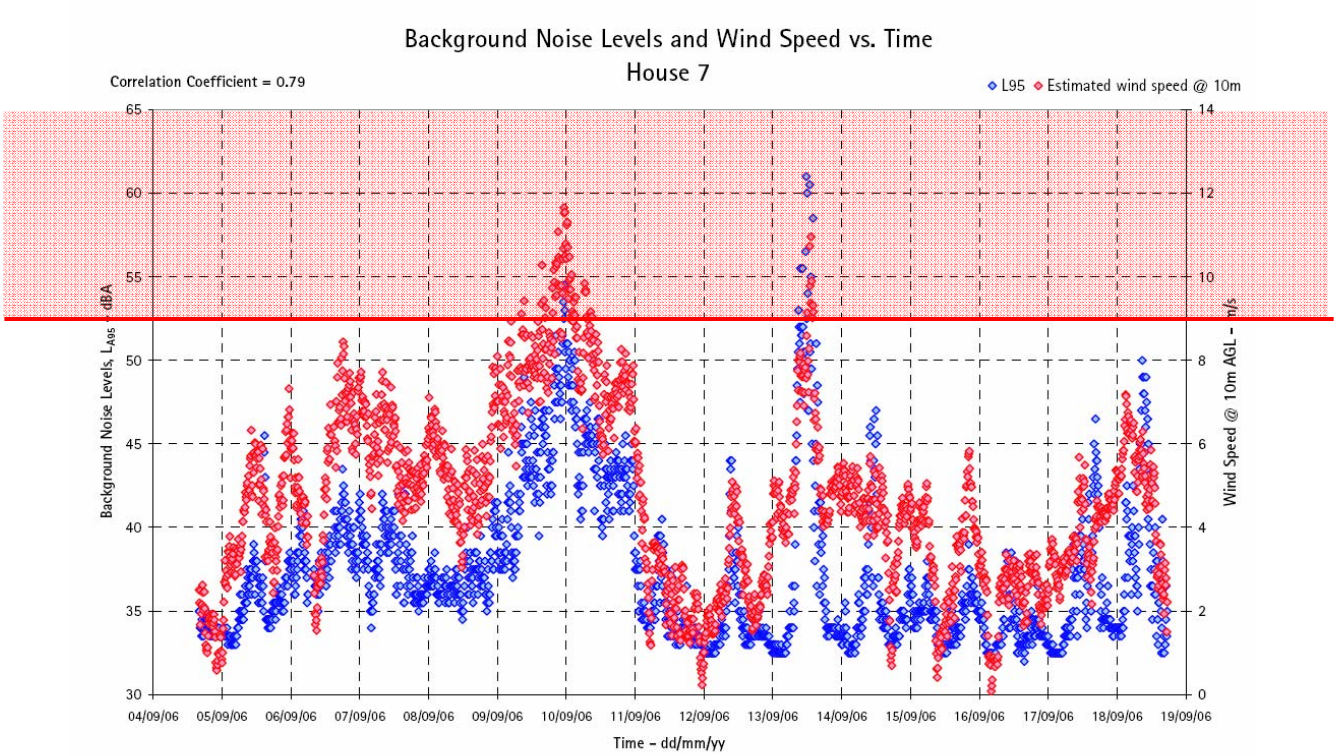
Greenhouse Benefits Calculation

In this assessment, only about 60-80 of approximately 2000 wind speed data points (3-4%) qualify for inclusion for 'capacity factor' calculation.

The Vic Gov guidelines ask to use computer modelling or an estimation to predict actual wind energy facility output.

Despite this, in their 'Greenhouse Benefits Calculation' the proponents seem to have used the 'typical' capacity factor of 35%. They claim in their proposal that power will be produced for 2500 homes (using the Vic Gov calculation guide this number should have been 2301 homes).

The actual number, however, using real data (i.e. a capacity factor of 4%) is in fact 263 homes only !



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Council failed to realise

- **that many requirements set by NZS 6808:1998 were not met;**
- **that the proponents overstated the greenhouse benefits by a factor of approximately 10;**
- **that the proposal does not adhere to the Victorian Government's 'Policy and planning guidelines for the Development of wind energy facilities in Victoria'.**

Careful assessment of the data presented also raises questions about the validity of

- **the views of the Sustainable Energy Association of Victoria**
- **and the rigour of the assessment by the Vic Gov's funding body providing a $ 1 M grant to this development.**

52.32 WIND ENERGY FACILITY

19/01/2006 VC37

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- ? The impact of the development on significant views, including visual corridors and sightlines.
- ? The impact of the facility on the natural environment and natural systems.
- ✓ The views of the Civil Aviation Safety Authority if within a 30 kilometre radius of an airfield.
- no ~~?~~ The Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, 2003.

Finally

If all goes well, Wind Turbine Generators have an expected life span of 20-25 years.

According to wind farm proponents (and at an average capacity of 35%) economic returns can be expected as early as after 10-15 years of operation.

For the Lennards Hill location and at the more realistic capacity of 4%, economic returns can only be expected after 87.5 - 131.25 years, 4-5 times the maximum life span of the proposed windmills.

The Victorian Government's
Policy and planning guidelines for development of wind energy facilities in Victoria
state that

"Wind speed is the single most important factor affecting the financial viability of a wind energy facility."

"The challenge is to ensure that we develop Victoria's wind resource in a way that appropriately balances environmental, economic and social factors."
(Steve Bracks MP; Premier of Victoria)

Using the proponents own data and the formula provided in the Vic Gov's 'Policy and planning guidelines…'

this proposal will contribute no more than 0.00373% to Victoria's annual energy consumption.

At a price tag of $ 8,000,000 and a substantial cost to community peace and social justice this development can only be described as

UTTER NONSENSE !