



7 May, 2003

Hawkes Bay Wind Machines Ltd  
438 Twyford Road  
RD5  
Hastings

Attention: Kim McAulay Dear Sir,

### Noise Measurements on a New Generation 2 bladed Orchard Rite Wind Machine

As requested, we carried out noise measurements on an "Orchard Rite" 2 bladed wind machine, and the results are set out below. We also compare the results with noise measurements taken previously on a "Frost Boss" 4 bladed machine.

#### 1.0 "Orchard Rite" 2 blade Wind Machine

Measurements were made on Wednesday 30 April 2002 with a Bruel & Kjaer Type 2260 sound level meter, in general accordance with NZS680 Weather conditions were clear and calm with a temperature of approximately 18 degrees C.

The wind machine on which the noise testing was carried out is described as follows:

Manufacturer: Orchard Rite  
Engine No/Model: T06068TF1 50 / John Deere diesel (6.8 litre)  
Blade: 2-blade fibreglass (6E-355) radius=2955mm, width=255mm  
Engine speed: 2500 rpm throughout measurement period

A measurement was made at a distance of 100 metres from the wind machine. Results are as follows:

	<b>L95</b>	<b>L10</b>	<b>Lmax</b>
2 blade New Generation Orchard Rite wind machine at 100 metres distance	70 dBA	76 CIBA	83 dBA

Attached as Figure 1 is a graph showing the measured Li0 and Lmax sound level in each one-third octave band for the “Orchard Rite” machine. In most District Plans of Territorial Authorities throughout New Zealand, the noise rules are normally written in terms of compliance with L10 and Lmax noise limits.

## 2.0 Comparison with 4 bladed “Frost Boss” Wind Machine

As requested, we compare the above results with noise measurements taken on a 4 bladed “Frost Boss” wind machine on 12 August 2001. The results of these measurements were set out in our report No. 03T034a dated 22 August 2001.

Measurements were made at a distance of 100 metres, at an engine speed of 1750 rpm. Results are as follows:

	<b>L95</b>	<b>L10</b>	<b>Lmax</b>
Frost Boss 4 blade wind machine at 100 metres distance	61 dBA	65 dBA	67 dBA
Comparison with 2 blade New Generation Orchard Rite wind machine at 100 metres distance	70 dBA	76 dBA	83 dBA

We note that a slightly higher level of 67 dBA Li 0 at 95m from the same 4-bladed machine was measured by Hegley Acoustic Consultants (at 1700rpm as set out in evidence dated August 2002). As such, it appears that noise from the 4 bladed “Frost Boss” wind machine is in the range 65-67 c Li0 at 100m distance (at 1700-1750 rpm).

Figure 2 attached is a graphical comparison of the Li 0 levels (in each 1/3 octave band) of the 2 blade versus 4 blade machine.

### 3.0 Conclusions

From the above noise measurements, noise from the 2 bladed “Orchard Rite” machine (at 76 dBA L10) is 9 to 11 dBA higher than noise from the 4 bladed Frost Boss” machine. As a “rule of thumb” it is generally considered that a noise which is 10 c higher than another sounds ‘twice as loud’.

For your general information, we note that both machines are likely to attract a 5 dBA penalty for “special audible characteristics when assessed in accordance with Appendix A6 of NZS6802:1991. However, the 2 bladed wind machine has strong tones at 40 Hz (1/3 octave band) and at 125 Hz (1/3 octave band) and because of this the noise from the 2 bladed wind machine contains a strong audible “chop”.

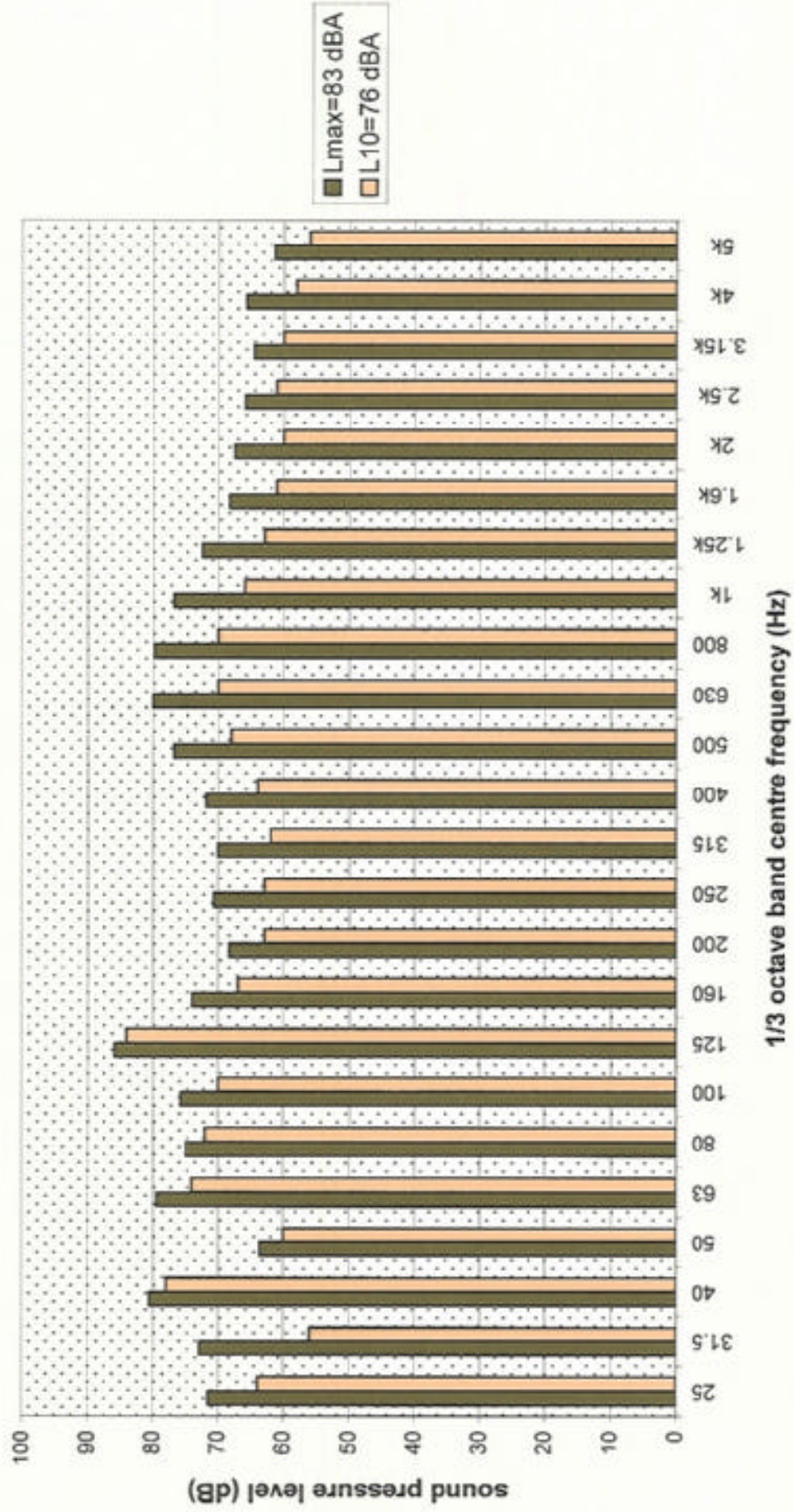
We trust this information is satisfactory for your present purposes. If you have any questions please do not hesitate to contact us.

Yours faithfully  
Marshall Day Acoustics Limited

A handwritten signature in blue ink, appearing to read "Tony Windner", is placed on a light-colored rectangular background.

Tony Windner  
Senior Consultant

**Figure 1:**  
**2-blade wind machine at 100m distance**



**Figure 2:**  
**Comparison between 2 blade and 4 blade**

