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13 Dec 2011

IN THE ENVIRONMENT COURT  
WELLINGTON

ENV-2010-WLG-000114

IN THE MATTER

of the Resource Management Act 1991  
(the Act)

AND

IN THE MATTER

of an application under section 311 of the  
Act

BETWEEN

Palmerston North City Council

Applicant

AND

New Zealand Wind Farms Limited

Respondent

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SECOND JOINT STATEMENT OF ACOUSTIC EXPERTS FOR NEW ZEALAND  
WINDFARMS LIMITED AND PALMERSTON NORTH CITY COUNCIL

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## INTRODUCTION

1. This joint statement has been prepared by Miklin Halstead of Marshall Day Acoustics, Nevil Hegley of Hegley Acoustics, and Nigel Lloyd of Acousafe Limited as acoustic experts engaged by New Zealand Windfarms Limited ("NZWL") and Palmerston North City Council ("**Council**") respectively and is filed in accordance with the Court's directions of 1 December 2011.
2. Miklin Halstead is an Associate with Marshall Day Acoustics Limited. He holds a Bachelors degree in Industrial Engineering from The University of Washington, USA; He has 23 years experience assessing and advising on the environmental sound effects of various projects, including wind farms, gas production plants, electricity substations and roading projects for industrial and public sector clients; his experience with wind farms includes consenting and/or compliance measurements for Te Apiti, Tararua 3, Te Rere Hau, West Wind, Waitahora wind farms, and research on propagation of wind turbine noise; and he served as Chair of the NZS6801-6802 (noise measurement and assessment standards) revision committee, and was a member of the NZS6808:2010 (wind farm noise) standard revision committee.
3. Nevil Hegley is the Principal of Hegley Acoustic Consultants. He has more than 40 years experience in civil engineering and for the last 35 years has specialised in acoustics. He has an MSc from Southampton University where he undertook research in acoustics. He is a Chartered Professional Engineer (member ID 58104), a Member of the Institution of Professional Engineers New Zealand, the Institution of Civil Engineers United Kingdom and the Acoustical Society of America. He has been on the majority of the Standards sub-committees since 1977 and was Chairman of two of the committees.
4. Nigel Lloyd has been an acoustic consultant with Acousafe Consulting & Engineering Ltd since 1985. He holds a degree in Mechanical Engineering from the University of Wales received in 1976. His previous work experience includes five years as the noise control engineer with the New Zealand Department of Labour and three years with the Industrial Acoustics Company in the United Kingdom. He assisted various Councils with noise reviews of information for different wind farms including Westwind, Mill Creek, Tararua 3, Turitea, Motorimu, Mahinerangi, Waitahora as well as others. He advised the Council Reporting Officer on noise matters during the consent hearing for the original Te Rere Hau wind farm and Tararua District Council for the eastern extension of Te Rere Hau wind farm.
5. The acoustic experts confirm that they have read the Environment Court's Code of Conduct for Expert Witnesses and agree to comply with their terms. Our qualifications as experts are set out above. We confirm that the issues addressed in this statement are within our areas of expertise. We have not omitted to consider any material facts known to us that might alter or detract from the opinions expressed.

## SCOPE

6. This joint statement covers the following acoustic matters:
  - (a) Deficiencies of the AEE;
  - (b) Whether the current consent conditions are appropriate;
  - (c) Minor issues related to Mr Lloyd's Affidavit.
7. The agreements and disagreements are placed together in this statement, within each area of discussion.

## DEFICIENCIES OF THE AEE

8. It is agreed that the sound power level of the turbines installed at TRH is on average 5 decibels higher than the sound power level value measured at the Gebbies Pass turbine and reported in the AEE.
9. It is agreed that over-estimation of the topographical screening is likely responsible for the remainder of the difference between predicted and measured sound pressure levels at dwellings, which is of the order of 5 – 7 decibels.
10. It is agreed that the AEE contains a discussion of tonality issues related to the Windflow 500 turbine, and that it concludes that no tonality is present in this turbine.
11. There is disagreement on whether tonality near the turbines is relevant to the assessment of environmental effects.
  - (a) Mr Lloyd is of the opinion that this means the turbines are tonal from an AEE perspective;
  - (b) Mr Halstead is of the opinion that only the tonality as measured at dwellings is relevant to this assessment.
12. It is agreed that the AEE contains information about the sound levels expected at four dwellings and three other locations if the degree of topographical screening assumed in the AEE predictions was decreased.
13. However there is disagreement on the relevance of the information related to topographical screening.
  - (a) It is Mr Lloyd's concern that this is venturing into a legal question of interpretation however, if we are going to insert an opinion then his opinion would be as follows:

Topographical screening is only discussed in relation to the residential sites of interest (namely Hargreaves, Beale, Gapp and site 4 near to Gapp) and does not alter the unqualified statements as to the effects beyond those three properties. There is also reference to other sites (sites 1, 2 and 3) the location of which is not easily discernable from the AEE and it now turns out sites 1, 2, and 3 are not located at dwellings sites at all but are apparently located within a

gully. An ordinary person would not have ascertained the significance of a reduction in screening and Mr Lloyd did not interpret the 100% terrain screening reduction as being a realistic possibility. He found the analysis difficult to follow and he did not understand it as qualifying the overall assessment as to the extent of noise effects. Other than the three specified dwellings (and site location 4), Mr Lloyd did not interpret the AEE as predicting that the levels would be greater than 30dBA. NZS6808 does not provide for terrain screening and by introducing these terrain screening effects therefore the predictions in the AEE go beyond what was required by the Standard.

(b) It is Mr Halstead's opinion that the higher noise levels predicted and presented for the "reduced screening" cases forms a valid part of the AEE, and would have been sufficient to signal doubts about the low levels of sound predicted in the conclusions. It is Mr Halstead's opinion that residents would have looked within the report (for instance to tables or noise contours) to find information relating specifically to their properties or to properties nearby.

14. There is disagreement on the matter of whether the topographical shielding values presented in the AEE would be likely values under downwind propagation.

(a) Mr Lloyd is concerned that Para 14 addresses issues the Court has not asked the acoustic experts to caucus on,

Given that position it is Mr Lloyd's opinion that the terrain shielding values and their use in the AEE are unclear and are not used to present any qualification. That is why the acoustic experts agreed in the first caucusing statement that the predictions were those contained on page 23 of the AEE. It is the applicant's noise consultant's responsibility to make a prediction, including any uncertainties that may be part of that prediction. The attenuation values in the AEE only relate to downwind conditions and 100% reduced screening was not considered by the AEE (page 29 second paragraph) to be a reasonable assumption. Even with 50% sound reduced screening in table 6, site 1 and site 2 were still predicted to receive less than 30dBA and Site 3 to receive 31.9dBA. In addition the AEE set out a number of reasons why these predictions were thought to be an "over estimate" (page 30).

Checks were made of the calculations in the AEE by Marshall Day Acoustics and these were reported in a peer review 10<sup>th</sup> December 2004. The MDA peer review stated (page 2) that "this data shows that the fundamental conclusions of the assessment are not substantially altered by the terrain screening". That peer review expressed no concerns about downwind propagation and does not support Mr Halstead's opinion expressed in 14(b).

- (b) It is Mr Halstead's opinion that some of the values of attenuation presented in the AEE would be unlikely to be achieved under downwind propagation, and that this would have led an expert reader to place more reliance on the 'reduced screening' values.

## **APPROPRIATENESS OF CONSENT CONDITIONS**

15. Agreement was nearly reached on the relevance of the NZS6808 approach.

- (a) Mr Halstead's view on this is expressed as follows: "It is agreed that NZS6808:1998 was an appropriate noise standard to apply to the TRH application at the time of consent."

- (b) Mr Lloyd's view on this is expressed as follows: "It is agreed that NZS 6808:1998 was an appropriate noise standard to follow in the presentation of information in an AEE including prediction of effects and provided guidelines for appropriate noise levels subject always to the particular evidence in the case including special background noise conditions."

16. There is disagreement on whether "40 dBA or BG+5" was the appropriate noise limit to apply to TRH at the time of the consent.

- (a) Mr Lloyd is reluctant to express any retrospective opinion about what would have transpired at the hearing if the information had been provided at that time regarding the wind farm noise levels that are now being experienced and the tones emitted by the turbines.

- (b) Mr Halstead is of the opinion that the 40 dBA limit relates to the assessment of the existing noise environment, not the predicted level of turbine noise, and would not have changed in response to this information. It is his opinion that the NZS6808 approach would derive the same 40 dBA limit whether the predicted turbine levels were 25 dBA or 40 dBA.

17. It is agreed that the dwellings currently being measured, as agreed in the previous joint statement (the study group) are a good representation of monitoring sites that would be selected given the current acoustic profile of the wind farm.

18. There is disagreement on whether the current consent conditions allow these measurement positions to be admitted.

- (a) Mr Halstead is of the opinion that condition 5(m) suitably calls these positions into play;

- (b) Mr Lloyd's view of Mr Halstead's opinion in 18(a) is that he is venturing into the question of legal interpretation of conditions. NZS6808 only requires the monitoring of background sound levels

at locations where the predicted sound levels are 35dBA or higher (4.5.1) and requires compliance testing to take place at the same locations (5.2.1). Therefore an assessment according to NZS6808 would not bring these study group locations into play using condition 5(m) because predicted sound levels were less than 35dBA.

Condition 5(m) could have been inserted for any number of reasons including the dynamic nature of building development in the area in 2004 particularly as Mr Lloyd recalls concern at the number of undeveloped sites or sites in development and the possibility that sites of interest were missed. Mr Lloyd considers that the conditions would have been considerably different if the AEE had predicted noise levels that are currently being experienced because the requirements of NZS6808 would then have identified these dwellings as requiring an impact assessment using measured background sound levels and for compliance testing. The appropriate background sound monitoring for the study group was not contemplated by the consent because a requirement for such monitoring was not triggered by the predictions in the AEE.

19. There is disagreement on whether this higher predicted noise level has a bearing on the conditions which would have arisen.

(a) Again Mr Lloyd finds it difficult to say now what his approach would have been had all of the information been known during the hearing. It would have been possible that a higher predicted noise level would have required 1) more background sound measurements; 2) a more stringent examination of those measurements; and 3) possibly a more stringent noise limit. Mr Lloyd however emphasises that the ultimate form of the conditions and/or whether consent would have been granted for all or any turbines would have depended on all aspects of the evidence taken together and the assessment of them by a properly informed commissioner.

(b) Mr Halstead is of the opinion that setting the noise limit is a separate issue from considering whether a proposed activity would comply with that limit, and that the conditions would not have depended on the predicted level of the wind farm.

20. It is agreed that the question of whether Condition 1 imposes a stricter limit than Condition 4 is a legal rather than a technical argument.

21.

## **ISSUES ARISING IN THE LLOYD AFFIDAVIT**

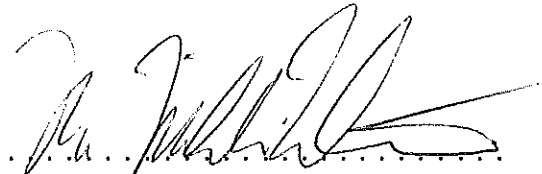
22. It is agreed that the identification of a "possible tone" in the IEC61400-11 tonality method is used for a different purpose than that of assessing a penalty.
23. It is agreed that the tone described in the 2011 MDA report as part of the sound power level measurements of the TRH turbines is different from the "rumbling gear mesh" sound described by residents in submissions.
24. It is agreed that the "Measurement Specification" prepared in December 2010 requires monitoring at times when 9 out of 10 of the closest turbines are operating and at least 80% of the wind farm is operating. This "worst case scenario" is designed to measure the wind farm at times when it is approaching its maximum noise generation, and was devised because of concerns about how many turbines were shown not to be operating during initial noise monitoring times. Because it is possible that long term operation includes times when fewer turbines are rotating than the "worst case scenario" set out in the Measurement Specification, the noise levels thus determined may be marginally greater than the long term average noise levels during actual operation.
25. It is agreed that IEC61400-11 is concerned with "emission" and not "propagation".
26. It is agreed that in paragraph 27 of Mr Lloyd's affidavit the control measures referred to would involve engineering noise controls (for example installing rubber vibration isolators), plus the mitigation options discussed in Mr Hunt's statement of evidence, section 10, page 27, including relocation of turbines, managing WTG operation including shutting down turbines.
27. It is agreed between Mr Halstead and Mr Lloyd that the difference in opinion relating to their affidavits, as expressed in paragraphs 57 to 62 of Mr Lloyd's affidavit arise from the different legal interpretations between NZWL and PNCC. Mr Lloyd and Mr Halstead do not feel these opinions are acoustical issues which would benefit further from caucusing.
28. Similarly it is agreed that technical acoustical discussion is not useful in response to matters of planning discussed in paragraphs 63 – 69, except to agree that noise impact assessments can be undertaken with a reasonable degree of technical precision.
29. It is agreed that the issues raised in the 17 November affidavit of Mr Lloyd have been discussed, and agreement or disagreement on those matters has been described in this Joint Statement.

## **MR HEGLEYS POSITION**

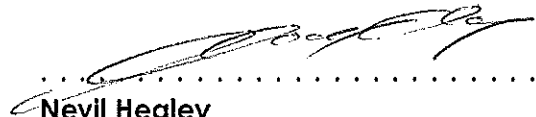
30. Mr Hegley confirms that:

- (a) He agrees with the areas of agreement expressed above; and
- (b) For those areas where there are areas of disagreement Mr Hegley agrees with the views expressed by Mr Halstead.

**Date: 13 December 2011**



**Miklin Halstead**  
Marshall Day Acoustics Ltd



**Nevil Hegley**  
Hegley Acoustic Consultants Ltd



**Nigel Lloyd**  
Acousafe Limited