

34 Old Mill Road
Duntocher
Clydebank
Dunbartonshire
G81 6BX
Scotland

Tel (013) 8987 8891
Fax (013) 8989 0516

email mail@newacoustics.co.uk
web site www.newacoustics.co.uk

TILLYRIE WIND CLUSTER

ENVIRONMENTAL STATEMENT

Comments on Noise Section

Dick Bowdler
8th May 2005

TILLYRIE WIND CLUSTER
ENVIRONMENTAL STATEMENT
Comments on Noise Section

SUMMARY

- 1 The purpose of this report is to review the Noise Section of the Environmental Statement for the proposed wind cluster at Tillyrie and to provide an opinion as to the impact of the windfarm on local residents.
- 2 The method of assessment used by the applicant, which I will call the ETSU method, is commonly used to assess windfarm noise and is incorporated into Planning Advice Note, PAN45 Renewable Energy Technologies. However, it is not a method of assessing the impact of noise on neighbours but a framework for achieving a balance between a reasonable degree of protection to neighbours and reasonable restrictions on developers. In addition to commenting on the ETSU assessment, I have assessed the impact of turbine noise on neighbours.
- 3 The applicant has elected to make use of the shortened assessment, method provided for in ETSU-R-97, which eliminates the necessity to take background noise measurements. I do not consider that the applicant is justified in using the short form method.
- 4 I have no significant disagreement with the stated method of calculation of turbine noise or with the results for turbine noise but I note that the noise levels used are not warranted levels. I also note that the noise levels used are for the selected turbine at its quietest setting.
- 5 Using the non-warranted levels I agree that all properties meet the ETSU standard, perhaps with an insignificant excess at one property.
- 6 In making an assessment of the impact of the turbines on surrounding properties I have taken noise levels 2dB above those shown in the Environmental Statement to allow for the warranted levels.
- 7 I conclude that there are three properties that will suffer a marginal loss of amenity but I do not consider that this is sufficient to refuse the development on noise grounds. Nevertheless the situation is marginal and, should the proposal be granted planning permission, the sound power levels of the selected turbines should be limited to the sound power levels of the Vestas V52 at its lowest noise setting.
- 8 I am not aware that this area is used extensively for walking or other recreational purposes.

1 INTRODUCTION

This report is prepared on the instructions of Perth and Kinross Council. The purpose is to examine and comment on the Noise Section (Section 9) of the Environmental Statement for the proposed wind cluster at Tillyrie and to provide an opinion as to the impact of the windfarm on local residents. References to the Environmental Statement refer only to the noise section.

I have not been asked to comment on construction noise.

2 METHODS OF ASSESSMENT

The method of assessment used by the applicant is set out in *The Assessment and Rating of Noise from Windfarms* (ETSU-R-97). This is commonly used to assess windfarm noise and is incorporated into PAN45 *Renewable Energy Technologies*. However, it is not a method of assessing the impact of noise on neighbours. This is not merely a personal view but is clearly stated in the first paragraph of the Executive Summary of ETSU-R-97 where it explains that the report *describes a framework for the measurement of wind farm noise and gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities*. Section 3 of this report contains my comments on the Environmental Statement in terms of ETSU-R-97.

The most commonly used method of assessment of the impact of a new noise is by comparing the new noise with the pre-existing background noise by the method set out in British Standard 4142. At low noise levels there is some controversy about using this method but, for all its faults, BS4142 has been around for over 30 years and is widely used in rural Scotland even for low background levels. The Appendix sets out the issues in more detail.

Since the Environmental Statement does not clearly set out the noise impacts on neighbouring properties I have used BS4142 to do this in Section 4.

3 ETSU-R-97 ASSESSMENT

All noise levels in this section are shown as L_{A90} unless otherwise stated, in accordance with ETSU-R-97.

The ETSU method compares the predicted noise from turbines with the background noise or, where background noise is low, with a fixed noise level. This normally requires that measurements of background noise are made, turbine noise levels are calculated, and a comparison is made of the two. However, the applicant has elected to make use of the shortened assessment method described on page 66 of ETSU-R-97 where the Noise Working Group says *We are of the opinion that if the noise is limited to an LA90,10min of 35dB(A) up to wind speeds of 10m/s at 10m height then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary*.

The ETSU guidance that permits the short version has apparently (see Table 9.2) been met by just one fiftieth of a decibel. However, I note a number of points. The noise levels used in the calculations appear to be the measured turbine noise levels. These have an error of ± 2 dB. It is normal to use warranted noise levels and these are likely to be 2dB more than the measured ones. Secondly I note that the noise levels used are for the turbine in its lowest noise configuration. The V52 has a number of power settings that can be used to reduce noise levels at the expense of power output. Finally the nearest property appears to be Shire End Farm, 25m nearer than Shire End House, where the turbine level, even based on measured figures, would be slightly over 35dB.

I do not consider that the applicant is justified in using the ETSU short form method. However, for reasons that will emerge in my report, the fact that he has done so may not be significant.

3.1 General Comments

I have no significant general comments on the noise section except to say that there are few technical comments of doubtful accuracy but these have no significance in the conclusions.

3.2 Turbine Noise

I have no significant disagreement with the stated method of calculation of turbine noise or with the results for turbine noise set out in Table 9.2 based on the sound power levels shown in Table 9.1. However, as I have already described, the sound power levels are not warranted and are for the lowest noise configuration.

3.3 Assessment

The assessment states that all properties meet the ETSU standard, in this case, of 35dB. This is only achieved because, as I have described above, warranted turbine levels have not been taken and the selected turbine is run at the quietest setting.

4 NOISE IMPACT ASSESSMENT

I have set out in this section my assessment of the likely loss of amenity to residents using the spirit of British Standard 4142.

Unless otherwise stated in this section, turbine noise is in L_{Aeq} and background in L_{A90} as provided for in BS4142. I have no evidence that there are any tonal components in windfarm noise and so the L_{Aeq} value is the same as the rating level described in BS4142. Wind speeds are those at 10m height.

As a rule of thumb I think that all properties within 2km of a turbine should be assessed. However, for the purposes of the noise calculation I consider that, since there are only 5 turbines and they are run at low power setting a distance of 1,500m is sufficient. As it happens, this is about the minimum distance for these turbines in the Perth and Kinross Wind Energy Policy Guidelines.

4.1 Background Noise

The table below shows the background noise levels from the Perth and Kinross Guideline 6. I have used these since no measurements of background noise have been made.

Background Noise	Wind Speed m/s							
	5	6	7	8	9	10	11	12
All Properties	25	27	29	31	33	35	37	39

4.2 Turbine Noise at Neighbours

As a basis for the turbine noise calculations I have taken sound power levels 2dB above those shown in Table 9.1 of the Environmental Statement in order to allow for the warranted levels. I have used, in common with the applicant, the lowest noise setting of the V52 turbine.

I have calculated the noise levels at the neighbouring properties by the CONCAWE method, which takes account of different meteorological conditions. The conditions taken are Category 6, which is favourable to downwind propagation. In practice the results from this method are usually within about 1dBA of those obtained with other methods.

The table below shows the turbine noise levels at neighbouring properties.

Turbine Noise	Wind Speed m/s							
	5	6	7	8	9	10	11	12
Newhill (2 properties)	22	24	24	25	26	27	27	27
Cottage on road to Hosp	24	26	27	28	28	29	29	30
Old Hospital	29	31	32	33	33	34	34	35
Shire End House	29	31	32	33	33	34	34	35
Shire End Farm	29	31	32	33	34	34	34	35
Shire End Cottage	27	29	30	31	32	32	32	33
Cloverlea	23	25	26	27	28	28	28	29
Plains	23	25	25	26	27	28	28	28

4.3 Assessment of Impact

BS4142 says that *A difference of around 10dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance.*

An increase in noise level of up to 3dB is not readily detectable.

Based on the principles above, the following assessment guidance is provided in Guideline 6 of the Perth and Kinross Wind Energy Guidelines, June 2004.

- A difference of 3dB or less – insignificant
- A difference of 4 to 6dB – marginal loss of amenity
- A difference of 7 to 9dB – significant loss of amenity
- A difference of 10dB or more – major loss of amenity

The old planning guidance (Circular 24/73) provided some justification for this in the case of industrial noise generally. It says (in common with the Welsh guidance quoted on page 21 of ETSU-R-97) that *where, by the standards established in BS4142, “the noise from the development is likely to give rise to complaints” it will hardly ever be right to give [planning] permission.* PAN 56 is less specific but says in relation to windfarms that *Good acoustical design and siting of turbines is essential to ensure there is no significant increase in ambient noise levels as they affect the environment and any nearby noise-sensitive property.*

Taking the two tables above I have deducted the background noise level from the turbine noise level to obtain the values in the table below.

Difference	Wind Speed m/s							
	5	6	7	8	9	10	11	12
Newhill (2 properties)	-3	-3	-5	-6	-7	-9	-10	-12
Cottage on road to Hosp	-1	-1	-2	-4	-5	-6	-8	-10
Old Hospital	4	4	3	1	0	-1	-3	-5
Shire End House	4	4	3	2	0	-1	-3	-4
Shire End Farm	4	4	3	2	0	-1	-3	-4
Shire End Cottage	2	2	1	0	-2	-3	-5	-6
Cloverlea	-2	-2	-3	-4	-6	-7	-9	-10
Plains	-2	-2	-4	-5	-6	-7	-9	-11

There are three properties that will suffer a marginal loss of amenity. The excess is less than 5dB above background and I do not consider that this is sufficient to refuse the development on noise grounds.

Nevertheless the situation is marginal and, should the proposal be granted planning permission, the sound power levels of the selected turbines should be limited to the sound power levels of the Vestas V52 at its lowest noise setting.

5 OTHER MATTERS

I am not aware that this area is used extensively for walking or other recreational purposes.

APPENDIX

It is my view that an Environmental Statement should set out the impact of noise on sensitive receptors. The most commonly used method of assessment of the impact of a new noise is by comparing the new noise with the pre-existing background noise by the method set out in British Standard 4142. It is normal to set a noise limit relative to the pre-existing background noise when a new industrial noise is to be introduced into a residential area. Typical planning conditions imposed by rural local authorities (and sometimes urban ones) require that the new noise be no more than 5dB above the pre-existing background. Where the new noise is around 10dB or more above background noise BS4142 predicts that complaints are likely.

BS4142 is not normally used by developers to assess wind farms. This is done using the document ETSU-R-97 "The Assessment and Rating of Noise from Wind Farms". Paragraph 68 of PAN 45 "Renewable Energy Technologies" says that ETSU-R-97 *gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or planning authorities.* This quotation is taken from the Executive Summary of ETSU-R-97. My point is that, whatever the value of ETSU-R-97 as a planning tool, it is not, by its own admission, a method of assessing impact.

There are circumstances in which ETSU-R-97 considers that 11dB over background is appropriate for wind farms as against normal practice for industrial noise of 5dB over background noise. Of course I have to bear in mind that ETSU-R-97 does not purport to offer a method of assessment of impact. So ETSU-R-97 is proposing that, for wind farms, a level of noise that is likely to give rise to complaints is appropriate because of the particular public benefits of wind farms. Other projects of public benefit have to meet the stricter standard of 5dB above background.

They go further to suggest that even this comparison with background is not appropriate when background levels are low and decide that there ought to be an absolute limiting noise level. During the night they consider that a turbine noise level inside peoples houses of just less than the World Health Organisation say is necessary to get back to sleep if you wake up in the night is satisfactory. It seems to me this must be the very upper limit of acceptability, not one that is well balanced. Since then, the WHO has revised its guidance 5dB lower.

When they come to day time, they argue that there is no need for wind farm noise to be less than 40dB (7dB above the level at which you could get to sleep on your patio) because *Wind farms do not operate on still days when the more inactive pastimes (eg sunbathing) are likely to take place* so people will not want to sleep on their patios on such days.

Roughly speaking ETSU-R-97 concludes that, for wind farms, noise levels can be at least 10dB above background noise – a level that would be completely unacceptable in any other circumstances.