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CALLIACHER WINDFARM

ENVIRONMENTAL STATEMENT

Comments on Noise Section

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Comments on Noise Section

SUMMARY

1 The purpose of this report is to review the Noise Section of the Environmental Statement for the proposed windfarm at Calliacher 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 the 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 view of this, in addition to commenting on the applicants ETSU assessment I have made an assessment of the impact of turbine noise on neighbours.

3 I do not significantly disagree with the contents of Annex E and confirm that the noise levels comply with the requirements of ETSU-R-97.

4 I have assessed the likely loss of amenity to residents due to noise from the proposed development and consider that it will be insignificant.

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, Annex E, of the Environmental Statement for the proposed windfarm at Calliacher and to provide an opinion as to the impact of the windfarm on local residents. Note that 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*.

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 nearly 30 years and is widely used in rural Scotland even for low background levels. The appendix sets out the issues in more detail.

3 ETSU-R-97 ASSESSMENT

This is the method referred to in the Environmental Statement and my comments on it are contained in this section. 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 generally requires that measurements of background noise are made, turbine noise levels are calculated, and a comparison is made of the two.

The applicant has taken advantage of the simplified assessment method on page 66 of ETSU-R-97 and this is referred to in paragraph 4 of Annex E.

I do not significantly disagree with the contents of Annex E and confirm that the noise levels comply with the requirements of ETSU-R97.

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.

4.1 Background Noise

Local Authorities generally require that background noise is measured at the quietest part of the period in question. For example, where the background is dominated by road traffic this may fall to a minimum about 3am. The 3am level is generally considered to be representative of the background noise throughout the night: the average over the whole night period is not considered to be appropriate. In the case of windfarms the "period" required at each wind speed is the aggregate of all the periods at that wind speed.

The methodology used by ETSU is effectively to average 10 minute values of L_{A90} at each wind speed and this gives a higher figure than would normally be considered appropriate for an amenity assessment.

To overcome this problem it is my practice to take the 25th percentile of a group of 10-minute measurements at a particular wind speed to define the L_{A90} at that wind speed.

As background noise levels were not measured, I have taken a typical background noise level based on my own experience of similar cases. The basic level chosen is 36dBA at 8m/s rising at 2dBA for each 1m/s increase of wind speed and falling by 3dBA for each 1m/s decrease of wind speed to a minimum value of 24dBA. These figures represent the 25 percentile of the ten-minute noise levels.

The background noise levels computed in this way are shown in the following table.

	Wind Speed (m/s)				
	4	5	6	7	8
Background dBA	24	27	30	33	36

4.2 Turbine Noise at Neighbours

I have used the noise levels at the neighbouring properties as calculated by the CONCAWE method which takes account of different meteorological conditions. The conditions taken are Category 6, which is favourable to downwind propagation.

The table below shows the turbine noise levels at the five nearest sample properties. The levels are calculated from published noise levels for the Vestas V80.

Location	Wind Speed (m/s)				
	4	5	6	7	8
Garrow	18.5	23.5	27.5	28.5	29.5
Tirchardie	20.3	25.3	29.3	30.3	31.3
Wester Shian	21.0	26.0	30.0	31.0	32.0
Easter Shian	20.8	25.8	29.8	30.8	31.8
Turrerich	20.1	25.1	29.1	30.1	31.1

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, I suggest an assessment of loss of amenity as follows:

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

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.

Location	Wind Speed (m/s)				
	4	5	6	7	8
Garrow	-6	-4	-3	-5	-7
Tirchardie	-4	-2	-1	-3	-5
Wester Shian	-3	-1	0	-2	-4
Easter Shian	-3	-1	0	-2	-4
Turrerich	-4	-2	-1	-3	-5

Inspection of the table shows that the noise impact of the proposed development will be insignificant.

APPENDIX

ETSU R-97 is not, and does not claim to be, a method of assessing loss of amenity. It sets out maximum noise levels from windfarms that aim to achieve a balance between the need for windfarms and the protection of residents' amenity. The levels set are effectively the upper limits of acceptability or even higher. For example, for night time, the level proposed by ETSU R-97 is that which the World Health Organisation considered to be the highest level at which people are able to get back to sleep.

The ETSU R-97 method is quite different from general practice in assessing loss of amenity such as the use of BS4142. It is different even from the method normally used to assess other renewable energy developments such as landfill and biomass generators.

In my opinion an Impact Statement should clearly set out the potential loss of amenity to residents. Thereafter the decision as to whether any loss of amenity is outweighed by other factors is a political one.

Normal Practice

Where a new noise is to be introduced into a residential area it is normal to set a noise limit relative to the pre-existing background noise.

What is Background Noise at a Windfarm Site?

ETSU R-97 rejects BS4142 for two reasons related to background noise. The first is that it is not applicable in low background noise levels and the second is that it should not be used when wind speeds are above 5m/s. I see no reason to reject the principle of the method on these grounds.

Low Background Noise

In low background noise levels much is often made of the suggestion that BS4142 precludes its own use where background levels are less than 30dBA. The current standard (which was published after ETSU R-97) actually says that *the method is not suitable . . . . when the background and rating noise levels are both very low.* Very low is defined as 30dB for the background level and 35dB for the rating level.

The fact is that some measure of loss of amenity needs to be applied below a background level of 30dB and there is nothing better at present than to use the same method of comparing turbine noise with background.

Wind

BS4142 also requires that measurements be made with wind speeds less than 5m/s. There are two reasons for this. The first is that, for most assessments, windy weather is not representative of quiet times and the second is that noise may be created by wind on the measuring equipment. Clearly the procedure needs some modification for wind turbines because they do not generally operate until wind speeds reach around 4m/s and it would be unreasonable to base the assessment in calm conditions when the turbines would not be working. BS4142 is

looking for the noise level in the quietest normal circumstances. With wind farms it would be reasonable to make background noise measurements when wind speeds at the development site were in the range at which the turbines operate. In fact, ETSU R-97 accepts this point and does make background measurements in this way. Clearly care needs to be taken to ensure that wind noise on the microphone is not a factor.