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## **LOCHELBANK WINDFARM**

## **ENVIRONMENTAL STATEMENT**

### **Comments on Noise Section**

**Dick Bowdler**  
**15<sup>th</sup> November 2005**



## LOCHELBANK WINDFARM

## ENVIRONMENTAL STATEMENT

### Comments on Noise Section

#### SUMMARY

1. The purpose of this report is to review the Noise Section of the Environmental Statement dated April 2005 for the proposed windfarm at Lochelbank 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 have any significant comments on the background noise measurements. They appear to have been carried out over a sufficient period of time and at sufficient locations.
4. I have no disagreement with the method of calculation of turbine noise or with the resulting figures.
5. I find that the turbine noise levels meet the night time and the most stringent day time standard of 35dBA set out in ETSU.
6. I have assessed the likely loss of amenity to properties in the area and conclude that there is one property that will suffer a marginal loss of amenity. I do not consider that there is reason to refuse the application on the grounds of noise.
7. Should the proposal be granted planning permission I recommend that there should be conditions attached that limit noise levels at surrounding properties.
8. If planning permission is given for this and other windfarms nearby, for which application has been made, it does not appear that there will be a cumulative effect on any residents.



## 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 8 and Appendix F) of the Environmental Statement for the proposed windfarm at Lochelbank 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.

This report refers to a revised Environmental Statement dated April 2005 which has similarities to a previous application on the same site and was reported by me on 25<sup>th</sup> September 2004.

## 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 nearly 40 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

This is the method used in the Environmental Statement. 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 requires that measurements of background noise are made,

turbine noise levels are calculated, and a comparison is made of the two.

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

### 3.1 Background Noise

Background noise measurements have been made near to neighbouring residential properties. As required by ETSU-R-97, a curve has been drawn through the noise measurements to give, effectively, an average background noise level at each wind speed.

I do not have any significant comments on the background noise measurements. They have been made over a period of 4 weeks and, although I do not know the range of wind directions and speeds over this period, this would normally be sufficient to provide an adequate sample. In addition measurements have been made at seven locations, which seems adequate for this site.

### 3.2 Turbine Noise

I have no disagreement with the stated method of calculation in 8.2.2. The results for turbine noise are set out in Tables 8.6 and 8.7 and I have no significant disagreement with these.

### 3.3 Proposed Turbine Noise Standards

The maximum permitted noise level of turbines has been derived using paragraphs 21 and 22 of ETSU R-97. This permits levels of 5dBA above background noise except where background noise is low when there is an absolute limit of 35 to 40dBA during the day and 43dBA at night.

The applicant has selected an absolute day time level of 40dBA, which is the top end of the permitted scale. Whether or not it is correct to select 40dBA is irrelevant since an examination of the figures shows that the lower ETSU limit of 35dBA is also met at all properties.

I am therefore satisfied that the development meets the most stringent of the ETSU tests.

## 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. The table below shows those properties within 2km. Columns 2 and 3 give the National Grid references and the last column shows the number of properties at that location.

I have assembled the list from observation and from conversation with some local people so I cannot guarantee complete accuracy.

I have no information about Berryknowe except its presence on the map.

Name	E	N	Properties
West Dron Cottages	312316	715836	1
Blairstruie	313880	713530	1
House	314120	712990	1
Scarhill	313560	712710	1
House	313600	712580	1
Lochelbank	313265	712719	1
Fordel	313065	712284	3
Berryknowe	312000	712060	1
Wester Deuglie	310828	711958	1
Heatheryleys	309925	712477	2
Eastfield	309310	713069	3

#### 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 and the background noise level at any wind speed should be the quietest 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 or the mean less one standard deviation of a group of 10 minute measurements at a particular wind speed to define the  $L_{A90}$  at that wind speed.

Where there are background noise levels available from the Environmental Statement I have taken them off the graphs. I have taken the average of the day and night levels shown in the curves and deducted 3dB, which is typical of the difference between the mean and the 25th percentile. This means that the background noise level is less than the figures shown for about 25% of the time.

Where I do not have the data for background noise, I have taken typical background noise levels based on my own experience of similar locations to those here. The basic level chosen is 31dBA at 8m/s rising at 2dBA for each 1m/s increase of wind speed and falling by 2dBA 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 incorporated into Perth and Kinross Wind Energy Policy Guidelines June 2004. It is interesting to note that, for wind speeds up to 7m/s, which are the most critical for noise impact, the average of the measured figures is about the same as my assumed figures.

I see no reason to differentiate between day and night since the turbine noise levels will be no different. In any case, in most rural areas there is only a small difference in background noise levels between day and night.

The table below shows these background noise levels.

Background Noise		Wind Speed (m/s)									
		3	4	5	6	7	8	9	10	11	12
West Dron Cottages	1	28	27	27	27	29	30	32	33	35	37
Blairstruie	1	24	24	25	27	29	31	33	35	37	39
House	1	24	24	25	27	29	31	33	35	37	39
Scarhill	1	24	24	25	27	29	31	33	35	37	39
House	1	24	24	25	27	29	31	33	35	37	39
Lochelbank	1	29	30	32	33	36	38	41	43	46	48
Fordel	3	27	27	28	29	30	32	34	36	38	40
Berryknowe	1	24	24	25	27	29	31	33	35	37	39
Wester Deuglie	1	19	20	21	23	25	28	30	33	35	37
Heatherleys	2	21	23	26	29	32	36	39	42	44	46
Eastfield	3	21	22	25	28	31	35	38	41	43	44

#### 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. In practice the results from this method are usually within about 1dBA of those obtained using ISO 9613-2, which is the applicants model. In accordance with BS4142

the values are  $L_{Aeq}$  so the noise levels are typically 2dBA higher than the ETSU figures.

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

Turbine Noise		Wind Speed (m/s)									
		3	4	5	6	7	8	9	10	11	12
West Dron Cottages	1	18	20	21	25	26	27	28	29	31	32
Blairstruie	1	19	20	22	25	27	28	29	30	31	33
House	1	16	18	19	23	24	25	26	27	29	30
Scarhill	1	20	21	22	26	27	29	30	31	32	33
House	1	19	20	22	25	26	28	29	30	31	32
Lochelbank	1	22	24	25	28	30	31	32	33	34	36
Fordel	3	21	22	24	27	29	30	31	32	33	35
Berryknowe	1	24	25	27	30	32	33	34	35	36	38
Wester Deuglie	1	23	24	25	29	30	31	32	34	35	36
Heatherleys	2	21	23	24	27	29	30	31	32	33	35
Eastfield	3	19	20	21	25	26	27	28	30	31	32

#### 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 shown below and in 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.

Location	Wind Speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
West Dron Cottages	1	-9	-7	-6	-2	-3	-3	-3	-3	-4
Blairstruie	1	-5	-4	-3	-2	-2	-3	-4	-5	-6
House	1	-8	-6	-6	-4	-5	-6	-7	-8	-8
Scarhill	1	-4	-3	-3	-1	-2	-2	-3	-4	-5
House	1	-5	-4	-3	-2	-3	-3	-4	-5	-6
Lochelbank	1	-7	-6	-7	-5	-6	-7	-9	-10	-11
Fordel	3	-6	-5	-4	-2	-1	-2	-3	-4	-5
Berryknowe	1	0	1	2	3	3	2	1	0	-1
Wester Deuglie	1	4	4	4	6	5	4	2	1	0
Heatheryleys	2	1	0	-2	-1	-3	-6	-8	-10	-11
Eastfield	3	-2	-2	-3	-3	-5	-7	-9	-11	-12

Cream (pale grey if this is printed in black and white) indicates a marginal loss of amenity.

There is one property that will suffer a marginal loss of amenity.

#### 4.4 Other Matters

I am not aware that this is a major walking area though there is a path marked from Lochelbank to West Dron.

Should the proposal be granted planning permission then there should be conditions attached that limit noise levels at surrounding properties at each wind speed. This is because alternative turbines may have higher noise levels than the presently proposed turbines.

I am aware that there are other applications for windfarms pending in the area. From what I have seen I think it unlikely that there would be a cumulative noise effect at any properties.