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PROPOSED WIND TURBINE SITE,
STONEBRIDGE LANE, GREAT HAUGHTON

NOISE IMPACT ASSESSMENT

Report **7917-NIA-01**

Prepared on 18 January 2013

Issued For:

UGE Ltd
Titan Business Centre
Cleckheaton
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committed to CSCS Platinum award

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Figure 7917-NM1 Noise Map Showing Proposed Turbine and Surrounding Dwellings

1.0 INTRODUCTION

Clement Acoustics Ltd has been commissioned by UGE Ltd to undertake an environmental noise impact assessment of the proposed wind turbines close to Stonebridge Lane, Great Houghton, Barnsley, in accordance with Local Planning Authority requirements.

This report presents the assessment criteria and methodology and noise impact calculation results of the proposed wind turbine at the nearest identified noise sensitive receivers.

2.0 PLANNING REQUIREMENTS AND REFERENCES

Based on the Environmental Protection's Minimum Information Requirements for Wind Turbine Planning Applications (April 2012) a desktop site specific noise assessment will be presented in this report, taking into account the following standards and guidance documents:

- ETSU-R-97 - The Assessment & Rating of Noise from Wind Farms,
- ISO9613-1:1993 - Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere,
- ISO9613-2:1996 - Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation,
- Report ECN-CX-99-044 – 'Acoustic Noise Measurements at a Lagerway LW18/80 Wind Turbine Near Slootdorp' by JJD Van Dam and PW Vink.

3.0 ASSESSMENT CRITERIA

3.1 Non-financially involved properties

Clause 25 of ETSU-R-97 provides the following guidance when assessing the noise impact on non-financially involved properties:

"*For single turbines or wind farms with very large separation distances between the turbines and the nearest noise sensitive properties a simplified noise condition may be suitable. We are of the opinion that, if the noise is limited to an $L_{A90,10min}$ of 35 dB(A) up to wind speeds of 10 m/s at 10 m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary. We feel that, even in sheltered areas when the wind speed exceeds 10 m/s on the wind farm site, some additional background noise will be generated which will increase background levels at the property*".

3.2 Financially involved properties

Clause 24 of ETSU-R-97 advises that the above limit may be increased to 45 dB(A) where the occupier of the property has some financial involvement.

4.0 SITE DESCRIPTION

4.1 Proposed Site and Applicants

Current proposals are to install two Wind Energy Solutions WES80 wind turbines on 40m masts, in a field approximately 750m to the northeast of Great Houghton village, as shown in Figure 7917-NM1. It is understood from discussions with Universal Green Energy Ltd that the measured levels of the LW18/80 turbine would be considered representative of the WES80 turbines.

There are no financially involved applicant properties close to the application site.

4.2 Receiver Locations and Distances

There are a number of houses, cottages and farms in the area as shown in Figure 7917-NM1.

The nearest non-financially involved premises, is approximately 394m to the southeast of Turbine 1 and 292m to the southeast of Turbine 2 and is indicated in green in the attached noise map. This receiver will be included in the noise impact calculations for the purpose of this report and presented in Section 5.2.

5.0 NOISE IMPACT CALCULATIONS

Noise impact calculations for the nearest non-financially involved property have been undertaken using the guidance provided in ISO 9613. Results of the noise propagation predictions are shown in Table 5.2 below.

5.1 Assumptions

The following assumptions have been made when carrying out noise impact calculations and noise impact modelling:

- Neutral meteorological conditions assumed (10°C temperature and 70% relative humidity), ground is modelled as partially reflective,
- Proposed wind turbines modelled with propeller hub 40m above ground level, as per specifications,
- All receivers placed at a height of 4m, in line with standard planning requirements,
- Wind turbine modelled with Sound Power Level L_{WA} of 95.5dB, as warranted in the EWT noise report. Warranted levels include corrections for uncertainty and wind speed as specified in the report,
- Having reviewed spectral noise level, there is no indication of any tonal content in the noise emissions of the turbines. A penalty of +5dB has therefore not been applied to noise emission levels for the purpose of this assessment,
- Measured spectral sound power levels of the turbine have been shifted to match the warranted overall levels, for use in calculations.

All ground and atmosphere corrections are calculated according to standard acoustic theory and the specifications detailed in ISO9613-2:1996 - Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

5.2 Nearest Noise Sensitive Receiver

Table 5.2 shows spectral calculations undertaken for the closest noise sensitive premises.

	Frequency, Hz								
Element	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
Linear Sound Power Level at 7m/s WES80 Wind Turbine 1	64	72	77	85	87	87	87	67	
Correction for stated uncertainty *Multiplied by 1.645 as per standard requirements*	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
Correction to 10m/s wind speed	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Conversion to sound pressure level	-11	-11	-11	-11	-11	-11	-11	-11	
Distance Correction, 394m	-52	-52	-52	-52	-52	-52	-52	-52	
Atmospheric Attenuation	0	0	0	-1	-2	-4	-13	-46	
Ground Effect	3	0	1	2	2	2	2	2	
Turbine 1 level L_{eq} at receiver	7	11	17	25	27	24	15	0	**30**
L90 Correction	-2	-2	-2	-2	-2	-2	-2	-2	
Calculated L_{90} at Receiver	5	9	15	23	25	22	13	0	**28**
Linear Sound Power Level at 7m/s WES80 Wind Turbine 1	64	72	77	85	87	87	87	67	
Correction for stated uncertainty *Multiplied by 1.645 as per standard requirements*	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
Correction to 10m/s wind speed	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Conversion to sound pressure level	-11	-11	-11	-11	-11	-11	-11	-11	
Distance Correction, 292m	-49	-49	-49	-49	-49	-49	-49	-49	
Atmospheric Attenuation	0	0	0	-1	-2	-4	-13	-46	
Ground Effect	3	0	1	2	2	2	2	2	
Turbine 1 level L_{eq} at receiver	10	14	19	28	29	27	18	0	**33**
L90 Correction	-2	-2	-2	-2	-2	-2	-2	-2	
Calculated L_{90} at Receiver	8	12	17	26	27	25	16	0	**31**
Cumulative L_{90} at Receiver	10	14	19	28	29	27	18	0	**33**

Table 5.2: Noise Impact Calculations for Noise Sensitive Receiver

As shown in the above calculations, noise emissions are expected to comply with the minimum requirements for the shortened procedure of ETSU-R-97, presenting a predicted noise emissions level less than the design criterion of 35 dB(A).

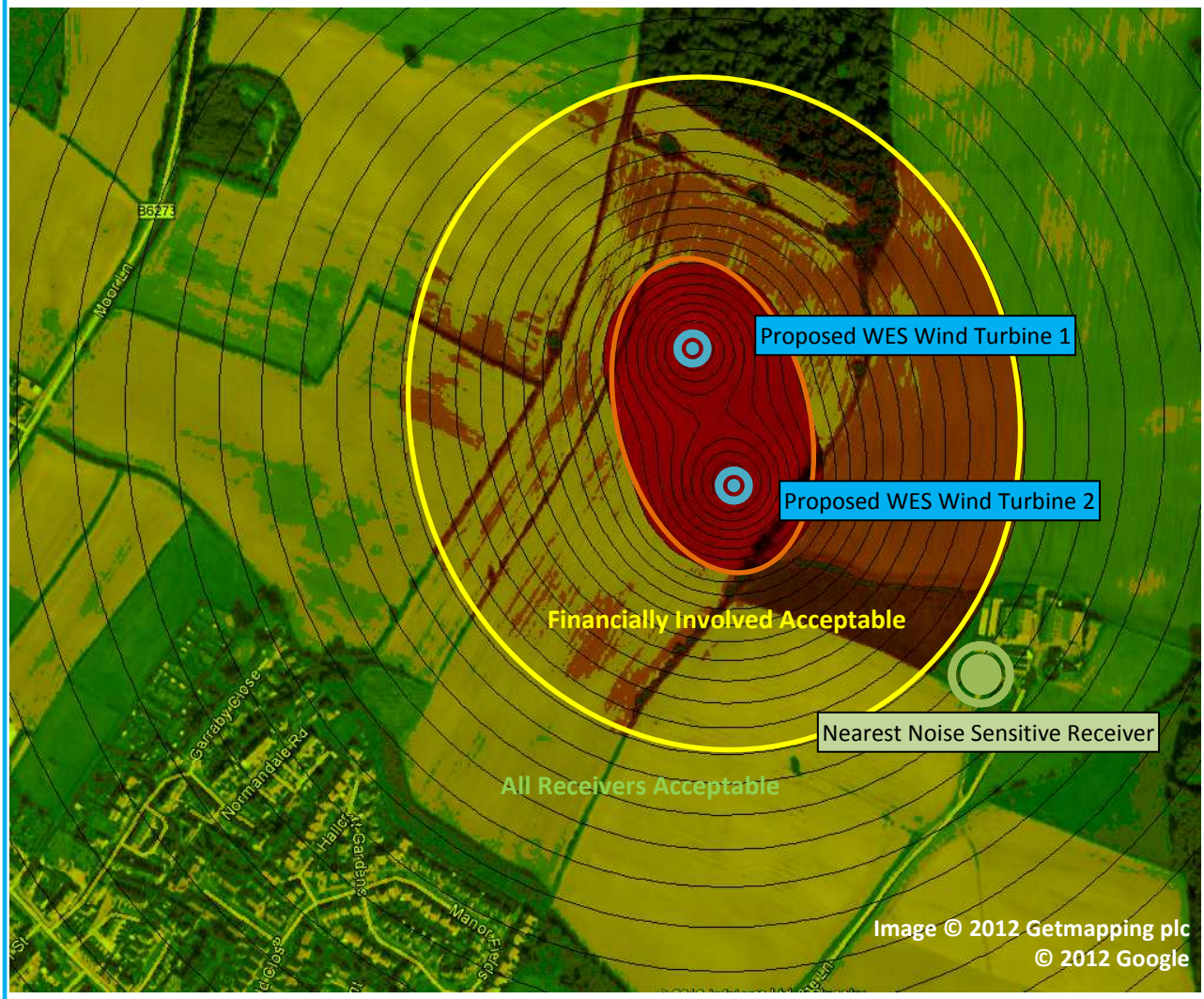
6.0 CONCLUSION

Clement Acoustics has undertaken a desktop site specific assessment on behalf of UGE Ltd with regards to the proposed installation of two Wind Energy Solutions wind turbines at Great Houghton, Barnsley.

Noise impact calculations have shown that the maximum predicted receiver noise level L_{90} at the nearest non-financially involved properties would be 33 dB(A) and therefore within the minimum requirements of an ETSU-R-97 assessment.

Report by	Checked by
Duncan Martin MIOA	**Florian Clement MIOA**

< 35.0 dB [*Acceptable for All Receivers*]
< 45.0 dB [*Acceptable for Financially Involved Receivers*]
> 45.0 dB



Noise Model, Proposed Great Houghton Turbines:

- Neutral meteorological conditions assumed (no wind, 10°C temperature and 70% relative humidity), ground is modelled as partially reflective
- Proposed wind turbines modelled with propeller hubs 40m above ground level, as per specifications
- Wind turbines each modelled with Sound Power Level L_{WA} of 95.5dB, warranted sound power level at wind speed of 7.5m/s, including corrections for uncertainty and wind speed of 10m/s
- Sound Power Levels specified in report 'Acoustic Noise Measurements at a Lagerway LW18/80 Wind Turbine Near Slootdorp' by JJD Van Dam and PW Vink [*Understood to be representative following discussions with UGE Ltd*]
- Nearest 'noise sensitive' premises indicated in green
- All receivers placed at a height of 4m, in line with standard planning requirements
- Noise contours and calculations indicate that noise levels at all dwellings are acceptable