

INFINITY ACOUSTICS

DESKTOP NOISE IMPACT ASSESSMENT

**Bank House,
Bank House Farm,
Spalding,
PE11 3JH**



Project Description:

Desktop Noise Assessment Due to the Replacement of an Existing Wind Turbine

Project Reference Number:

A473BH

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001	06.07.2026	Original Version
002	17.09.2026	Revised Assessment Locations

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1. Introduction

- 1.1 Infinity Acoustics Ltd has been appointed to undertake a desktop noise assessment to evaluate the potential noise impact on nearby residential dwellings due to the replacement of an existing wind turbine with a new 40m hub height wind turbine. The development site is located at Bank House, Bank House Farm, Spalding, PE11 3JH.
- 1.2 As part of the application process, the client will be submitting a planning application for the development to the Local Planning Authority (LPA), South Holland District Council.
- 1.3 The aim of the noise assessment below is to provide the relevant information to assist the client and local planning authority in approving the application, specifically in relation to satisfying any noise concerns the LPA may have with regard to the development. The noise levels produced by the development will be calculated and assessed according to the relevant standards, and noise control measures will be provided where necessary to ensure the amenity of the nearby residents can be protected from any potential noise impact caused by the development. Before the installation of the wind turbine or any noise control measures or sound insulation works, the contents of this report should be fully approved by the local authority.
- 1.4 The following noise assessment will be undertaken with reference to the following standards.

1.5 ETSU – R – 97 The Assessment and Rating of Noise from Wind Farms

This standard describes the standardised method for assessing the potential noise impact of wind turbines on sensitive receptors such as dwellings. Specifically, the document outlines approaches for measuring background sound levels of a given area, predicting the noise from wind turbines and applying acoustic feature penalties. The document also outlines relevant criteria at which wind turbine noise would be deemed to be causing potential noise impact.

As well as the primary methodology, ETSU – R – 97 also defines a simplified method that can be implemented for single-turbine developments or areas in which it is expected that the wind turbine noise will be sufficiently low. The simplified method defines a single absolute criterion that can be utilised instead of undertaking measurements and comparisons to the background sound levels of an area. Provided the criteria can be achieved at wind speeds of up to 10m/s at a height of 10m above the closest Noise Sensitive Receptors (NSRs), it is expected that the amenity of nearby residents can be retained. The simplified method criterion is outlined in the table below.

Location	Criteria
10m height at Closest Dwellings (NSR)	35 dB $L_{A90,1}$ Wind Speed of 10m/s

Table 1.0 – ETSU – R – 97 Simplified Method Criteria

2. Site & Surroundings

- 2.1 The development site is located at Bank House Farm Approximately 6.5km south west of Spalding town centre. The site could be described as rural and primary farmland surrounded by small villages and intermittent farms.
- 2.2 The development site is situated in proximity to a number of residential dwellings. The closest dwellings to the development have been defined via desktop review and are outlined in the table below.

Location	Designation
Earls Cottage	NSR 1
Dwelling on Counter Drain Drove	NSR 2

Table 2.0 – Noise Sensitive Receptor Location

- 2.3 It is concluded that, as these dwellings are within 340m - 700m of the development site, if low impact can be achieved at these locations, then it will also be achieved at all other residential dwellings in the area due to the greater intervening distance.
- 2.4 It is proposed that the existing wind turbine be replaced with a higher model having a new hub height of 40m. The proposed wind turbine is a Vestas V29-225kW unit. The noise emission from the unit has been provided by the client, and the manufacturer's noise data is outlined in the figure below.

- 6b. The measurements show the following results at a wind speed of 8 m/s. The measurements are given respectively, as the A-weighted sound pressure level $L_{Aeq,ref}$ and the A-weighted sound power level $L_{WA,ref}$.

Frequency	Sound pressure $L_{Aeq,ref}$ [dB(A)]	Sound Power $L_{WA,ref}$ [dB(A)]
1/1 octave 63 Hz	35.2	76.4
1/1 octave 125 Hz	42.5	83.7
1/1 octave 250 Hz	47.3	88.5
1/1 octave 500 Hz	52.1	93.3
1/1 octave 1 kHz	51.1	92.3
1/1 octave 2 kHz	48.4	89.6
1/1 octave 4 kHz	40.4	81.6
1/1 octave 8 kHz	29.8	71.0
A-weighted, total	56.6	97.8

Figure 1.0 – Wind Turbine Noise Data

- 2.5 The manufacturer's data sheet provides an averaged sound power level of the wind turbine measured and calculated at 8m/s. However, for the purposes of this assessment, the sound power of the proposed turbines at 10m/s has been interpolated from the graphs shown within Appendix D, which were also obtained from the manufacturer's noise data. The graph indicates an approximate 1 dB increase in noise levels from 8m/s to 9m/s. As such, it is expected that the wind speed of 10m/s would result in a slight increase of +2 dB in the sound power levels outlined above. This correction will be applied to the input noise levels of the acoustic model below to represent the sound levels of the turbine at wind speeds of 10m/s.
- 2.6 The figure below indicates the development location, the surrounding area and the nearest residential dwelling as detailed in Table 2.



Figure 2.0 – Site Layout & Surroundings

3. Computer Noise Model Results & Assessment

3.1 In order to calculate the specific sound levels from the wind turbine at the Noise Sensitive Receptor, a computer sound model has been generated using DGMR Noise Prediction Software. This software undertakes calculations using the methods outlined in ISO 9613-2 Attenuation of Sound During Propagation Outdoors.

3.2 The following assumptions have been made within the computer sound model:

- The ground in the area has been considered primarily soft.
- The suggested calculation corrections and parameters outlined in the IOA Good Practice Guide on Wind Turbine Noise have been implemented.
- The topography of the site and surrounding land has been taken from Google Earth and information gained on-site.
- The elevations and building heights for the proposed development have been obtained from the associated plans and information gained on-site.
- The sound power of the point source has been calculated based on the manufacturer's noise data of the proposed turbine, outlined in the manufacturer's data sheets and the section above.
- A 2dB correction has been applied to the input noise levels to enable the conversion of the L_{Aeq} predicted noise levels at the NSR to the L_{A90} parameter as specified in ETSU – R – 97 and the IOA Good Practice Guide on Wind Turbine Noise.
- As per the simplified method outlined in ETSU–R–97, a receiver height of 10m has been assumed at each NSR.
- Manufacturer's noise data indicates the units do not have distinctive tones or impulses and as such no acoustic feature penalties will be applied.

3.3 The results of the computer noise model can be found in the table below. The table below presents the noise levels at 10m height above the Noise Sensitive Receptors. Further noise contours indicating the most exposed NSR are also outlined below.

Specific Noise Levels & Assessment			
Location	$L_{A90,t}$ (dBA) Wind 10m/s	Criteria $L_{A90,t}$ (dB)	Criteria Achieved
NSR 1	35.0	35.0	Yes
NSR 2	28.0	35.0	Yes

Table 3.0 – Calculated Specific Noise Levels & Assessment

3.4 As can be seen in the noise model results above, considering a worst-case scenario and calculation methods, the expected L_{A90} noise levels at the nearest dwellings fall below the defined criteria of 35 dB L_{A90} , and it is concluded that the residential amenity in the area can be maintained, and the development would have a low noise impact on the surrounding dwellings and sensitive receptors.

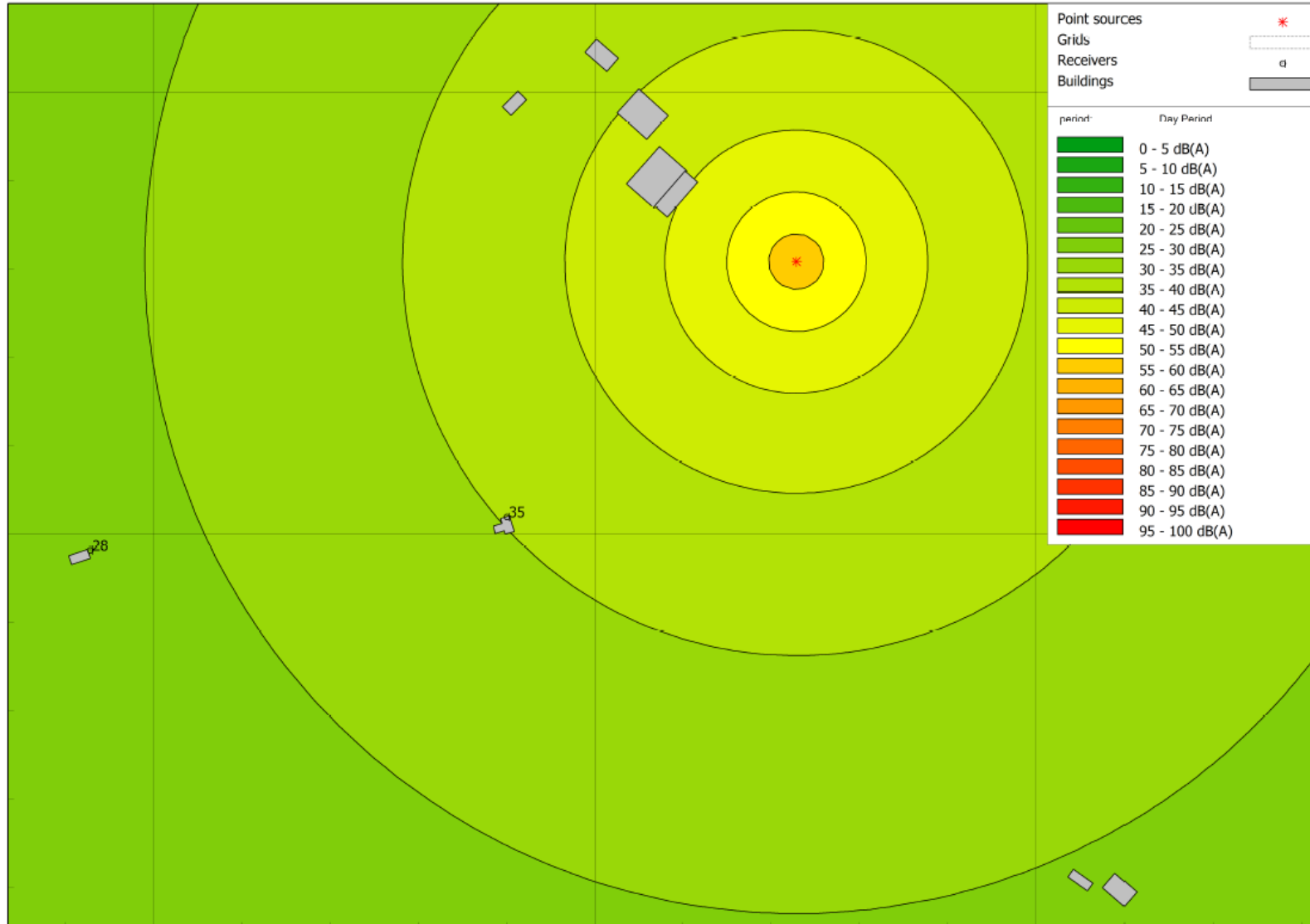


Figure 3.0 – $L_{A90,t}$ Specific Noise Levels – 10m Grid height

4. Conclusion

- 4.1 In conclusion, a desktop noise assessment has been undertaken at Bank House, Bank House Farm, Spalding, PE11 3JH in order to assess the potential noise impact of the replacement of an existing wind turbine on the surrounding dwellings.
- 4.2 The assessment indicated that when considering a worst-case scenario, the noise criteria of 35 dB L_{A90} is not likely to be exceeded when considering wind speeds of up to 10m/s at the closest dwellings. As such, this outcome is deemed to represent low impact, and the amenity of nearby residents and NSRs can be retained.
- 4.3 Before the installation of the turbine, prior approval of the outcome of the report should be sought from the local authority.

APPENDIX A – List of Terms and Glossary

The following section of the report outlines a glossary of terms used in the assessment to assist the reader in understanding the assessment above, which is, by necessity, technical in nature.

Decibel dB - The decibel, often denoted as dB, is the logarithmic unit used to describe the magnitude of sound or noise levels. The typical range of sound pressure levels is from 0 dB, defined as the threshold of hearing, to 120 dB, defined as the threshold of pain.

Frequency Hz – As well as being measured in decibels, sound and noise are also measured and defined in terms of frequency. Frequency or Hertz (Hz) is an expression of the number of cycles a sound wave will complete per second. Larger frequencies may be expressed in kilohertz (kHz). The typical range of human hearing is from 20 Hz to 20,000Hz; however, with age, the audible frequency range decreases in most humans.

A - Weighting – The A-weighting is the most commonly used weighting curve taken from IEC 61672:2003 and is applied to sound pressure level measurements. The A-weighting is applied to measured sound levels to account for the loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.

L_{Aeq} - The A-weighted 'equivalent continuous noise level', which is an average of the total sound energy measured over any given time period. L_{Aeq} is the level of a continuous noise that has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. The A-weighting represents a curve

that is applied to the measured noise levels to represent the way the human auditory system perceives sound.

L_{Afmax} - The maximum A-weighted noise level that was recorded during the monitoring period using a fast time weighting. This acoustic parameter represents more transient sound levels within the acoustic environment, which may only occur for a few seconds or minutes.

L_{A10} - This is the A-weighted noise level exceeded for 10% of a given time period. This parameter is typically used to measure and predict road traffic noise.

L_{A90} - This is the A-weighted noise level exceeded for 90% of any given time period. Generally, this acoustic parameter represents the underlying background sound level in a given area and doesn't generally include transient or short-term noise events that may occur within the surroundings.

Sound Pressure – Sound pressure is the difference between the instantaneous pressure at a point in the presence of a sound wave and the static pressure of the medium. Sound pressure fluctuates due to refractions and compressions of air molecules.

Sound Reduction Index – The sound reduction index, denoted by the parameter 'R', is the laboratory-measured sound reduction of a given material or construction. R is measured in 1/3 octave band frequencies. The R_w sound insulation parameter stands for the weighted standardised sound reduction index and is a single-figure global rating of the sound insulation of a given material or construction.

APPENDIX B – Development Plans

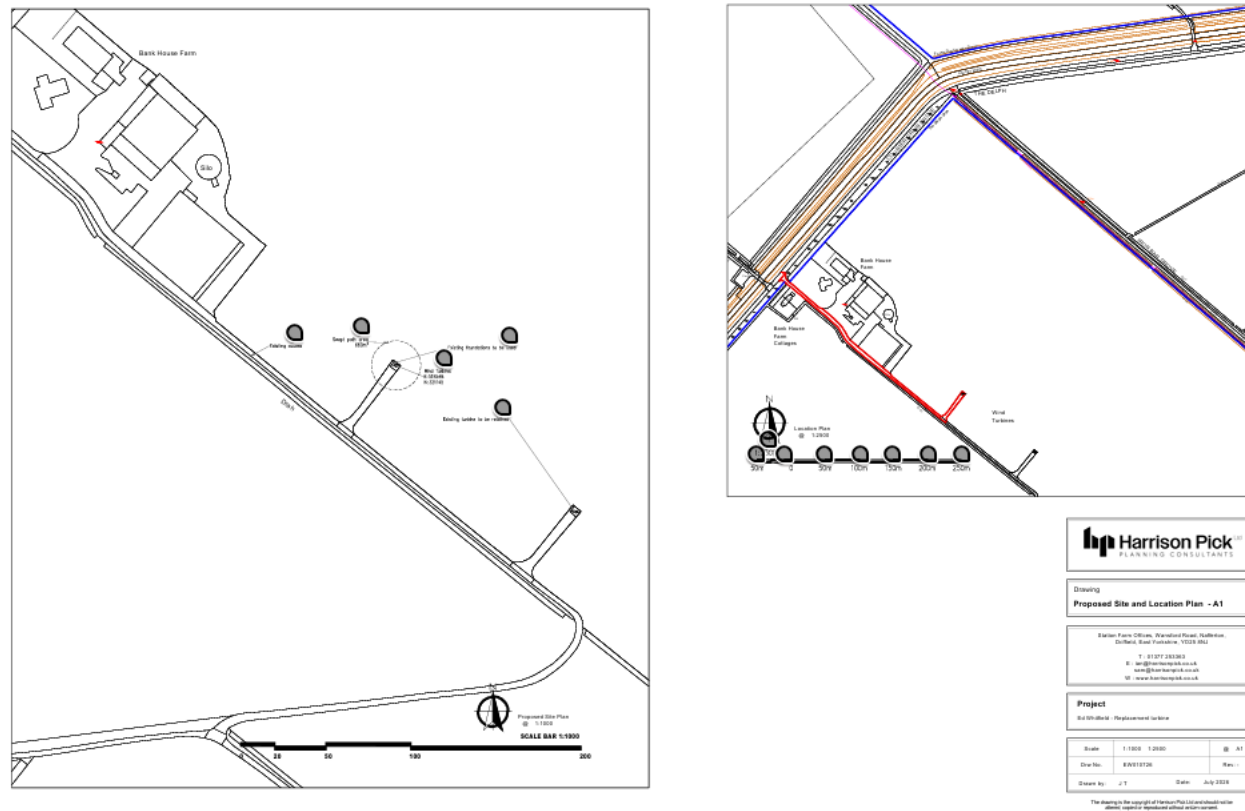
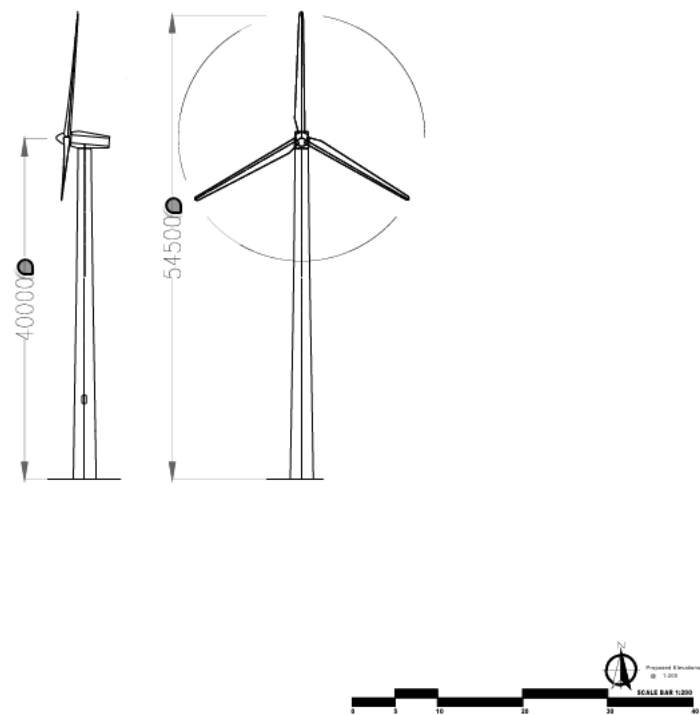


Figure 4.0 – Development Plans

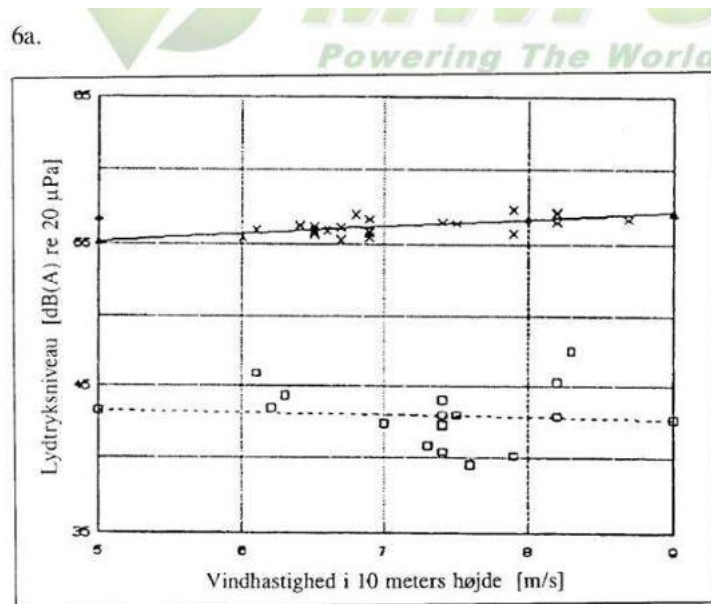


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Figure 5.0 – Turbine Elevation Plan

APPENDIX C – Vestas Noise Data

6a.



The sound power level (L_{Aeq}) can be calculated from the sound pressure level, using the following expression:

$$L_{wa} = L_{Aeq} * 10 * \log \left(4 * \pi * (d^2 + h^2) \right) - 6 \text{ dB}$$

Figure 6.0 – Wind Speed vs Noise levels

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