

Borough Council of King's Lynn and West Norfolk - Community Safety and Neighbourhood Nuisance (CSNN).

Small Scale Wind Turbines - Shadow Flicker and Noise guidance.

Please note that this guidance document has been provided as an informal guidance document.

The erection of any wind turbine currently requires planning permission, with the exception of certain wind turbines which are mounted on buildings or ground mounted within the curtilage of the dwelling house. In certain cases planning permission is not required and this is known as 'permitted development'.

This guidance note aims to provide planning advice in respect of the appropriate location and siting of small scale wind turbines in the Borough Council of King's Lynn and West Norfolk in so far as shadow flicker and noise are concerned.

The type and level of information and detail that would need to accompany any planning application will clearly be dependent upon the size, number and location of the particular wind turbine (s) proposed and this is reflected in this guidance

Shadow flicker

Wind turbine blades rotate typically between 15 and 50 revolutions per minute, usually at a constant speed. If a wind turbine is viewed with the sun behind it, under specific conditions an effect known as 'shadow flicker' can occur. This is when the blades of a wind turbine cast a shadow on neighbouring properties whereby intermittent "flicker" can occur particularly through constrained openings such as windows.

The potential for shadow flicker can be mapped to identify any properties that may be affected. This is likely to be a seasonal occurrence, as it relates to the angle of the sun, and is unlikely to occur during cloudy conditions. Any potential impacts can be mitigated, for example by switching the wind turbines off for the short period of time when the problem may potentially occur.

A National Independent peer reviewed study by DECC in May 2011, identifies that the Flicker effects have been known to occur only within ten rotor diameters of a turbine and only affect properties within 130 degrees either side of north of a turbine.

Therefore the Local Planning Authority may request a shadow flicker assessment and the identification of appropriate necessary mitigation measures where the

nearest residential premises curtilage are within 10 rotor diameters of the proposed wind turbine(s).

Noise

All wind turbines will produce sound when rotating, which usually comes from two sources.

1. Aerodynamic Noise-generated by the movement of the blades through the air.
2. Mechanical Noise- from the generator and any associated gearbox.

Potential noise sensitive receptors such as residential accommodation, schools, offices etc may be affected depending on wind speed, wind direction, background noise levels and distance from the wind turbine(s).

Depending on the number and type of wind turbine(s), minimum separation distances from a noise sensitive receptor(s) can be derived from the acoustic data that is provided with the wind turbine along with site specific information. It is strongly recommended that advice is sought from the Borough Council's Community Safety and Neighbourhood Nuisance team at the earliest opportunity to determine whether the acoustic data is appropriate and to discuss possible separation distances from potential noise sensitive receptors.

Planning Application Information requirements

All applications should provide sufficient information to determine whether or not noise is likely to be an issue. Where potential impacts are identified further information, assessment and mitigation recommendations will be necessary, regardless of the size or number of wind turbines involved.

It is considered that the key objective of the Local Planning Authority, will be to ensure that the LA90,5min noise level is limited to no more than 5dBA above existing background at the curtilage of the nearest non-involved noise sensitive receptor, with additional penalties for tonal characteristics as appropriate. Alternative limits may be appropriate in certain circumstances and the Local Planning Authority reserves the right to determine these on a case by case basis.

The following information should be provided as a minimum, to allow the Local Planning Authority to determine whether the above indicative noise limits are likely to be exceeded, which would then trigger the requirement for an appropriate noise assessment to be provided by the applicant. ***If the following information is not submitted then that could delay proper consideration of the application or lead to a refusal on the grounds of lack of information relating to noise.***

- Make and model of the proposed wind turbine including the mast height/hub height to be clearly stated on the application form.

- Six (preferably twelve) figure national grid reference for location of proposed wind turbine.
- Most recent manufacturer's noise data for the make and model of the proposed wind turbine to which the planning application relates. (e.g. Sound Power Levels at different wind speeds)
- Plan showing distance (in metres) from the proposed wind turbine to the curtilage of the nearest non-involved noise sensitive premises (usually dwellings, but may be schools, hospitals, care or residential homes).
- A calculation of the sound pressure level at the curtilage of the nearest non-related receptor using a sound power level of the turbine(s) at a 5 m/s wind speed.
- Details of approved turbines within 500m radius of current application.

Where the above identifies high enough noise emission rates, numerous enough wind turbines or short enough separation distances, to make exceedance of the indicative noise limits possible, then it will be necessary for the applicant to submit an appropriate noise assessment. The assessment must include detailed predictions of likely wind turbine noise levels at receptors and information on the prevailing background noise level, at typical wind turbine operating wind speeds. The level of detail required, will depend on the number of properties that are likely to be affected and the specific details of the application. Please see details in advisory note regarding recommended methodology of background noise assessment.

Each application is considered on a case by case basis, when the Local Planning Authority considers if a background noise survey is required. However, due to the rural character of the Borough area, as a general rule, if the proposed turbine(s) have a predicted noise from sound pressure levels at the curtilage of nearest noise sensitive receptor of 30dB (or over) at 5 m/s wind speeds, the Local Planning Authority would generally ask for a site specific background noise survey.

Applications that have a sound pressure level at the receptor's boundary of under 30dB at 5 m/s wind speeds are generally approved without the need for a site specific background noise survey.

With regards to acceptability, CSNN would generally be aiming for proposed development to be no more than 5dB above existing background.

Cumulative effect.

When assessing the impact of a proposed development the applicant will need to take into account the existing sources of noise from approved turbines in the local area. Therefore a plan detailing approved turbine(s) within at least 500m radius of the proposed turbine(s) should be submitted with the current application. The potential accumulation of noise from both existing and the proposed development should be predicted and mitigated as necessary.

The Local Planning Authority will consider World Health Organisation Guidelines and background noise levels for reasonable noise limits. Please note that existing approved turbines should not contribute to the background noise measurements within the acoustic assessment for the current application. Where existing turbines contribute to ambient noise levels in the study area for a new development, one of the following approaches (or a combination of these) may be appropriate:

- i) adopt a background noise survey data previously used for existing wind turbine(s), providing that the data available is considered to be robust and relevant.
- ii) Carry out additional background noise surveys at locations or wind directions where it can be reliably confirmed that noise from existing turbine(s) is not a significant contributor to background noise levels.
- iii) Where a 'new' development is proposed by the operator of the existing wind turbine(s), it may be feasible to stop all existing wind turbine(s) for a limited period to obtain background noise measurements.

Wind Turbine Planning Application Advisory Notes

1.General Notes:

For the purposes of this advisory note the word 'curtilage' is used to describe an existing domestic garden area boundary. It is not used to describe the entire extent of a land parcel.

Other legislative controls may be relevant including the Environmental Protection Act 1990 and derivatives thereof may be used to determine nuisance should complaints be received. Compliance with this advisory note does not exempt the turbine operator / owner from nuisance provisions.

It should be noted that in some locations other factors may influence the noise transmission and noise impact from turbines. It is therefore suggested that individual site specifics be considered. These should include (not an exhaustive list):-

- Non involved premises in sheltered locations that may not benefit from the perceived masking effect that the wind can provide.
- Other site specific conditions including topography should be given due consideration (many acoustic reports provided with turbines are derived from testing facilities that may not mirror the location(s) being considered).
- Existing turbines already in the location (within 500m radius of proposed turbine) should also be considered in terms of cumulative impact.
- Other noise sources in the location e.g. roads, watercourses etc

2. Recommended methodology for Background Noise Surveys:

CSNN would ordinarily recommend employing a noise consultant to gather the background noise data. However, the following details provide some guidelines of what would generally be needed:

- Parameters needed LAFmax, LAeq, LAF90, LAFmin only (Time Weighting Fast)
- Meter set up as per principles of BS4142 with regard to meter position, height, weather conditions etc. Please confirm details of such in report.
- Measurements should be undertaken for the minimum of 24 hours and raw data of each 15 minute period should be provided.
- Attended measurements preferred so that any anomalies can be noted and wind speed can be checked regularly. If meter is to be unattended, please exercise judgement as to whether data appears reliable. If it doesn't, please consider doing further measurements during the next 24 hour period.
- Wind speed to be checked and noted before and after the 24 hour assessment at the very least and on each occasion someone attends the site. In this Borough the average wind speed is likely to be around 5m/s so we would ideally like for measurements to be taken when the wind speed is somewhere in this region. This may not always be possible but please try to avoid period of very high and very low winds.
- The acoustic assessment should also identify and take into account of other approved wind turbines and that any existing wind turbines in the vicinity should not contribute to the background noise measured within the survey
- Please note any existing nearby noise sources if applicable, such as trees, roads etc.
- Please provide a report of the above along with your conclusions referring to the Sound Power Level applicable to the wind speeds during the background noise measurement period.
- Note that where data is provided from unmanned measurement periods we will use the lowest levels shown as it will not be possible to ensure the data is reliable from any higher readings. We may also request that the measurements are carried out again should we have doubt as to the reliability of the data taken from an unmanned meter.

3. Examples of conditions and informative:

1. The rated noise level from the operation of the wind turbine (s), measured or calculated as a LAeq (5min) at the boundary of (name of nearest non-related receptor) shall not exceed the background LA90 (5min) noise levels, measured at the same location with the wind turbine(s) switched off by more than 5dBA at any wind speeds and at any time.
2. Only the (specify) turbine on a 15m mast shall be installed. .

Environmental Protection Act 1990 - informative

Under the Environmental Protection Act 1990, the Local Authority has a duty to investigate complaints of noise nuisance and should a complaint be received, irrespective of planning consent, the Local Authority may on determination of a Statutory Nuisance serve a legal notice requiring any said nuisance to be abated and failure to comply may result in prosecution. Further advice may be sought from the Community Safety and Neighbourhood Nuisance Team on this matter where necessary.