

LDP Ceredigion

Local Development Plan
2007 - 2022






Supplementary Planning Guidance Renewable Energy - Help Sheet for Assessing Noise Impact from Wind Turbine/s



This guidance note is not formal supplementary planning guidance but aims to provide information and advice to improve the quality of planning submissions, which will enable officers to provide consistent decision making.

Definition of Turbine Size and Associated Information

For the purposes of this guidance document Ceredigion County Council uses the following definitions based on tip height of wind turbine from ground level;

	Domestic	<18 metres
	Very Small	18 – 25 metres
	Small	26 – 60 metres
	Medium	61 – 99 metres
	Large	100 – 150 metres

Permitted Development

On Monday 18th June 2012, the Town and Country Planning (General Permitted Development) (Amendment) (Wales) came into force. The Order will extend the existing Part 40 of the General Permitted Development Order through the introduction of new permitted development rights for householders wishing to install amongst others, stand alone wind turbines.

Copies of the Order can be obtained from the following link:

<http://www.legislation.gov.uk/wsi/2012/1346/contents/made>

A condition of permitted development Planning Standards will be the need to comply with the Microgeneration Certification Scheme (MCS). Copies of the MCS Planning Standard are available from the following link:

<http://www.microgenerationcertification.org/installers-manufacturers/installers-certification>

It will be necessary for stand alone wind turbines and/or temporary anemometer masts to be located on land outside areas safeguarded for aviation purposes. The Aviation Safeguarding Toolkit hosted by the Planning Portal has been extended to

cover Wales and can be used by householders and installers to check and prove that the location of such equipment is not on safeguarded land. The toolkit can be found through following this link:

<http://aviationtool.planningportal.gov.uk/>

Sources of Noise Emissions from Wind Turbines

Sources of noise emissions from wind turbines can be categorised as Mechanical and Aerodynamic noise:

Mechanical Noise is generated by the gearbox, generator and other parts of the drive train which can radiate as noise through the nacelle, gear box and the tower supporting the structure. Careful design at the development stage of a wind turbine can reduce the source of noise such that most modern wind turbines do not exhibit tonal noise within the measured/audible noise emissions.

Aerodynamic Noise is generated by the action of the rotating blades of the turbine as they pass through the air. The level of noise from the source is determined by the speed of the blades as they pass through the air. This in turn is determined by the rotor diameter and the rate of rotation.

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 type of wind turbine, minimum separation distances from 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 Ceredigion County Council's Environmental Health Officer at the earliest opportunity to determine whether the acoustic data is appropriate and to discuss possible separation distances from potential noise sensitive receptors. Smaller separation distances may be appropriate where the receptor(s) have a 'financial involvement' with the project.

Planning Application Information Requirements in Relation to Noise

This advice considers wind turbines in three categories;

- Small turbines – meet the BWEA definition of a small turbine which is a turbine having a rotor swept area of 200m² or less. In a horizontal axis wind turbine, this equates to a rotor diameter of 16m.
- Large wind turbines – ones that fall outside the scope of BWEA definition.

- Multiple large wind turbine projects.

All applications submitted to Ceredigion County Council should contain adequate information to assess whether or not noise issues are likely. Where potential issues are identified further information, assessment and mitigation should be submitted, regardless of the size or number of wind turbines involved. We appreciate that undertaking formal noise assessments in relation to small wind turbine developments are likely to be prohibitive, due to costs, however this is a factor that needs to be considered.

The key objective of Ceredigion County Council will be to ensure that noise levels for turbines are limited to:-

- 35dBLAeq for small turbines
- 35dBLA90 for large single turbines
- ETSU levels with a minimum fixed daytime limit of 35dBLA90 for wind farms.

Site Specific Desktop Noise Assessment

All applications submitted must include a desktop noise assessment which is specific to the development locality. The desktop noise assessment should contain all the following information;

- A twelve figure national grid reference for the precise location of the turbine
- Identification of the nearest noise sensitive premises and details of their respective distances from the proposed development. Property that is in ownership of the applicant should also be included. A statement should be provided as to whether any properties in ownership of the applicant are let to third parties.
- The make, model, hub height, declared apparent emission sound power level and rotor diameter of the proposed turbine.
- The most recent turbine-specific noise report (usually supplied by the turbine manufacturer) providing information on the derivation of the sound power level of the turbine, including the level of uncertainty and information on tonality. The assessment must have been undertaken and reported in accordance with;

Small Wind Turbines (rotor diameter of 16m or less)	Large Wind Turbines (rotor diameter above 16m)
The British Wind Energy Association (BWEA) “Small Wind Turbine Performance and Safety Standard” 29 February 2008	Most recent version of IEC 61400-11.

- A modelled assessment detailing the predicted level of turbine noise for each identified receptor for all wind speeds up to and including;

	Small Wind Turbines	Large Turbines
Indices	L _{Aeq, T}	L _{A90, 10 minutes}
Wind Speeds	Up to and including wind speeds of 8 m/s at rotor centre height	Up to and including wind speeds of 10 m/s at 10m height

- Where multiple small or large turbines are proposed, a desktop noise assessment **must** be submitted that demonstrates that the cumulative noise emissions from the turbines will not exceed the noise limits specified in the small or large wind turbine condition.
- Identification of existing turbines, consented turbines and any turbines currently the subject of an application or screening opinion within a 2 kilometre radius of the proposed development, including their respective distance to the proposed development and any likely cumulative noise impact. For assistance in completing this task then please contact the Ceredigion County Council’s planning department on 01545 572333.

Small Wind Turbines

The British Wind Energy Association (BWEA) document “Small Wind Turbine Performance and Safety Standard” 29 February 2008, provides a method for evaluation of wind turbine systems in terms of acoustic characteristics. Small Wind turbines may be characterised by having a rotor swept area of 200 m² or less and a rotor diameter of ~ 16 m for horizontal-axis wind turbines. The acoustic noise data associated with the wind turbine should be summarised on a noise label. A copy of the Small Wind Turbine Performance and Safety Standard document may be accessed via the following link.

<http://www.bwea.com/small/standard.html>

The key objective of Ceredigion County Council will be to ensure that, where possible, noise levels for small wind turbine/s are limited to an absolute level of 35 $\text{dBL}_{\text{Aeq,T}}$ as measured 3.5 meters from the façade of any noise sensitive property at any time, at wind speeds up to and including 8m/s at rotor centre height. If compliance with this noise condition cannot be demonstrated, then the applicant will be expected to proceed with a site specific noise assessment.

Large wind turbines

A site specific desk top study should be undertaken to demonstrate that the wind turbine will not exceed the large turbine noise condition, which is noise from the proposed turbine(s) (inclusive of any tonal element) shall not exceed 35 $\text{dBL}_{\text{A90, 10 min}}$ as measured 3.5 meters from the façade of any noise sensitive property at any time, up to on-site wind speeds of 10 m/s measured at a height of 10m.

Where the site specific desk top study demonstrates that the proposed wind turbine(s) do not meet the large turbine condition, then the applicant has the alternative to undertake and submit a site specific noise assessment.

Site Specific Noise Assessment

The main guidance document for assessing impact from wind turbines is ETSU-R-97 'The assessment and rating of noise from wind farms.' ETSU-R-97 may be accessed through the following link;

<http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/energy/sources/renewables/explained/wind/onshore-offshore/page21743.html>

Whilst it is important to understand that this document was written in respect of larger wind farms, its methodologies will form the basis of assessments of the impact of individual/multiple small and large sized wind turbines.

A site specific noise assessment should include all the requirements detailed above for the desktop study with the additional information:

- A detailed background noise survey. Locations and details of which should be discussed and agreed with the local planning authority.
- Predicted turbine(s) noise levels at the noise sensitive properties.
- Noise limits specified in ETSU-R-97 and the difference between the predicted noise levels and ETSU-R-97 derived noise limits.

Please Note that the Local Planning Authority of Ceredigion County Council so reserve the rights of specifying a single noise limit, which are not specified in ETSU-R-97.

Background Noise Measurements

- Locations to undertake background noise measurements must be representative of all noise sensitive properties and the amenity spaces of these properties.
- The locations of the background noise measurements must be discussed and agreed by the Public Health Services Division prior to the commencement of monitoring.
- Images showing the location of the background measurements and their surrounding should be provided.
- The duration of undertaking the background noise measurements must be sufficient to represent the typical conditions. The monitoring duration must be at least one week.
- Background noise measurements should represent seasonal variety.
- Atypical results should be removed from the background noise measurement results but should be retained by the developer to justify the reasons for their removal if requested by the Local Planning Authority.
- Rain affected data should be removed from the background noise measurement results but should be retained by the developer to justify the reasons for their removal if requested by the Local Planning Authority.
- Wind speeds of up to 12m/s should be included in the background noise measurement results
- Examples of typical sources that should not be included within the background noise measurements include; watercourse, quarry, construction sites, boiler flues, extraction fans, sewage pumps, foliage, wind chimes, road traffic.

Noise Predictions

- Predictions of noise levels must be made at noise sensitive properties. The predicted noise levels should be made at all wind speeds up to and including 10m/s at 10m height.

- The predictions must include any element of tonality or uncertainty factors that are specified within the noise assessment made in accordance with IEC61400-11.
- The predicted noise levels must be modelled either in line with:

Hemispherical Propagation calculation

Or

ISO 9613 – 2 following the Institute of Acoustics Bulletin March/April 2009

- A full and detailed description of the above assessment should be provided which is specific to the proposed site. The assessment should address potential noise related impacts from blade swish, tonality, amplitude modulation, low frequency noise and wind shear. The assessment should be undertaken by a qualified and competent acoustician. All the data inputs, justification for use of these values, assumptions made, and margins of error must also be included in the assessment. Printouts from computer models used to make predictions or produce noise contour maps are insufficient by themselves.

Noise Conditions for Small Wind Turbines

- ❖ The rating level of noise immission from the wind turbines (including the application of any tonal penalty) should not exceed a sound pressure level of 35 dB_{L_{Aeq,T}} within the amenity space of any lawfully existing dwelling, at wind speeds up to and including 8m/s at rotor centre height. Measurements should be made at least 3.5m away from the building facade or any reflecting surface except the ground.

The measurement time period shall be based on BWEA blade length calculation (3.4.1):

$$t = 4 * D \text{ seconds}$$

Where:

t - measurement period in seconds (Subject to a minimum period of 10 seconds)

D – rotor diameter in meters

Post monitoring conditions will also apply, therefore:

- ❖ Within 28 days from the receipt of written request from the Local Planning Authority, following a justified noise complaint the operator of the development shall, at its expense, employ an independent consultant approved by the Local Planning Authority to assess the level of noise imissions from the wind turbines at the complainant’s property following the procedures described in ETSU-R-97 “The Assessment and Rating of Noise from Wind Farms”.
- ❖ During the course of the investigation, should the wind turbine be identified as operating above the parameters specified in the above Condition the wind turbines will be modified, limited or shut down. These measures shall be applied until such time as maintenance or repair is undertaken sufficient to reduce the absolute noise level of the operating turbines to within the parameters specified in the above Condition.

Noise conditions in relation to a large wind turbine

- ❖ Ceredigion County Council will try to limit the noise emissions from large wind turbine(s) to a sound pressure level not exceeding 35dB $L_{A90, 10 \text{ mins}}$ at wind speeds up to and including 10m/s at 10m height. Measurements should be made at least 3.5m away from the building facade or any reflecting surface except the ground.

Where this is not possible ETSU-R-97 conditions will apply, based on the background noise levels and predictions submitted.

Post monitoring conditions will also apply, therefore:

- ❖ Within 28 days from the receipt of written request from the Local Planning Authority, following a justified noise complaint the operator of the development shall, at its expense, employ an independent consultant approved by the Local Planning Authority to assess the level of noise imissions from the wind turbines at the complainant’s property following the procedures described in ETSU-R-97 “The Assessment and Rating of Noise from Wind Farms”.
- ❖ During the course of the investigation, should the wind turbine be identified as operating above the parameters specified in the above condition the wind turbines will be modified, limited or shut down. These measures shall be applied until such time as maintenance or repair is undertaken sufficient to reduce the absolute noise level of the operating turbines to within the parameters specified in the above condition.