Environmental Health Technical Planning Policy:

Noise & Vibration

Version 2, November 2013

Contents

Purpose of this Document

This document is intended to provide guidance to Lichfield District Council (LDC) Environmental Protection Officers when reviewing planning applications and making recommendations to Development Control, on matters relating to noise and vibration.

The document may also assist those seeking planning permission, and their advisors, by drawing to their attention the noise and vibration issues that may need to be addressed. However, the document is for guidance only, and advice should be sought from Pollution Control in respect of specific applications.

The document provides general guidelines, drawing on information to be found in a number of international, national and local documents. Occasionally, the review of a planning application may raise issues not fully addressed in this guidance, and other guidance or criteria may then be utilised.

This document is intended to support and promote the policies concerning noise in the LDC Local Plan: Strategy and reflect the guidance concerning noise in the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE). This document considers the majority of situations which arise in planning applications; situations that have not been considered in this document will be assessed in line with the policies in the Strategy and the guidance in the NPPF.

Ownership of this Document

Ownership of this document rests with Environmental Health, Lichfield District Council.

This document replaces all previous noise guidance.

This document will be reviewed as and when necessary, e.g. if there are significant changes in National and local noise policy or guidance.

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1. Introduction

1.1. Background to the Guidance

Environmental Health consider that the most effective means of noise management, and the avoidance of noise problems, is to ensure that new developments are sited and designed to minimise the impact of noise. It is important, therefore, that noise and vibration issues are considered fully in the planning process.

Environmental Health seek to advise and influence the planning process in order to achieve these aims. Environmental Health provides advice on noise and vibration issues to Development Control and to applicants, and prospective applicants, for planning permission. It is to assist this function that this guidance has been prepared.

1.2. Acknowledgements

This document draws heavily on the work of Birmingham City Councils Environmental Protection Unit (EPU) and Lichfield District Council would like to express its gratitude to the EPU for granting us permission to use their policy as the basis for its own.

1.3. The role of Environmental Health as advisors to Development Control

Development Control consults with Environmental Health on a planning application if they consider that environmental issues require consideration. Environmental Health assesses the application with regard to a number of environmental issues, including noise and vibration, before making a comment to Development Control. The comments can generally be classified as nothing adverse, informative, suggestions of conditions upon approval, or recommending refusal.

The determination of the outcome of a planning application is made by the elected District Councillors of the Planning Committee. In arriving at its decision the Committee consider all relevant matters, including recommendations made by Environmental Health.

1.4. The role of Environmental Health as advisors to applicants and prospective applicants

Environmental Health is keen to provide advice and assistance to applicants at the earliest opportunity in the design process, and welcomes enquiries from prospective applicants prior to the submission of a planning application. Environmental Health can then advise whether the proposals address adequately the noise and vibration issues.

Environmental Health may advise that additional information or investigation work is required to assist the assessment process and the specification for this information or work can be provided.

Environmental Health may suggest amendments to the design to render it acceptable, for example by proposing a revised layout; and advice would be given to assist in this. This can then be considered early in the design process.

Where Environmental Health identify noise and vibration issues that cannot be resolved in the design process, then potential applicants can be made aware of this at the earliest opportunity.

Environmental Health can be contacted by letter at the address on page 4, or by telephone, fax or email at:

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2. Relevant policy, standards and guidance

This document has been developed following careful consideration of the following widely recognised national standards and planning and design technical guidance. These publications provide comprehensive information on the issues addressed in this document and may be consulted for additional information and explanation.

2.1. Noise Policy Statement for England 2010

In March 2010 the Government issued a Noise Policy Statement for England (NPSE). The aim of this document is to "provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion."

The NPSE sets out the long term vision for Government noise policy.

Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

The NPSE includes three primary aims: all interpreted by having regard to a set of shared UK principles that underpin the Government's sustainable development strategy. The Government's sustainable development strategy is provided in NPSE paragraph 1.8

Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid **significant adverse** impacts on health and quality of life;
- mitigate and minimise **adverse** impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life

The NPSE aims include the terms ***"significant adverse"*** and ***"adverse***"

The World Health Organisation is currently applying the following established concepts from toxicology to noise impacts:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

The NPSE expands these terms leading to the concept of a Significant Observed Adverse Effect Level.

- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

The NPSE goes on to state that it is not possible to have a single objective noise-based measure that defines SOAEL that will be applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.

2.2. National Planning Policy Framework (March 2012)

The National Planning Policy Framework sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities. Guidance concerning noise is provided in Paragraph 123 of the NPPF.

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Para 123 NPPF March 2012

The explanation of significant adverse impact and adverse impacts are provided in the Explanatory Note for the Noise Policy Statement for England

2.3. Relevant local policy

The guidance within this document has also been produced having regard to the District Council's own various policy statements.

- Lichfield District Council Local Plan: Strategy

- Lichfield District Council Licensing Policy

This document is required under the Licensing Act 2003 and seeks to ensure that the Council's policy with regards to its licensing function is both updated and consistent with the licensing objectives including the prevention of noise related public nuisance.

2.4. Other relevant standards and guidance

- Guidelines for Community Noise, World Health Organisation 1999

The Guidelines for Community Noise have been prepared as a practical response to the need for action on community noise at the local level, as well as the need for improved legislation, management and guidance at the national and regional levels. It provides criteria for the assessment of the acoustic environment for a variety of situations.

- Night Noise Guidelines for Europe. World Health Organisation 2009

This document presents the conclusions of the WHO working group responsible for preparing guidelines for exposure to noise during sleep. This document can be seen as an extension of the WHO Guidelines for community noise.

- British Standard 8233:1999 'Sound insulation and noise reduction for buildings – Code of Practice'

This Code of Practice provides guidance on the design of buildings that have internal acoustic environments appropriate to their functions. It includes design criteria and deals with the control of anonymous noise from outside the building and noise from plant and services within.

- British Standard 4142:1997 'Method for Rating industrial noise affecting mixed residential and industrial areas'

This standard is intended to be used for assessing the measured or calculated noise levels from both existing premises and new or modified premises, for noise of an industrial nature. It recognizes that the standard may be helpful in certain aspects of environmental planning and may be used in conjunction with recommendations on noise levels and methods of measurement published elsewhere

- British Standard 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings'

This standard provides guidance on predicting human responses to vibration in buildings and includes advice on measurement methods to be employed. Methods of assessing continuous, intermittent and impulsive vibration are presented.

Two further documents are of relevance here covering the particular noise sensitivities of schools and hospitals.

- Building Bulletin 93: 'Acoustic Design of Schools'

This document provides acoustic design criteria for schools and has been referenced in this document particularly with regard to criteria to ensure that schools are not subject to unacceptable levels of external noise.

- Department of Health 'Health Technical Memorandum 08-01 Acoustics'

This document provides acoustic design criteria for healthcare premises and has been referenced in this document particularly with regard to criteria to ensure that hospitals are not subject to unacceptable levels of external noise.

A further document is of relevance in relation to the control of noise from certain entertainment premises.

- Institute of Acoustics Good Practice Guide on the Control of Noise from Pubs and Clubs.

This document provides guidance for the assessment and control of noise affecting noise-sensitive properties from public houses and clubs, and other premises holding similar events. The main noise sources considered are music, singing and public address systems as well as noise from other ancillary activities.

3. Development of Planning Guidance to Support of NPSE Aims

3.1. Aims

Recommendations made by Environmental Health to Development Control are to support the aims in the NPSE, NPPF and Local Plan (Core Strategy).

Aim1: The first aim of the NPSE is that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (NPSE paragraph 1.8).

This aim is reflected in the NPPF which states that "planning policies and decisions should avoid noise giving rise to significant adverse impacts on health and quality of life".

To support this aim Environmental Health will normally recommend refusal where the noise impact on sensitive receptors exceeds the SOAEL.

Aim 2: The second aim of the Noise Policy Statement for England is to mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. This refers to the situation where the noise impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (NPSE paragraph 1.8). This does not mean that development cannot take place where such adverse effects will occur.

This aim is reflected by the NPPF which states that "planning policies and decisions should mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions".

To support these aims Environmental Health will normally recommend conditions to mitigate noise impacts where noise levels exceed the LOAEL but are less than the SOAEL.

Aim 3: The third aim of the Noise Policy Statement for England seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (NPSE paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

3.2. Values of SOAEL and LOAEL

Values for SOAEL and LOAEL for residential properties have been derived for common noise sources. These are included in table 1 below. The criteria selected will depend upon the specific proposal (i.e. new residential development or introduction of a noise source to existing residential development).

Noise source	Assessment location	LOAEL	SOAEL	Times
General environmental noise, road traffic, rail traffic	Outdoor living space	50 dB $L_{Aeq,1hr}$ (A)	55 dB $L_{Aeq,1hr}$ (D)	Day 07:00 – 23:00
	Façade	50 dB $L_{Aeq,16hr}$ (A)	72 dB $L_{Aeq,16hr}$ (E)	Day 07:00 – 23:00
	Façade	45 dB $L_{Aeq,8hr}$ (B)	67 dB $L_{Aeq,8hr}$ (F)	Night 23:00 – 07:00
	Habitable room	30 dB $L_{Aeq,8hr}$ (C)	40 dB $L_{Aeq,8hr}$ (G)	Night 23:00 – 07:00
	Habitable room	35 dB $L_{Aeq,16r}$ (C)	45 dB $L_{Aeq,16hr}$ (G)	Day 07:00 – 23:00
Air traffic	Façade	50 dB $L_{Aeq,16hr}$ (A)	69dB $L_{Aeq,16hr}$ (E)	Day 07:00 – 23:00
	Façade	45 dB $L_{Aeq,8hr}$ (B)	64 dB $L_{Aeq,8hr}$ (F)	Night 23:00 – 07:00
Commercial noise or noise of industrial nature (not anonymous) **Note** criteria selected will depend on both nature of the source and the assessment location	Facade	b/g – 10 dB (H)	b/g + 10 dB (H)	Noise source Hours of operation
	Facade		55 dB L_{AFmax} (B)	Evening / night 19:00 – 07:00
	Habitable room	30 dB $L_{Aeq,8hr}$ (C)	40 dB $L_{Aeq,8hr}$ (G)	Night 23:00 – 07:00
	Habitable room		45 dB L_{AFmax} (G)	Evening / night 19:00 – 07:00
	Habitable room	35 dB $L_{Aeq,16hr}$ (C)	40 dB $L_{Aeq,16hr}$ (G)	Day 07:00 – 23:00
	Outdoor living space	45 dB $L_{Aeq,1hr}$ (I)	50 dB $L_{Aeq,1hr}$ (I)	Day 07:00 – 23:00
	Facade	No change to ambient (J)	ambient 5dB L_{Aeq} increase (J)	Noise source Hours of operation

Table 1 Values of SOAEL and LOAEL for common noise sources

The references in superscript (example) within Table 1 are explained in section 3.3 following.

Guidance concerning noise from entertainment and licensed premises is provided in sections 5.5 and 6.3.2. Note that the references to air traffic noise above and in 3.3 below have been left in for completeness.

3.3. Derivation of noise limits for noise sensitive receptors based on observed effect levels

3.3.1. Anonymous Noise sources: General environmental noise – transportation noise

A. The most widely observed effect is community annoyance. The World Health Organisation[1] (WHO) suggest that to protect the majority of people from moderate annoyance during the day time outdoor noise levels should not exceed 50 dB L_{Aeq}. This should be considered as the LOAEL for residential development subject to transportation noise. At sites where daytime levels from transportation noise are less than 50 dB L_{Aeq} noise will not be a consideration. Where the external noise is 50 dB L_{Aeq} internal noise levels (open windows) will be acceptable (35-40 dB L_{Aeq}).

B. Night time noise limits: The overriding concern is to prevent sleep disturbance, the WHO published their finding on the impact of night time noise in 2009[2]. Table 5.4 in the WHO night time noise guidance summarises much of the findings. At levels below 30 dB $L_{night,outside}$ there are no observed effects and this may be considered the NOEL. When levels increase to 40 dB $L_{night,outside}$ adverse effects are observed, it should noted in addition to a steady level effects were also observed for transient events maximum levels exceeded 42 dB $L_{AFmax,inside}$. , It is suggested that for sleep disturbance the LOAEL is 45 dB $L_{night,outside}$, and 45 dB $L_{AFmax,inside}$ (i.e. 55 dB $L_{AFmax,outside}$ with open windows). When external levels increase above this level it will be necessary to close the windows and provide alternative ventilation to ensure that the internal noise levels continue to be acceptable. Research carried out in Sweden suggests that where external noise levels exceed 42-46 $L_{Aeq,\ 22:00\ -\ 06:00}$ fewer people sleep with their windows open (WHO[2] figure 1.7).

C. The values provided in the guidance in WHO Table 4.1 1 can be considered to be the LOAEL within habitable rooms.

D. WHO report that to prevent the majority of people becoming seriously annoyed during the daytime the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq}, this should be considered the SOAEL for gardens and outdoor living spaces.

E. For indoor spaces there is, in theory, no restriction to the outdoor noise level as long as the building envelope provides sufficient insulation although this will result in a very poor outdoor environment.
As the community response is generally less sensitive to other transportation sources[3] it is suggested that the day time SOAEL for rail and road traffic should be 72 dB L_{Aeq}.

F. For indoor spaces there is, in theory, no limit as long as the building envelope provides sufficient insulation although this will result in a very poor outdoor environment. As the WHO suggests that sound pressure levels during the evening and night should be 5 – 10 dB lower than during the day (Section 4.2.7). The values

[1] Guidelines for Community Noise Edited by B. Berglund et al WHO 1999 (paragraph 4.3.1)
[2] Night Noise Guidelines for Europe WHO 2009
[3] EU Future Noise Policy, WG2-Dose/Effect. Position paper on dose response relationships between transportation noise and annoyance

of SOAEL for transportation noise at night are 5 dB less than the values adopted for daytime

G. WHO report that to prevent the majority of people becoming seriously annoyed during the daytime the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} with open windows this would result in an internal noise level of 40-45 dB L_{Aeq} . A value of 45 dB L_{Aeq} is the SOAEL for daytime. As the WHO suggests that sound pressure levels during the evening and night should be 5 – 10 dB lower than during the day (Section 4.2.7). A value of 40 dB L_{Aeq} is the SOAEL for night time.

3.3.2. Other noise sources: (not anonymous)

The limits derived above refer to anonymous noise sources; there is less published research on the impact of other specific sources. Possible methods include the following:

- relative levels (i.e. compare the noise level from the source to the ambient or background noise);
- reduce the criteria provided by the WHO[1]guidance (table 4.1) to allow for the non anonymous nature of the noise source.
- consider the change to the overall noise level due to the introduction of the noise source

H. The comparison of the source level to the ambient (or background noise level) will take account of the existing acoustics environment. This methodology is described in BS 4142. Based on this we can obtain the following values for SOAEL and LOAEL.

- LOAEL is where complaints are unlikely (i.e. rating of source is 10 db less than background noise level)

- SOAEL is where complaints are likely (i.e. rating level exceeds background by 10 dB)

Whilst this is intended for noise of an industrial nature it can provide a basis for assessing other noise sources, for example music or entertainment noise which usually includes a significant quantity of bass can be assessed by undertaking a similar analysis in octave (or third octave) bands.

When using this type of assessment we should still ensure that levels provided in WHO Table 4.1 [1] are not exceeded.

I. The values provided in the guidance in WHO Table 4.1 [1] can be applied to the situation, in cases were the noise is easily attributable to a specific source (i.e. it is NOT anonymous) a 5 to 10 dB reduction to the value for outdoor living spaces may be appropriate.

J. The impact of an increase (or reduction) in noise level is provided in a variety of documents including DMRB[4].

[4] Design Manual Roads and Bridges, Volume 11 environmental assessment, Section 3 environmental assessment techniques Part 7 (Table 3.1)

Change in Noise Level, x	Magnitude of Impact
$x \geq 5$	Major adverse
$3 \leq x < 5$	Moderate adverse
$1 \leq x < 3$	Minor adverse
$0 < x < 1$	Negligible adverse
$x = 0$	No change

In this case an increase of 5 dB would be considered a significant impact and be regarded as the SOAEL and should be avoided.

Again when using this type of assessment we should still ensure that levels provided in WHO Table 4.1 [1] are not exceeded

4. The Undertaking and Reporting of Noise Assessments

4.1. Requirement

> It should be noted that noise assessment is a skilled operation and should be undertaken only by persons who are competent in the procedures.
>
> BS 4142, Page ii

Noise assessments should be submitted to Environmental Health for consideration in support of planning applications where proposed or existing noise sensitive occupiers may be affected by proposed or existing noise sources as a result of the development. They should have been carried out by a competent person who has appropriate training and experience in the field of environmental acoustics.

In some cases a noise assessment may simply show by predictive calculation that a proposal will have no noise implications, and in others a detailed and complex study with proposals for further mitigation measures may need to be considered and the effectiveness analysed. Environmental Health work closely with Planning Officers where such proposals may materially affect the application (e.g. a high acoustic barrier may not be acceptable on visual grounds).

4.2. Assessments

Key requirements for noise assessment reports include:-

- A clear plan indicating locations of noise sources, sensitive receptors, measurement positions and any mitigation measures if appropriate;
- Consideration of worst case scenarios (e.g. averaged values for $L_{Aeq,T}$ or $L_{A90,T}$ will not normally be accepted and background noise measurement times must be representative of quieter periods whilst noise generating activities are ongoing)[5].
- Measurement time periods for noise indices should be appropriate to the location and situation. This guidance stipulates time periods for some circumstances which should be used unless there are specific circumstances why they are not appropriate (which should be stated, and preferably agreed with Environmental Health).
- An indication of uncertainty or errors associated with measurements or assessment.
- Where mitigation is necessary for a development to satisfy noise criteria provided in this report the report should include a full specification of the mitigation. For example barrier height, location or location(s) maximum sound power level(s) for items of plant.

Further general guidance on the contents of a noise assessment report can be found in Appendix II. If an applicant is in any doubt as to the need for, or any requirements of, a noise assessment then this should be discussed with Environmental Health.

[5] N.B. Arithmetic averaging is not generally appropriate for noise indices. Environmental Health will however accept averaged values of $L_{A10,1hr}$ in accordance with the procedure in Calculation of Road Traffic Noise.

4.3. Criteria for external and internal noise levels

Design documents generally specify acceptable noise levels within the building. Where there is a need to specify an external noise level then it is recommended this be done by adding 10 dB to the internal criteria. This adjustment is based on the assumed noise reduction of a partially open window.

4.4. How to deal with multiple site / façade standards

Where two or more performance criteria apply for at a point on a site or façade then the highest standard of noise mitigation shall be applied. If in doubt the developer should seek advice from Environmental Health.

4.5. Consideration of local noise sources

In order to better guide the decision making process it is important to know what noise sources exist in the locality of a proposed development and also the extent of their impacts (e.g. operating hours of source premises). Consideration should also be given to presenting the impact of each source on the development and including details of any remedial measures proposed to reduce the impact.

The onus for gathering this information will lie with the applicant as part of a full and comprehensive acoustic survey (See Appendix II).

Where this is not undertaken this may result in Environmental Health identifying information which could impact upon the application under consideration and this could result in an unfavourable recommendation made to Development Control or lead to time consuming discussions and further work on behalf of the applicant.

It is therefore in the interests of all parties that suitable time be set aside for the acoustic survey to ensure it is as comprehensive as possible.

4.6. Measurement of internal noise levels

Internal noise levels in residential dwellings can be very low, particularly late at night and in the early hours of the morning when entertainment venues may still be operating. In some cases the noise levels may be significantly below the lower measurement limits of the instrumentation used to measure the noise. Care must be taken to ensure that the measured noise levels are not influenced by the noise floor of the instrumentation used. Advice should be sought from Environmental Health if necessary.

5. Proposed Developments Containing Noise Generating Uses

5.1. Introduction to the section

Where applications contain noise sources which may have an impact upon existing noise-sensitive uses, the applicant will be required to provide supporting information to allow this impact to be evaluated, in line with the provisions of this section. For the purposes of this document noise sensitive premises are taken to be places where the building occupants may be resting, sleeping or studying, this includes residential premises, hotels, hospitals and schools. Noise sources including plant, deliveries, car parking originating from hospitals, schools and hotels shall be assessed using the guidelines in this section.

The guidance in this section has been prepared to support the principles and aims provided below.

Core planning principle

- Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings;

Para 17 NPPF March 2012

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Para 123 NPPF March 2012

5.2. General noise sources

For most general noise sources an assessment should be carried out at the façade of noise sensitive premises to demonstrate that the following three criteria would be met:

- The rating level (calculated in accordance with BS 4142) is at least 10 dB below the existing ambient noise level (L_{Aeq})
- The rating level (calculated in accordance with BS 4142) is at least 5dB below the existing background noise level (L_{A90})
- Between the hours of 19:00 and 07:00 the maximum noise levels (L_{AFmax}) from the development shall not exceed the L_{A90} by more than 10 dB, however where the existing background noise level is 45 dB L_{A90} or less, the maximum noise levels shall not exceed 55 dB L_{AFmax}.

The noise level of the source shall be reported as $L_{Aeq,T}$ where T shall normally follow the guidance in BS 4142 (1 hour for daytime and 5 minutes for night time). Where a single cycle of a night time operation exceeds 5 minutes the L_{Aeq} for a complete cycle shall be measured.

Remember noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development for example, the character of the noise should be taken into account as well as its level. Sudden impulses, irregular noise or noise which contains a distinguishable continuous tone may require special consideration.

Where two or more performance criteria apply at a point on a site or façade then the more stringent criteria shall apply. If in doubt the developer should seek advice from Environmental Health.

Where specific noise sources do not lend themselves well for assessment under this section Environmental Health may recommend an alternate assessment criteria be used.

Two specific type of noise sources that have already been identified as requiring alternate assessment criteria and these are detailed in sections 4.4 (places of worship) and 4.5 (entertainment noise / amplified music).

Measurement of background and ambient noise levels

- Background and ambient noise levels shall be representative of the existing noise levels at the most sensitive time during the proposed period(s) of operation.
- Where different operating regimes are proposed (for example daytime, evening and night time) background and ambient noise levels shall be determined for each operating period.
- For most developments a 20 minute measurement of background noise will not normally be sufficient.

5.3. Speculative developments

Some planning applications contain very little information on which an assessment of the potential noise impact can be based. This is common for outline planning applications but is also an issue with some full applications where there is little information about the likely end-user, for example with speculative commercial developments.

In such circumstances, to ensure that the amenity of residents of nearby noise sensitive premises is safeguarded, Environmental Health will make an assessment based on the likely worst case scenarios with respect to noise impact. This may lead to Environmental Health recommending a large number of conditions to address all foreseeable situations. Clearly the more detail that is provided by the applicant, the more Environmental Health will be able to limit uncertainties and thereby reduce the number of conditions required.

In circumstances where, even with reasonable mitigation measures, the development is unlikely to satisfy the requirements of this document then Environmental Health will recommend refusal.

5.4. Places of worship

Many aspects surrounding such premises may be covered by sections 4.2 and 4.5 of this document. This section specifically covers the use of loudspeakers or other such devices which are used to call the faithful to prayer or make some other announcement.

Developers should be aware of the following planning restrictions which are likely to be attached to consents for any such venue:

- The maximum noise level from the loudspeaker shall not exceed 81dB L_{AFmax} when measured under free field conditions at a distance of 75 metres from the loudspeaker.

- The use of loudspeakers is limited to twice in any day and only between the hours of 09.00 and 18.00.

- The loudspeakers shall not be operated for more than 2 minutes on any occasion.

5.5. Noise from entertainment premises

It is assumed that pubs, clubs, community halls and similar premises will be used for holding regular entertainment events. Therefore it will be necessary to design these premises to reduce the emission of music and associated noise.

It is expected that all applications for this type of premises should properly address noise issues. As a general principle music and noise from customer activity (talking, shouting and applauding) emanating from any entertainment premises including external areas (balconies, gardens and smoking areas) should not be audible within any noise sensitive premises.

The applicant should provide an acoustic assessment covering the period when the noise from the proposed entertainment premises is expected to have the greatest impact on nearby noise sensitive premises, to demonstrate that at the façade of the noise sensitive premises either:

- The level of the noise emanating from the entertainment premises ($L_{eq,5min}$) is at least 10 dB less than the background noise ($L_{90,5min}$ measured in the absence of the entertainment noise) in octave bands from 63 Hz to 4 kHz,

  and

- The L_{AFmax} due to customer activity on the premises shall not exceed a noise level 10 dB less than the background noise level ($L_{A90,5min}$) measured in the absence of the entertainment noise.

  or

- The level of noise emanating from the entertainment premises shall not exceed the following octave band levels ($L_{eq,5min}$),

Octave band	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
$L_{eq,5min}$	39	27	17	10	5	1	-1

  and

- Noise levels due to customer activity on the premises shall not exceed a sound pressure level of 17 dB L_{AFmax} at any noise sensitive premises.

  In addition:

- For attached premises the level of the noise emanating from the entertainment premises shall not exceed the following octave band levels ($L_{eq,5min}$) within the noise sensitive premises.

Octave band	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
$L_{eq,5min}$	36	22	12	5	0	-4	-6

In addition noise from car parks, materials handling, deliveries, refuse collections and customer activity must not exceed the following maximum criterion:

- Between the hours of 19:00 and 07:00 the maximum noise levels (L_{AFmax}) from the development shall not exceed the background noise level (L_{A90}) by more than 10 dB, however where the existing background noise level is 45 dB L_{A90} or less, the maximum noise levels shall not exceed 55 dB L_{AFmax}.

5.6. General sound insulation criteria

"A higher standard of sound insulation may be required between spaces used for normal domestic purposes and spaces used for communal or non domestic purposes. In these circumstances the level of sound insulation required will depend upon the level of noise generated in the communal or non domestic space"

Where a development containing the noise source(s) is attached to noise sensitive premises for example in the case of a parade of shops with flats above the applicant shall submit a scheme of noise insulation to demonstrate that the following criteria would be met:

- In all cases sound insulation between the two uses shall be at least 60dB $D_{nT,W}$.
- For some applications it may be necessary to undertake a noise assessment to demonstrate that the level of inside the noise sensitive premises arising from the activities in the noise generating premises ($L_{eq,5min}$) will be at least 10dB below the indoor ambient noise level ($L_{eq,5min}$) in octave bands over an appropriate frequency range.

In both instances it is advisable that the applicants contact Environmental Health for advice.

Consideration should also be given to structure borne noise and vibration from machinery, fixed plant and ventilation systems, and from footfall, the opening and closing of doors, etc. For vibration the guidance in Section 8 shall be followed.

5.7. Mixed use schemes

Where a mixed-use development is to be considered Environmental Health will assess the parts of the development containing noise sources as if the proposed noise sensitive areas are already there with reference to the sections above.

5.8. Wind energy

Applications for wind energy developments (commonly called 'Wind Farms', though this tends to infer more than one turbine) may range from small, single turbines, to multiple turbines many 10's of metres high.

The UK government recommends that the noise impact from wind energy schemes should be assessed using the methodology and criteria given in ETSU-R-97: 'The Assessment and Rating of Noise from Wind Farms'. Applications for wind turbines must be accompanied by a **site-specific** assessment carried out in accordance with ETSU-R-97 and taking into account the guidance given in the Good Practice Guide on ETSU-R-97 produced by the Institute of Acoustics [6]. 'Generic' assessments and manufacturers data sheets are not acceptable. ETSU-R-97 assessments are complex and must be carried out by acoustic suitably qualified consultants experienced in this field of work. Developers are advised to bear in mind that it could require several weeks of background noise measurements and meteorological data capture before an ETSU assessment can be completed, and they should allow plenty of time for that before applying for planning consent.

Applicants will need to demonstrate that their proposals meet the relevant criteria given in the ETSU document. An example planning condition is given in Appendix VI. Applications that exceed the criteria will not be supported by Environmental Health.

[6] *A GOOD PRACTICE GUIDE TO THE APPLICATION OF ETSU-R-97 FOR THE ASSESSMENT AND RATING OF WIND TURBINE NOISE*. *INSTITUTE OF ACOUSTICS, MAY 2013*

5.9. Noise action plans, quiet areas and amenity space

Under the Environmental Noise (England) Regulations 2006 some areas may be affected by the following initiatives:

- Noise action plan areas where measures will be introduced to reduce the impact of ambient noise on residents

- Designated quiet areas where measures will be implemented to prevent the increase of the current noise levels.

Where a development is in or adjacent to one of these areas it will be necessary to demonstrate that the proposed development will not conflict with measures introduced as part of the noise action planning process.

In addition to the above consideration should also be given to the potential noise impact on any nearby amenity space, for example gardens, parks, sports fields, canal towpaths.

Further information will be made available as the noise action planning process develops.

> Planning policies and decisions should aim to:
>
> - identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
>
> Para 123 NPPF March 2012

6. Proposed Developments Containing Noise Sensitive Uses

6.1. Introduction to the section

This chapter concerns itself with setting design criteria for developments which contain noise sensitive uses, which primarily includes residential premises, schools, hotels and hospitals. Noise arising from plant, deliveries or other activities at schools, hotels or hospitals shall be assessed using the guidance in Section 4 of this document.

The guidance in this section has been prepared to support the principles and aims provided below.

> Core planning principle
>
> - Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings;
>
> **Para 17 NPPF March 2012**

> Planning policies and decisions should aim to:
>
> - avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
>
> **Para 123 NPPF March 2012**

For the purposes of this document noise sensitive premises are taken to be places where the building occupants may be resting, sleeping or studying, this includes residential premises, hotels, hospitals and schools. When building noise sensitive developments the following approach should be taken:

- For schools and hospitals refer to section 6.4
- For hotels refer to section 6.5
- For residential premises
    - Determine the noise exposure for each façade and apply the insulation standard as specified in section 6.2.1 to account for road and/or rail traffic
    - For air traffic, see 6.2.2
    - Consider the impact from commercial noise sources as specified in section 6.3, ensuring that the specified noise levels will be met
    - Give regard to any industrial noise source that may be present by following the approach specified in section 6.3.1
    - Give regard to any entertainment premises in the vicinity by following the approach specified in section 6.3.2

Where two or more standards apply for a site or façade then the highest standard of insulation shall be applied. If in doubt the developer should seek advice Environmental Health.

6.2. Noise from transportation sources

There are three principle transportation sources that may affect noise sensitive premises, these being road, rail and aircraft. The assessment and impact from road and rail traffic is covered in section 6.2.1, whilst the assessment and impact from aircraft is discussed in section 6.2.2.

6.2.1. Road and rail traffic

To promote the health and well being of the occupants of the proposed developments it will normally be necessary to ascertain the noise exposure. In order to obtain this data detailed surveys may need to be undertaken to the methodology specified in Appendix VII.

Road and rail Traffic

External noise level Not exceeding		**Acoustic Performance requirement**	
Day (dB L_{Aeq})	Night (dB L_{Aeq})	Windows	Ventilators
		All windows and doors to habitable rooms to provide a sound reduction index (dB $R_w + C_{tr}$) of not less than	Ventilation to habitable rooms to provide a sound reduction index (dB $D_{n,e,W}+C_{tr}$) of not less than
< 50	< 45	No requirement See **Note 1** below	
57	52	25	31
60	55	26	32
63	58	29	35
66	61	32	38
69	64	35	41
72	67	38	44
≥ 72	≥ 67	See **Note 2** below	
Noise levels shall be rounded up to a whole dB when determining the external noise exposure			

Note 1: Research provided by the World Health Organisation suggests that "general daytime outdoor noise levels of less than 50 dB L_{Aeq} are desirable to prevent any significant community annoyance". Where noise exposure is below this level no specific building envelope sound insulation is required.

Note 2: Environmental Health will not support approval. If consent is granted by Planning Committee then Environmental Health will recommend standards unique to each application upon the request of Development Control.

6.2.2. Air traffic

As far as is known, at the time of preparing this document (November 2013) there are no significant commercial airports operating or planned for the Lichfield District Council area and its immediate environs. Therefore, no specific policy has been prepared. Anyone wishing to develop facilities for aviation within the District Council area should contact Environmental Health at an early stage for advice.

6.3. Noise from commercial (including industrial and entertainment) sources

There are three specific categories of noise sources which could impact upon noise sensitive developments:

- Industrial sources – see 6.3.1
- Entertainment premises – see 6.3.2
- General or anonymous noise – see 6.3.3

For dwellings, the main criteria are reasonable resting/sleeping conditions in bedrooms, good listening conditions in other rooms and reasonable outdoor amenity.

> Occupants may tolerate higher levels of anonymous noise, such as that from road traffic or mixed commercial uses, than noise from specific sources which may trigger complex emotional reactions that are disproportionate to the noise level.
>
> BS 8233:1999 (Para 7.6.1.2)

6.3.1. Noise from industrial sources

Noise from industrial premises is not considered anonymous and will therefore be more disturbing to future residents. To address this noise levels for outdoor amenity areas should not exceed 45 dB L_{Aeq} and where the industrial premises contains a number of noise sources no single source should be dominant in an amenity area.

As a BS4142 type assessment may be used by an investigating officer when responding to a complaint of noise nuisance, it is recommended that applicants should undertake an assessment in line with BS4142 as part of their application. The approach in section 4.2 may be adopted as the basis for this assessment and background noise assessments should normally be based on a situation without the influence of industrial noise sources.

If the BS 4142 type assessment suggests a high probability of a complaint then it is likely that Environmental Health will recommend refusal.

If the BS 4142 type assessment suggests a positive indication that complaints are unlikely then Environmental Health are unlikely to refuse the application on noise grounds.

In addition noise levels shall satisfy the criteria provided in section 6.3.3 for general noise sources.

> Planning policies and decisions should aim to:
>
> - recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
>
> Para 123 NPPF March 2012

6.3.2. Noise from entertainment premises

As a general principle the aim should be to ensure that music emanating from an existing entertainment premises should not be audible within the proposed noise sensitive premises. It is recognised that Lichfield is a diverse city containing areas of mixed use where residents live alongside commercial and entertainment developments and that music from existing entertainment premises may actually be audible. To minimise the disturbance caused by noise from such premises the council requires the installation of a high specification acoustic glazing particularly for low frequencies. At sites where the applicant can demonstrate that a lower specification of glazing will achieve inaudibility within the noise sensitive premises the lower specification may be used.

Developers will be expected to:

- Carefully consider the implications arising from the existing night-time use of the locality.

Unattached premises

A site visit shall be undertaken to determine if noise from entertainment premises would be **clearly** audible at the façade(s) of the proposed noise sensitive development. The visit must be undertaken at a time when the noise from entertainment premises is expected to have the greatest impact on the proposed noise sensitive premises.

At sites where noise from entertainment premises would be **clearly** audible at the façade all windows, doors, vents and other openings to habitable rooms on the affected façade(s) shall provide sound reduction indices (R) or weighted element-normalized sound pressure level differences ($D_{n,e,W}$) that are not less than the values in the table below.

	Acoustic Performance					
	Windows and Doors *R* (dB) by Octave Band					Vents $D_{n,e,w}$ + C_{tr}
Location	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**(dB)**
Bedrooms	29	32	39	45	43	46
Other habitable rooms	25	27	34	40	38	42

Alternatively the applicant may undertake a noise study and demonstrate that the predicted noise levels in habitable rooms within the proposed noise sensitive premises do not exceed the criteria (below) for attached premises.

Attached premises

At sites where the noise sensitive dwelling is attached to the entertainment premises the applicant shall undertake a noise survey and demonstrate that the predicted noise levels in habitable rooms within the proposed noise sensitive premises satisfy either:

- The level of the noise emanating from the entertainment premises is at least 10 dB less than the background noise ($L_{90,5min}$ measured in the absence of the entertainment noise) in octave bands from 63 Hz to 4 kHz.

  or

- The level of the noise emanating from the entertainment premises will not exceed the following octave band levels ($L_{eq,5min}$)

Octave band	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
$L_{eq,5min}$	36	22	12	5	0	-4	-6

6.3.3. Noise from anonymous sources

Where applications are received which contain residential or hotel use the relevant guiding standard is BS8233:1999 from which Environmental Health have adopted noise levels that should not be exceeded.

Location	Time Period	Ambient Level (dB $L_{Aeq,T}$)	Maximum noise level (dB L_{AFmax})
External amenity areas	0700–2300	50	-
External amenity areas	1900-0700	-	55
Habitable room	0700-2300	35	-
Habitable room	2300-0700	30	45
Hotel bedroom	0700-2300	40	-
Hotel bedroom	2300-0700	35	45

To demonstrate that these criteria will be satisfied it will normally be necessary to undertake an environmental noise survey to determine the noise climate at the development site.

> In gardens or balconies etc. it is desirable that the steady noise level does not exceed 50 $L_{Aeq,T}$ dB and 55 $L_{Aeq,T}$ dB should be regarded as the upper limit.
>
> BS 8233:1999 (Para 7.6.1.2)

As well as protection for the building, good site layout possibly including the use of barriers or bunds should be considered to protect external amenity areas such as usable gardens or balconies. In such areas the steady noise level should not exceed 50dB $L_{Aeq,T}$.

Where the external L_{Aeq} exceeds 50dB daytime or 45 dB night-time it will be necessary to predict the internal noise levels and specify the acoustic performance of the building envelope (windows, doors, wall, ventilators). The prediction of the internal noise levels shall include the performance of any ventilators with ventilators open.

6.4. Specific criteria for schools and hospitals

The design of schools and hospitals is covered within specific technical documents, which contain a large number of design criteria for the differing types of rooms.

Schools are covered within Building Bulletin 93 and the criteria are reproduced in Appendix IV of this document.

Hospitals are covered within Health Technical Memorandum 08-01 and the criteria are reproduced in Appendix V of this document.

Where applications are received for schools or hospitals Environmental Health will not specify any noise levels to be met at the planning stage. Environmental Health will recommend that consideration be given to the levels within the relevant document as a comment attached to the planning consultation response but this will be unlikely to be in the form of an actual condition.

6.5. Specific Criteria for Hotels

The location and construction of a hotel will normally be based on a business case. Environmental Health will not prescribe noise and vibration criteria for hotel bedrooms. We recommend that hotel bedrooms shall be designed and located such that the unoccupied noise levels do not exceed the criteria specified for a good standard in Table 5 of BS8233:1999.

Similarly we recommend that hotel bedrooms shall be designed and located such that vibration levels do not exceed 0.14 mm/s peak particle velocity or the assessment of vibration levels results in a low probability of adverse comment when assessed in accordance with BS 6472.

6.6. Ventilation provision for residential and hotel uses

The primary document for determining any standard of ventilation is Approved Document F, Means of Ventilation, issued under the Building Regulations 2000. Ventilation within any residential or hotel premises must comply with the provisions of this document.

The primary factors that will be considered are the need to achieve whole building ventilation and purge ventilation (which includes thermal comfort in summer months).

6.6.1. Basic design statement

- Any requirement for ventilation shall be met either via acoustic vents; or a scheme of mechanical ventilation; or another method of ventilation which is comparable to the above. In any case the ventilation proposed must not compromise the acoustic integrity of the building envelope.
- Environmental Health will not support any strategy that recommends the use of non-openable windows for residential properties as a means of securing the internal acoustic environment.

6.6.2. Special circumstances

There will be instances where the characteristics of the noise require special consideration, such as the low frequency bass from music, and in these instances Environmental Health will expect the design statement for the ventilation to take this into account. If this indicates that a non-standard bespoke system is required then Environmental Health will expect this to be installed.

6.6.3. Air quality considerations

In all instances where mechanical ventilation is proposed the design statement should consider the air quality around the development to ensure the highest quality of intake air. Information on air quality may be sought by contacting Environmental Health.

7. Design & Planning Principles

7.1. Introduction to the section

This chapter aims to discuss a number of topics, either relating to how a scheme should be designed or to the stance taken by Environmental Health under specific circumstances.

7.2. Eliminating noise problems through the design of noise-sensitive premises

Many potential noise problems can be resolved through the careful design of noise-sensitive premises. The following checklist should be considered as early as possible in the design of a scheme:

- Has noise from the surrounding area been taken into consideration in arranging the site layout? For example positioning residential units as far away as possible from an adjacent noise source, screening outdoor amenity areas, etc.
- Has the surrounding noise climate been taken into consideration in arranging the internal layout of residential units? For example locating bedrooms on quiet facades.
- Has consideration been given to increasing the noise insulation standard for windows and doors to potentially noisy facades? For example residential units backing onto a railway line.
- Where a development will overlook a significant noise source (e.g. major road, railway line, industrial or entertainment premises, etc) it is desirable that part of the habitable space in each unit does not overlook the significant noise source. Single aspect units where all the habitable space overlooks the significant noise source should be avoided.
- Avoid 'sealed environments'.

7.3. Noise reduction at source to facilitate noise-sensitive development

In some cases it is necessary to reduce noise levels of an existing source before a noise-sensitive development can be permitted nearby. There may be an economic benefit to the applicant to assist in reducing noise at source rather than to meet increased insulation requirements and this will also provide for greater protection for external amenity areas.

Where the only means to meet the required noise standards is to reduce noise from a source outside the application site then an agreement under section 106 of the Town and Country Planning Act may be used to require this. This is an option that should be considered by the applicant ideally at an early stage and agreement should be sought with the party responsible for the noise before comment is sought from Environmental Health. Once a technical solution has been agreed upon between the applicant and the responsible party, details of such should be passed to Development Control who will then request comment from Environmental Health who will in turn evaluate the technical merits of the proposed solution.

7.4. The granting of planning consents which result in noise-sensitive uses in close proximity to noise generating uses

In some cases measurements of current noise levels from existing premises may indicate that the existing noise climate is unlikely to result in complaint or loss of amenity to a proposed residential development. This may occur for example because premises holding a planning consent for a B2 use may currently be vacant, or only in limited use.

In some cases however it may be reasonably foreseeable that future changes are likely to result in future loss of amenity to occupiers of the proposed development. In these cases granting planning permission may in effect restrict the flexibility of an existing premises developing within its use class. In these cases Environmental Health may adopt a precautionary approach and recommend that the application be refused.

7.5. Mitigation following a recommendation of refusal

Occasionally an application for a noise sensitive development will be submitted and Environmental Health will recommend refusal because it is deemed that the development will be adversely affected by noise i.e. the L_{Aeq} of a site equals or exceeds 72dB daytime and/or 66dB night-time, or is subject to high maximum noise levels, or is subject to noise with unusual characteristics (frequency spectrum) yet the Planning Committee may still elect to approve the development having regard to the full breadth of relevant issues.

Where it is known that this situation is likely to occur Environmental Health will still recommend refusal of the application as the proposal is contrary to the provisions of this Guidance document. Environmental Health will however still advise on mitigation at the request of the Planners and will likely recommend a high standard of soundproofing or glazing complete with acoustically treated ventilation or mechanical ventilation, or any other measure deemed appropriate. Occasionally, no measures will be deemed appropriate and Environmental Health will advise the Planners accordingly. In circumstances where it is determined by Environmental Health that such a high standard of mitigation is necessary to protect amenity, internal amenity will be of paramount importance and it is acknowledged that this may be compromised by the opening of windows.

8. Vibration

8.1. Introduction to the section

Although vibration issues are not encountered frequently in the planning process it is something that should be considered where the development would lead to vibration sensitive premises being in close proximity to industrial/commercial activities or to railway lines.

Because of the uncertainties involved in predicting vibration effects each case will be considered individually, and appropriate criteria agreed. In all appropriate cases the applicant is encouraged to contact Environmental Health at the earliest opportunity to discuss vibration issues.

8.2. Vibration from railway traffic

For existing buildings within 30m of a railway line where change of use to residential use is proposed a vibration survey within the building should be carried out. For new-build developments within 30m of a railway line a vibration survey must be carried out on the building lines closest to the railway. It will be important to survey at times when the highest levels of vibration are likely to occur, and it should be noted that railway routes in Lichfield may carry freight traffic at night.

8.3. Vibration from industrial or commercial sources

For new residential development within 30m of industrial premises, a vibration survey may be required. For new industrial development the applicant must assess any possible vibration effects on nearby vibration sensitive premises. Where appropriate an assessment should also be made of the potential for structure-borne noise generation.

8.4. Vibration surveys

In circumstances where vibration is a potential source of disturbance it is expected that an appropriate vibration survey or prediction be carried out. Initially, to avoid complex investigations being carried out unnecessarily a screening survey should be carried out. If monitored vibration levels do not exceed 0.14 mm/s peak particle velocity in any axis then no further survey is necessary. If this level is exceeded then it is expected that an assessment would be carried out with reference to BS6472.

Where re-radiated noise is a potential problem then this should also be assessed. Data from these assessments should be made available to Environmental Health for consideration.

Appendix I - Glossary of Terms

'**A' weighting (dB(A)):** A frequency dependent correction which weights sound to correlate with the sensitivity of the human ear to sounds of different frequencies.

Ambient Noise: A measure of the typical noise (excluding any unusual events) present at a site. This is usually described in terms of $L_{Aeq,T}$.

Anonymous noise: Noise that cannot be attributed to a single (specific source). For example noise from cars on a road would be considered anonymous whereas a noisy ventilation unit would not.

Audible: Sound that can be heard or is perceptible by the human ear.

Background Noise: A measure of the underlying noise (excluding any unusual events) which is present at a site before a new noise source is introduced. This is usually described in terms of the L_{A90} level: the sound pressure level exceeded for 90% of the time.

C_{tr} Spectrum adaptation term: A correction added to a sound insulation quantity (such as R_w) to take account of a specific (traffic noise) spectra. See BS EN ISO 717-1:1997. For example the difference between internal and external traffic noise levels in dB(A) is calculated using $\boldsymbol{R_W + C_{tr}}$ (equivalent to $\boldsymbol{R_{traffic}}$)

Clearly audible: There is no acoustic definition for clearly audible and as such a noise source may be deemed to be clearly audible if it is both easily identifiable and deemed likely to adversely affect the amenity of residents of any (proposed) development.

DMRB: The "Design Manual for Roads and Bridges" (DMRB) was introduced in 1992 in England and Wales. The DMRB sets a standard of good practice that has been developed principally for Trunk Roads. It may also be applicable in part to other roads with similar characteristics. (Volume 11, Section 3, Part 7 covers Noise and Vibration, see http://www.standardsforhighways.co.uk/dmrb/index.htm)

$D_{ne,W}$ Weighted element normalized level difference: A single-number quantity which characterizes the airborne sound insulation of a small building element. See BS EN ISO 717-1: 1997

$D_{nT,W}$ Standardised level difference: A single-number quantity which characterizes the airborne sound insulation between rooms. See BS EN ISO 717-1: 1997

Decibel (dB): A unit used for many acoustic quantities to indicate the level of sound with respect to a reference level.

Façade measurement: Noise measurements made outside an external wall of a structure (usually 1 metre from the wall).

Habitable room: A room used for sleeping or recreation / relaxation.

Inaudible: Sound that cannot be heard or is imperceptible to the human ear.

Industrial-type noise sources: Noise sources that are industrial in character. For example noise from plant and machinery, materials handling operations, or manoeuvring of heavy vehicles.

Institute of Acoustics: A professional body representing persons at all levels working in the field of acoustics. *http://www.ioa.org.uk/*

$L_{A90,T}$: Sound pressure level exceeded for 90% of the measurement period "T" or 'background level'.

$L_{Aeq,T}$: Equivalent continuous sound pressure level measured over the time period "T"

L_{Amax}: The maximum RMS A weighted sound pressure level

Mixed Use: Premises or development which will include both residential and non-residential uses

Noise: Unwanted sound.

Noise Action Plans and Quiet Areas: The Environmental Noise Directive 2002/49/EC (END) and the Environmental Noise (England) Regulations 2006 (as amended) require UK government to:

- Prepare strategic noise maps for large urban areas (referred to as agglomerations in the Directive), major roads, major railways and major airports.
- Prepare **action plans** based on the results of the noise mapping with the intention that these plans will aim to manage and reduce, where necessary, environmental noise, and preserve environmental noise quality where it is good in agglomerations (so-called '**quiet areas**').

Noise assessment: Evaluation of noise climate by a suitably qualified person to assist in the determination of a planning application.

Noise-sensitive premises / developments: Principally comprising residential premises, hospitals, schools and hotels. Other premises types may be deemed such depending upon circumstances.

Noise Nuisance: A legal term used to describe noise at a level that is disturbing as perceived by a reasonable person. The meaning of nuisance is defined by precedent in common law.

Outdoor Amenity Area: An outdoor area adjacent to a residential building which is designed and intended primarily for the leisure and recreation of the occupants of the dwelling. This will include gardens, landscaped areas, balconies.

***R*, Sound reduction index:** A quantity which characterizes the airborne sound insulation of a material or building element in a stated frequency band. See BS EN ISO 140-3:1995

***R_W*, Weighted sound reduction index:** A single-number quantity which characterizes the airborne sound insulation of a material or building element measured in the laboratory. See BS EN ISO 717-1: 1997

Rating Level: The noise level of an industrial noise source which includes an adjustment for the character of the noise. Used in BS4142.

Sound insulation: A quantity which is used to characterize the reduction in sound pressure level across an element or partition. (See ***R*, R_W, $D_{nT,W}$, $D_{ne,W}$, C_{tr}**)

Structure borne noise: Noise that propagates through a structure, for example through a building.

Suitably qualified person: A person having a suitable combination of formal training and experience in the assessment of noise. Advice in the identification of suitably qualified persons can be obtained from the Association of Noise Consultants. *http://www.association-of-noise-consultants.co.uk/*

Appendix II – Criteria for the Content of Noise Assessments

> It should be noted that noise assessment is a skilled operation and should be undertaken only by persons who are competent in the procedures.
>
> BS 4142, Page ii

1. Introduction
   a. Outline the purpose and scope of the report
   b. Include the site address or other location details (e.g. land adjacent to 123 Any Road….)
2. Methodology
   a. Detail any standards / policies to be used and give a brief outline of why they have been chosen
   b. Provide more detail and justifications why accepted standards have not been used
   c. Outline the process to be followed
3. Noise measurements
   a. Detail the location, dates and times of all measured data relied upon and provide summaries of the results obtained
   b. If it has not been possible to measure at the actual location of the proposed development, state why an alternative location is considered representative
   c. Provide explanations for any abnormal or anomalous results
   d. Give brief details of the equipment used and a confirmation that it has been verified within an appropriate time (usually bi-annually) and that appropriate site calibration checks were carried out. Note that all equipment used should comply with appropriate standards (e.g. IEC 61672 or its predecessors [for Sound Level Meters])
   e. Detail the meteorological conditions during the monitoring period
      i. Wind speed
      ii. Wind direction
      iii. Temperature
      iv. Precipitation

      Note: It will generally be acceptable to state that meteorological conditions were satisfactory for measurement purposes and only provide more detail if they are borderline
4. Predictions
   a. Where it has been necessary to predict noise levels, brief explanations of how these have been derived including any assumptions made (e.g. downwind propagation) and what standard have been followed (e.g. CRTN, ISO 9613)
   b. If a software package has been used, a brief description of it (e.g. Lima, Cadna, NoiseMap, SoundPlan)
   c. Brief details of the geographical and source data used
   d. Details of any validation checks carried out

5. Assessment
    a. Give details of the assessments made based on the measured and/or predicted data
    b. State any assumptions made
    c. Show any calculations made to sufficient detail that they could be checked for accuracy. If the calculations are complicated, the details may be included as an appendix.
6. Mitigation
    a. Give details of any mitigation measures that are / may be required and the anticipated effect
        i. Enhanced glazing and doors
        ii. Reorientation of buildings
        iii. Barriers or bunds
        iv. Alternative plant or machinery
7. Recommendations
    a. Detail what steps should be taken by the developer to meet the relevant criteria
        i. Glazing specification
        ii. Ventilation specification
        iii. Heights, locations and specifications of barriers or bunds
        iv. Appropriate technical specifications for plant or machinery (e.g. refrigeration compressors, extract systems)
        v. Any other data required by the developer to meet the required noise standards / guidance
8. Conclusions
    a. A brief resume of the process described above and a confirmation that if the recommendations are carried out satisfactorily that appropriate standards / guidance will be complied with
9. Appendices
    a. Scale plans showing the site location and the location of any measurement or prediction positions in sufficient detail to enable them to be readily identified. Aerial photos from online mapping sources may be useful.
    b. Unabridged noise monitoring / measurement results on which the assessment is based
    c. Details of any calculations relied upon

Appendix III – Internal Noise Levels for New School Build

Criterion	Room Type / Activity	Specified Level
Reasonable listening / study and work conditions	Music Rooms Large lecture rooms > 50 people Drama Rooms	30 dB $L_{Aeq,T}$ plus 55 dB L_{AFmax}
	Audio visual video conference rooms Assembly halls, multi purpose halls Individual study, withdrawal, remedial work, teacher preparation, interview/counselling General teaching areas, classrooms and class bases, small lecture theatres < 50 people, seminar and tutorial rooms, language laboratories, small lecture rooms Libraries Nursery quiet room Nursery play room	35 dB $L_{Aeq,T}$ plus 55 dB L_{AFmax}
	Science laboratories, metalwork/woodwork classrooms, resource/light craft and practical	40 dB $L_{Aeq,T}$
	Offices, staff rooms, open plan classrooms / resource areas	45 dB $L_{Aeq,T}$
	Indoor sports / indoor swimming pools	45 dB $L_{Aeq,T}$
	Toilets, coats and changing areas, corridors and stairwells	45 dB $L_{Aeq,T}$
	Dining rooms	45 dB $L_{Aeq,T}$

Source: *Building Bulletin 93: 'Acoustic Design of Schools'*

Appendix IV – Internal Noise Levels for New Hospital Build

Room type	Example	Criteria for noise intrusion to be met inside the spaces from external sources
Ward – single person	Single bed ward, single bed recovery areas and no-call suite, relatives overnight stay	40dB L_{Aeq} (day) 35dB L_{Aeq} (night) 50dB L_{AFmax} (night)
Ward – multi bed	Multi-bed wards, recovery areas	45dB L_{Aeq} (day) 35dB L_{Aeq} (night) 50dB L_{AFmax} (night)
Small office type spaces	Private offices, small treatment rooms, interview rooms, consulting rooms	40dB $L_{Aeq,T}$
Open medical areas	A&E	45dB $L_{Aeq,T}$
Circulation spaces	Corridors, hospital street, atria	55dB $L_{Aeq,T}$
Public areas	Dining Waiting areas	50dB $L_{Aeq,T}$ 45dB $L_{Aeq,T}$
Personal hygiene (en-suite)	Toilets, showers	45dB $L_{Aeq,T}$
Personal hygiene (public)	Toilets, showers	55dB $L_{Aeq,T}$
Small food preparation areas	Ward kitchens	50dB $L_{Aeq,T}$
Large food preparation areas	Main kitchens	55dB $L_{Aeq,T}$
Large meeting rooms (>8m)	Lecture theatres, meeting rooms, board rooms	35dB $L_{Aeq,T}$
Small meeting rooms (<8m)	Meeting rooms, seminar rooms, classrooms	40dB $L_{Aeq,T}$
Operating theatres	Operating theatres	40dB $L_{Aeq,T}$ 50dB L_{AFmax}

Source: *Department of Health 'Health Technical Memorandum 08-01 Acoustics'*

Appendix V - Methodology for the assessment of transportation noise sources

Road traffic

In order to determine the impact of road traffic on a particular development it will be necessary for an acoustic assessment to be undertaken to determine the $L_{Aeq,T}$. It is recommended by Environmental Health that a full 24-hour assessment be undertaken for all applications.

In some cases it will be sufficient to simply determine $L_{Aeq,T}$ during a continuous 3-hour period during the daytime. Where it is proposed to undertake this shortened methodology it is advised that this should be first discussed with Environmental Health.

The revised version of DMRB (August 2008) Annex 5 suggests that night time measurements should be considered if night time levels are expected to be within 10 dB of daytime levels. Where the proposed development is adjacent to, or in close proximity to, major roads such as the motorways or trunk roads then a night-time assessment will be required

Railway

Noise from rail traffic may affect properties bounding railway lines. To determine the impact of the rail traffic on a particular development then it is necessary for an acoustic assessment to be undertaken to determine the $L_{Aeq,T}$ and L_{ASmax}. As railway lines in Lichfield may carry freight during the night it is necessary for a full 24-hour assessment to be undertaken. The assessment should provide both $L_{Aeq,T}$ and details of L_{Asmax} with the frequency of occurrence.

Air traffic

Currently, the only aviation activities known to be taking place within the LDC area are what are known as 'General Aviation'. This can range from 'hang gliding' and micro-light type aircraft to the classic 'light aircraft' and small helicopters used by flying clubs. It also includes 'business jets' and larger helicopters. Noise from this type of aviation falls outside of the generally accepted assessment criteria typically applied to commercial air traffic. Environmental Health should be contacted for advice and a methodology agreed prior to an assessment of air traffic noise being carried out

Appendix VI – Sample planning condition for wind turbines

The development hereby approved is for the installation of one XXX X kW wind turbine at XXX. No alternative turbine types and/or locations are permitted without the prior written approval of the Local Planning Authority.

The rating level of noise immissions from the wind turbine, when determined in accordance with the method laid down in ETSU-R-97, shall not exceed the Maximum Permitted Turbine Noise Level (in terms of LA90, 10mins) detailed in Tables XX (daytime) and YY (night-time) of report XXX dated XXX, at the nearest residential receptor, namely XXX, and:

(A) Prior to the commencement of the development, the wind farm operator shall submit to the Local Planning Authority for written approval a list of proposed independent consultants who may undertake compliance measurements in accordance with this condition. Amendments to the list of approved consultants shall be made only with the prior written approval of the Local Planning Authority.

(B) Within 21 days from receipt of a written request of the Local Planning Authority, following a complaint to it alleging noise disturbance at a dwelling, the wind farm operator shall, at its expense, employ an independent consultant approved by the Local Planning Authority to assess the level of noise imissions from the wind farm at the complainant's property in accordance with the procedures described in the attached Guidance Notes. The written request from the Local Planning Authority shall set out at least the date, time and location that the complaint relates to.

(C) Prior to the commencement of any measurements by the independent consultant to be undertaken in accordance with these conditions, the wind farm operator shall submit to the local planning authority for written approval the proposed measurement location identified in accordance with the Guidance Notes where measurements for compliance checking purposes shall be undertaken.

(D) Prior to the submission of the independent consultant's assessment of the rating level of noise immissions, the wind farm operator shall submit to the Local Planning Authority for written approval a proposed assessment protocol setting out the following:

> (i) The range of meteorological and operational conditions (the range of wind speeds, wind directions, power generation and times of day) to determine the assessment of rating level of noise immissions.
>
> (ii) A reasoned assessment as to whether the noise giving rise to the complaint contains or is likely to contain a tonal component.
>
> The proposed range of conditions shall be those which prevailed during times when the complainant alleges there was disturbance due to noise. The assessment of the rating level of noise immissions shall be undertaken in accordance with the assessment protocol approved in writing by the Local Planning Authority.

(E) The wind farm operator shall provide to the Local Planning Authority the independent consultant's assessment of the rating level of noise immissions undertaken in accordance with the Guidance Notes within 2 months of the date of the written request of the Local Planning Authority made under paragraph (B) of this condition unless the time limit is extended in writing by the Local Planning Authority. The assessment shall include all data collected for the purposes of undertaking the compliance measurements. The instrumentation used to undertake the measurements shall be calibrated in accordance with Guidance Note (a) and certificates of calibration shall be submitted to

the Local Planning Authority with the independent consultant's assessment of the rating level of noise immissions.

Note: For the purposes of this condition, a "dwelling" is a building within Use Class C2 and C3 of the Town and Country Planning (Use Classes) Order 1987, SI 1987/764 (as amended) which lawfully exists or had planning permission at the date of this consent.

Guidance Notes for Noise Condition

These notes are to be read with and form part of the noise condition. They further explain the condition and specify the methods to be employed in the assessment of complaints about noise immissions from the wind turbines. Reference to ETSU-R-97 refers to the publication entitled "The Assessment and Rating of Noise from Wind Farms" (1997) published by the Energy Technology Support unit (ETSU) for the Department of Trade and Industry (DTI).

Notes

a. Values of the $L_{A90,10\text{-minute}}$ noise statistic should be measured at the complainant's property, using a sound level meter of EN 60651/BS EN 60804 Type 1, or BS EN 61672 Class 1 quality (or the equivalent UK adopted standard in force at the time of the measurements) set to measure using the fast time weighted response as specified in BS EN 60651/BS EN 60804 or BS EN 61672-1 (or the equivalent UK adopted standard in force at the time of the measurements). This should be calibrated in accordance with the procedure specified in BS 4142: 1997 (or the equivalent UK adopted standard in force at the time of the measurements). Measurements shall be undertaken in such a manner to enable a tonal penalty to be applied if necessary.

b. The microphone shall be mounted at 1.2 - 1.5 metres above ground level, fitted with a two-layer windshield or suitable equivalent approved in writing by the Local Planning Authority, and placed outside the complainant's dwelling and be not more than 35 metres from it. Measurements should be made in "free field" conditions. To achieve this, the microphone shall be placed at least 3.5 metres away from the building facade or any reflecting surface except the ground at the approved measurement location. In the event that the consent of the complainant for access to his or her property to undertake compliance measurements is withheld, the wind farm operator shall submit for the written approval of the Local Planning Authority details of the proposed alternative representative measurement location prior to the commencement of measurements and the measurements shall be undertaken at the approved alternative representative measurement location.

c. The $L_{A90,10\text{-minute}}$ measurements should be synchronised with measurements of the 10-minute arithmetic mean wind speed and wind direction data.

d. If the rating level determined by the independent consultant at any integer wind speed lies at or below an LA90, 10mins of 35dBA then no further action is necessary. If the rating level at any integer wind speed exceeds an LA90, 10mins of 35dBA then the development fails to comply with the conditions.