

CITY AIRPORT DEVELOPMENT PROGRAMME
(CADP1) S73 APPLICATION

ENVIRONMENTAL STATEMENT

VOLUME 2: APPENDICES

DECEMBER 2022



P e l l F r i s c h m a n n

City Airport Development
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Volume 2: Appendices
Appendix 8.1 Policy

December 2022

Appendix 8.1 Relevant legislation, policy, technical guidelines and assessment criteria

This appendix provides further details of how the legislation and policy in Section 8.2 relates to noise.

Legislation

EU Regulation 598-2014

1.1.1 The European Commission introduced EU Regulation 598-2014 in 2016 to account for developments in the aviation world. This repeals 2002/30/EC which set out procedures and rules for the introduction of noise related operating restrictions to the busiest of the European airports. This previous regime for managing airport noise placed the responsibility with the airport operator. The entry into force in 2016 of EU Regulation 598/2014 represents a shift in responsibility from the airport operator to a separate, independent statutory entity or competent authority to oversee the delivery of the new, more prescriptive approach to airport noise management.

1.1.2 There are seven key elements of the new regulatory regime which are:

- Designation of a separate, independent statutory entity as the Competent Authority;
- Appropriate collaborative working arrangements;
- Robust consultation requirements;
- Adhere to the ICAO Balanced Approach;
- Compliance with Environmental Impact Assessment (EIA), Habitats & Birds, and the Environmental Noise Directives;
- Establishment of an appropriate, robust appeal mechanism, and
- Ongoing monitoring and enforcement activities.

1.1.3 The International Civil Aviation Organisation (ICAO) is the inter-governmental body that oversees the worldwide civil aviation industry. ICAO has adopted a set of principles and guidance, constituting the 'balanced approach' to aircraft noise management, which encourages ICAO member states to address the following points:

- Mitigate aviation noise through selection at a local level the optimum combination of four key measures;
- Reducing noise at source (from use of quieter aircraft);
- Making best use of land (plan and manage the land surrounding airports);
- Introducing operational noise abatement procedures (by using specific runways, routes or procedures);
- Imposing noise-related operating restrictions (such as a night time operating ban or phasing out of noisier aircraft);
- Select the most cost-effective range of measures; and
- Not introduce noise-related operating restrictions unless the authority is in a position, on the basis of studies and consultations, to determine whether a noise problem exists and having determined that an operating restriction is a cost-effective way of dealing with the problem.

Environmental Noise Directive 2002/49/EC 2002

1.1.4 The Environmental Noise Directive (END) concerning the assessment and management of environmental noise from transport, came into effect in June 2002. Its aim was to define a common approach across the European Union with the intention of avoiding, preventing or reducing on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. This involves:

- Informing the public about environmental noise and its effects;
- Preparation of strategic noise maps for large urban areas ('agglomerations'), major roads, major railways and major airports as defined in the END; and

- Preparation of action plans based on the results of the noise mapping exercise

Civil Aviation Act 2006

1.1.5 The Civil Aviation Act 2006 included measures aimed at strengthening the powers available to control noise. These included provision for airport operators to fix charges in respect of an aircraft or a class of aircraft based on the noise caused by the aircraft or the amount of emissions it produces. The Act also gave airport operators statutory powers to introduce noise control schemes for the purpose of avoiding, limiting or mitigating the effect of noise connected with the taking off or landing of aircraft. These could include penalties for straying from agreed flight paths that minimise the number of people affected by noise, fines for aircraft that breach noise controls and restrictions on aircraft of specified descriptions. Any income from penalty schemes would have to be put towards projects that benefit the local community.

Civil Aviation Act 2012

1.1.6 The Civil Aviation Act 2012 placed a new duty on the Civil Aviation Authority (CAA) to make information about the environmental performance of the aviation sector available to the general public and measures taken to limit adverse environmental effects. The CAA consulted on its proposed Statement of Policy for the use of its information powers in 2013.

Environmental Noise (England) Regulations 2006 (as amended)

1.1.7 These regulations transpose the European Environmental Noise Directive (Directive 2002/49/EC) into English law. They require operators of non-designated major civil airports to make and submit strategic noise maps to the Secretary of State every five years starting in 2007 which reflect the noise situation in the preceding calendar year. A major airport is defined as a civil airport that has more than 50,000 movements per year (a movement being a take-off or a landing). Regulation 18 places a duty on the operators of major airports, as the competent authority, to draw up a Noise Action Plan for places near the airport and submit this to the Secretary of State. There is then a continuing obligation on airport operators to review (and revise, if necessary) the Noise Action Plan every five years or sooner where a major development occurs.

The Airports (Noise-related operating restrictions) (England and Wales) Regs 2018

1.1.8 The Airports (Noise-related operating restrictions) (England and Wales) Regs 2018 implement, in relation to England and Wales, the requirement to designate competent authorities for the purposes of Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16th April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.

Aeroplane Noise Regulations 1999

1.1.9 The Aeroplane Noise Regulations 1999 require that all civil propeller and jet aeroplanes registered in the UK shall have a noise certificate. A similar requirement applies to any foreign registered aeroplane which cannot land or take off in the UK without a noise certificate granted by the competent authority in the state where it is registered.

Control of Pollution Act 1974

1.1.10 The Control of Pollution Act 1974 provides a means for regulating construction noise and vibration. Section 60 sets out the legal powers of a Local Authority to control construction noise. The Local Authority, in acting under this section, would ensure that best practicable means are employed to minimise noise and vibration.

1.1.11 Under Section 61, the person undertaking the construction works may apply for prior consent from the Local Authority over the method by which the works will be carried out and the steps proposed to minimise noise and vibration resulting from the works.

Policy

National Planning Policy Framework (NPPF)

1.1.12 The National Planning Policy Framework (NPPF) originally published in March 2012 and last updated in 2021, sets out the UK Government's planning policies for England and how these are expected to be applied. It is designed to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

1.1.13 The UK Government's current planning policy concerning noise is embodied in the NPPF (and more specifically the Noise Policy Statement for England). The aim of planning policies and decisions with respect to noise is addressed in paragraph 185 of the NPPF:

1.1.14 *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;”

1.1.15 The above policy refers to “significant adverse impacts” and “adverse impacts” which are not defined numerically in the document, although the NPSE references further research being undertaken in this regard.

Noise Policy Statement for England (NPSE) 2010

1.1.16 The Noise Policy Statement for England (NPSE) 2010 provides the framework for noise management decisions to be made that ensure noise levels do not place an unacceptable burden on society.

1.1.17 The stated aims of the NPSE are to:

- *“Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development;*
- *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; and*
- *Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”*

1.1.18 The NPSE introduces the concepts of NOEL (No Observed Effect Level), LOAEL (Lowest Observed Adverse Effect Level) and SOAEL (Significant Observed Adverse Effect Level). The definition of these is as follows:

- *“NOEL – No Observed Effect Level. This is the level below which no effect can be detected”;*
- *“LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected”;* and
- *“SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.”*

1.1.19 Further guidance on how planning authorities should take account of the acoustic environment and the mitigation strategies which should be applied in relation to the above terms is provided in the *National Planning Practice Guidance* in the section on Noise (PPGN).

1.1.20 The NPSE states that it is not possible to give a single objective noise-based measure that defines a SOAEL that is applicable to all sources of noise for all situations. It acknowledges that the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It also acknowledges that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, it states that not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

1.1.21 Where any adverse noise effects are predicted, these are to be identified and, if these cannot be avoided, mitigation measures are recommended to ensure no significant residual effects on health and quality of life arise. This approach is considered consistent with the principal aims of the NPSE. It is important to note that findings against the LOAEL and SOAEL are measures of the effect of noise on health and quality of life, and not environmental impact assessment findings.

National Planning Practice Guidance - Noise Section (PPGN)

1.1.22 The PPGN was first published in 2014, and most recently updated in 2019. As well as assisting with the interpretation of the NPSE, the PPGN provides a web-based resource in support of the NPPF. The PPGN states (paragraph 3) that local planning authorities should take account of the acoustic environment and in doing so consider:

1.1.23 *“whether or not a significant adverse effect is occurring or likely to occur, whether or not an adverse effect is occurring or likely to occur, and whether or not a good standard of amenity can be achieved.”*

1.1.24 Paragraph 5 of the PPGN provides guidance on how to establish when noise is likely to be a concern. It advises that as noise increases above the LOAEL it *“starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).”*

1.1.25 The guidance is that where the predicted noise level is above the SOAEL, the planning process should be used to avoid a material change in behaviour that would otherwise occur, for example by use of appropriate mitigation. Furthermore, while such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

1.1.26 A summary of how to interpret these concepts is given in the PPGN, which is reproduced as Table 8.1.1 below.

Table 8.1.1: Noise Exposure Hierarchy Based on the Likely Average Response

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television;	Observed Adverse Effect	Mitigate and reduce to a minimum

Response	Examples of Outcomes	Increasing Effect Level	Action
	speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.		
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Aviation Policy Framework (APF)

1.1.27 The *Aviation Policy Framework* (APF) was published in March 2013 by the Department for Transport (DfT). The APF defines the Government's objectives and policies on the impacts of aviation in the UK.

1.1.28 On managing aviation's environmental impacts, and specifically noise, it states in paragraph 3.12 that: *"The Government's overall policy on aviation noise is to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise, as part of a policy of sharing benefits of noise reduction with industry"*.

1.1.29 It goes on in paragraph 3.13 to state that: *"This is consistent with the Government's Noise Policy, as set out in the Noise Policy Statement for England (NPSE) which aims to avoid significant adverse impact on health and quality of life."*

1.1.30 Guidance is provided on the noise metric used to rate airborne noise in paragraph 3.13 where it states: *"To provide historic continuity, the Government will continue to ensure that noise exposure maps are produced for the noise-designated airports on an annual basis providing results down to a level of 57 dB $L_{Aeq,16hour}$ "*.

1.1.31 The noise index is described in a footnote as: *"the A-weighted average sound level over the 16 hour period of 07:00-23:00. This is based on an average summer day when producing noise contour maps at the designated airports."*

1.1.32 In paragraph 3.17 the interpretation of the contour is given as: *"We will continue to treat the 57 dB $L_{Aeq,16h}$ contour as an average level of day time aircraft noise marking the approximate onset of significant community annoyance. However, this does not mean that all people within this contour will experience significant adverse effects from aircraft noise. Nor does it mean that no-one outside of this contour will consider themselves annoyed by aircraft noise."*

1.1.33 Under the heading *"Noise insulation and compensation"* the APF states in paragraphs 3.36 and 3.37 that: *"The Government continues to expect airport operators to offer households exposed to levels of noise of 69 dB $L_{Aeq,16h}$ or more, assistance with the cost of moving."*

The Government also expects airport operators to offer acoustic insulation to noise sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or more. Where acoustic insulation cannot provide an appropriate or cost-effective solution, alternative mitigation measures should be offered."

1.1.34 With regard to airport development, it continues in paragraph 3.39: *“Where airport operators are considering developments which result in an increase in noise, they should review their compensation schemes to ensure that they offer appropriate compensation to those potentially affected. As a minimum, the Government would expect airport operators to offer financial assistance towards acoustic insulation to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to levels of noise of 63 dB $L_{Aeq,16h}$ or more.”*

Survey of Noise Attitudes 2014: Aircraft (SoNA)

1.1.35 The Civil Aviation Authority *Survey of Noise Attitudes 2014: Aircraft (SoNA)* includes the results of a survey to noise attitudes to civil aircraft. SoNA largely replaces Attitudes to noise from aviation sources in England (ANASE), the last large scale survey on attitudes to aircraft noise published in 2007.

Aviation 2050: The Future of UK Aviation

1.1.36 In December 2018, the Government published *Aviation 2050: The Future of UK Aviation* (Aviation 2050) which outlines proposals for a new aviation strategy and addresses a wide range of associated issues. The Green Paper set out (among other things) a robust policy framework and package of measures to reduce the harmful effects of aviation on the environment including in respect of noise. In the Green Paper, the Government recognises that there has been uncertainty on how current policy (to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise) should be interpreted, measured, and enforced. The Strategy sets out that the Government intends to put in place a stronger and clearer framework in order to ensure the sector is sufficiently incentivised to reduce noise, or to put mitigation measures in place where reductions are not possible.

Consultation Response on Legislation for Enforcing the Development of Airspace Change Proposals

1.1.37 In October 2019, the government published a consultation response on legislation for enforcing the development of airspace change proposals (ACPs) alongside an impact assessment. This response concerned Annex A of the ‘Aviation 2050 – the future of UK aviation’ consultation document.

1.1.38 The response concluded that they would:

- *“progress with proposals to give the Secretary of State for Transport – delegable to the Civil Aviation Authority (CAA) – new powers to direct that ACPs are taken forward by airports or other relevant bodies;*
- *implement its sanctions and penalties regime proposal; and*
- *give CAA the responsibility for enforcing the sanctions and penalties regime”.*

Other Guidance

World Health Organisation (WHO) – Guidelines for Community Noise

1.1.39 WHO Guidelines for Community Noise provide a range of aspirational noise targets aimed at protecting the health and well-being of the community. They therefore set out noise targets which represent goals for minimising the adverse effects of noise on health as opposed to setting absolute noise limits for planning purposes.

1.1.40 For outside areas of dwellings, the WHO Guidelines state that to protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq} . Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development. The WHO guidance cites a 16 hour period as applicable to the above limits.

WHO Night Noise Guidelines

1.1.41 Guidance on absolute noise levels at night are given in by the WHO Night Noise Guidelines (NNG) . These report findings from the WHO concerning night noise from transportation sources and its effects on health and sleep. These guidelines acknowledge that the effect of noise on people at night depends not just on

the magnitude of noise of a single event but also the number of events. It considers that in the long term, over a year, these effects can be described using the $L_{\text{night, outside}}$ index. This is essentially equivalent to the $L_{\text{Aeq, 8h}}$ index commonly used in the UK, but instead of being based on aircraft activities during the average summer night, is based on the average annual night.

1.1.42 These guidelines were prepared by a working group set up to provide scientific advice to the Member States for the development of future legislation and policy action in the area of assessment and control of night noise exposure. The working group reviewed available scientific evidence on the health effects of night noise, and derived health-based guideline values. Although this provides guidance to the European Community in general and has no policy status, it provides a description of recent research into the health effects of noise and provides guidance on noise targets.

1.1.43 The following night noise guideline values are recommended by the working group for the protection of public health from night noise:

- Night noise guideline (NNG) $L_{\text{night, outside}}$ equal to 40 dB
- Interim target (IT) $L_{\text{night, outside}}$ equal to 55 dB

1.1.44 The NNG is a health based limit to aspire towards whereas the IT represents a feasibility based intermediate target. This is borne out to some extent by the Strategic Noise Mapping work undertaken across European Member States in compliance with the Environmental Noise Directive³. For night noise, Member States are required to produce noise maps in terms of the $L_{\text{night, outside}}$ index no lower than 50 dB for strategic planning purposes.

1.1.45 The relationship between night noise exposure and health effects as defined by WHO can be summarised as shown in Table 8.1.2.

Table 8.1.2 WHO guidance on the relationship between night noise exposure and health effects

$L_{\text{night, outside}}$	Relationship between night noise exposure and health effects
<30	No effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise
30 – 40	There is no sufficient evidence that the biological effects observed at the level below 40 dB $L_{\text{night, outside}}$ are harmful to health
40 – 50	Adverse health effects are observed at the level above 40 dB $L_{\text{night, outside}}$, such as self-reported sleep disturbance, environmental insomnia, and increased use of somnifacient drugs and sedatives
>55	Cardiovascular effects become the major public health concern, which are likely to be less dependent on the nature of the noise

WHO Environmental Noise Guidelines for the European Region

1.1.46 In October 2018 the WHO published their updated Environmental Noise Guidelines. These guidelines strongly recommend that aircraft noise does not exceed 45 dB L_{den} or 40 dB L_{night} . These recommendations are considered aspirational and have not yet been adopted as policy.

1.1.47 Some of the research underpinning the report related to noise effects at night had been published earlier and considered for this assessment.

BS8233:2014 Sound insulation and noise reduction for buildings – Code of practice

1.1.48 The British Standard BS8233:2014 Sound insulation and noise reduction for buildings – Code of practice provides guidance on the control of external noise. The standard presents a number of design ranges for indoor noise levels for different types of space.

1.1.49 Internal ambient noise guideline levels for dwellings are given in Table 8.1.3.

Table 8.1.3 BS 8233:2014 Indoor ambient noise guideline levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{\text{Aeq, 16h}}$	-

Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

1.1.50 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{AFmax} , depending on the character and number of events per night. Sporadic noise events could require separate values.

1.1.51 These guideline noise levels can be used for rooms for residential purposes including hotels, hostels, halls of residence, school boarding houses, hospices and residential care homes.

1.1.52 BS8233:2014 also gives guideline ambient noise levels in non-domestic buildings. These are given in Table 8.1.4.

Table 8.1.4 BS 8233:2014 Indoor ambient noise guideline levels for non-domestic buildings

Activity	Location	Design range $L_{Aeq,T}$ dB
Speech or telephone communications	Department store, cafeteria, canteen, kitchen	50 to 55
	Concourse, corridor, circulation space	45 to 55
Study and work requiring concentration	Library, gallery, museum	40 to 50
	Staff/meeting room, training room	35 to 45
	Executive office	35 to 40
Listening	Place of worship, counselling, meditation, relaxation	30 to 35

1.1.53 BS 8233:201432 gives the following design criteria for external noise in amenity spaces:

- For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited; and
- Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.

Department of Education BB93

1.1.54 The Department of Education's BB93 gives upper limits for indoor ambient noise level in terms of $L_{Aeq,30min}$ for new and refurbished schools, and schools formed by a material change of use, are as follows:

- Classroom and general teaching area - 35 dB $L_{Aeq,30min}$; and
- Teaching space (special communication needs) - 30 dB $L_{Aeq,30min}$.

1.1.55 For classrooms and teaching spaces with natural ventilation, these levels can be achieved if the external noise level does not exceed 55 dB $L_{Aeq,30min}$.

1.1.56 These standards, while not required by legislation to be achieved within those existing schools built prior to their introduction, provide a guide to determine potential impacts on existing schools

Department of Health HTM 08-1

1.1.57 Guidance on recommended internal noise levels for healthcare facilities is given in the Department of Health's HTM 08-1. This recommends internal noise levels for healthcare facilities as follows:

- Hospital wards, daytime - 40 dB $L_{Aeq,1h}$;
- Hospital wards, night - 35 dB $L_{Aeq,1h}$;
- Hospital wards, night - 45 dB $L_{Amax,F}$;
- Operating theatres, night - 40 dB $L_{Aeq,1h}$; and
- Operating theatres, night - 50 dB $L_{Amax,F}$.

1.1.58 The L_{Amax} limit is applicable to events that occur several times during the night (for example passing trains) rather than sporadic events.

1.1.59 These criteria would be relaxed for emergency situations and sporadic events (such as helicopter flights) subject to agreement by the local authority or other relevant body.

1.1.60 For hospital wards with natural ventilation, these levels can be achieved if the external noise level does not exceed 55 dB $L_{Aeq,1h}$ and 50 dB $L_{Aeq,1h}$ during the day and night respectively.

1.1.61 For the control of noise in external areas in hospitals the following provisions should apply, with the most stringent taking precedence:

- Noise levels at the site boundary should meet reasonable standards required by the local authority or other relevant body;
- Noise outside the buildings should be controlled to allow the internal noise criteria to be achieved (with windows or trickle vents open for ventilation if the space is naturally ventilated); and
- Open external areas should be protected. Noise from services should not exceed the existing daytime background noise level or 50 dB L_{A90} , whichever is the higher. This limit should be achieved in any areas normally occupied by staff (except maintenance staff, notwithstanding the requirements of the Control of Noise at Work Regulations 2005) or the public (for example open courtyards and accessible landscaped areas). This means that noisy plantrooms should not face normally occupied external areas unless adequate acoustic control is provided.

Report of a Field Study of Aircraft Noise and Sleep Disturbance

1.1.62 In the UK, where night noise from individual events is considered sufficiently high, a value of 90 dB(A) SEL (approximately equivalent to 80 dB L_{Amax}) is commonly used as the eligibility threshold for a sound insulation scheme, often based on one movement or more on average per night by the noisiest or most common aircraft operating during the night. This threshold was developed based on research published in 1992 by the Department of Transport.

1.1.63 An interpretation of the research study results is that there is no significant risk of sleep disturbance for locations outside the 90 dB(A) SEL footprint area. For locations within 90 dB(A) SEL footprint, a very slight risk of sleep disturbance will be present. The chance of "awakening" (1 in 75) relates not to aircraft noise levels at 90 dB(A) SEL, but to aircraft noise levels in the range 90 to 100 dB(A) SEL.

1.1.64 This study, in contrast to some other similar studies, used social survey methods with actigraphy and Electroencephalogram (EEG) recordings on a sub-group of participants, to enable validation of the actigraphy with respect to aircraft noise-induced sleep disturbance. The participants of the sub groups were tested to determine what movements they made during the night while asleep in their homes against the varying noise environment. The findings suggest that the extent to which people experience sleep disturbance due to aircraft noise is much less pronounced in field studies where they are sleeping in their own home, compared to laboratory studies, where subjects are sleeping in unfamiliar surroundings.