

Planning Policy Guidance 24: Planning and noise

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Foreword

Planning policy guidance notes set out the Government's policies on different aspects of planning. Local authorities must take their content into account in preparing their development plans. They may be material to decisions on individual planning applications and appeals.

This PPG gives guidance to local authorities in England on the use of their planning powers to minimise the adverse impact of noise and builds on the advice previously contained in DOE Circular 10/73. It:

- outlines the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which will generate noise;
- introduces the concept of noise exposure categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and
- advises on the use of conditions to minimise the impact of noise.

Introduction

1. Noise can have a significant effect on the environment and on the quality of life enjoyed by individuals and communities. The aim of this guidance is to provide advice on how the *planning* system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It builds upon the principles established in Circular 10/73 "Planning and Noise", and takes account of the recommendations of the Noise Review Working Party which reported in October 1990 (HMSO, ISBN 0 11 752343 7). It outlines some of the main considerations which local planning authorities should take into account in drawing up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources.

General principles

2. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It will be hard to reconcile some land uses, such as housing, hospitals or schools, with other activities which generate high levels of noise, but the planning system should ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development). It is equally important that new development involving noisy activities should, if possible, be sited away from noise-sensitive land uses. Development plans provide the policy framework within which these issues can be weighed but careful assessment of all these factors will also be required when individual applications for development are considered. Where it is not possible to achieve such a separation of land uses, local planning authorities should consider whether it is practicable to control or reduce noise levels, or to mitigate the impact of noise, through the use of conditions or planning obligations.

Noise policies in development plans

3. Where the development plan is material to the development proposal, section 54A of the Town and Country Planning Act 1990 (inserted by section 26 of the Planning and Compensation Act 1991) requires applications and appeals to be determined in accordance with the plan, unless material considerations indicate otherwise. Development plans should give developers and local communities a degree of certainty about the areas in which particular types of development will be acceptable and those in which special measures may be required in order to mitigate the impact of noise. Policies on noise should take account of the guidance in the rest of this note and in the Annexes: it will generally be appropriate for these policies to be set out in Part II of Unitary Development Plans and in district local plans. But in some cases (when dealing with strategic issues such as development of, or near, major aerodromes, for example) it may be necessary to include some noise policies in Part I of UDPs and in structure plans.

4. Where noise policies apply to the plan area as a whole, they should be set out in the same way as other general policies. Area-specific noise policies may be useful in some circumstances and, in such cases, the relevant boundaries should be illustrated on the proposals map. However, it will generally be inappropriate for a proposals map to show detailed noise contours as noise emissions may change significantly over time (eg, in the case of an aerodrome, operational changes may lead to significant variations in the impact of the noise on those living in the area).

5. Plans should contain policies designed to ensure, as far as is practicable, that noise-sensitive developments are located away from existing sources of significant noise (or programmed development such as new roads) and that potentially noisy developments are located in areas where noise will not be such an important consideration or where its impact can be minimised. It may also be appropriate for local planning authorities to adopt policies to avoid potentially noisy developments in areas, which have remained relatively undisturbed by noise nuisance and are prized for their recreational and amenity value for this reason.

6. The Secretary of State considers that housing, hospitals and schools should generally be regarded as noise-sensitive development, but planning authorities may wish to include other developments or uses within this definition, depending on local circumstances and priorities and, if so, these should be explained in the development plan.

7. Where it is particularly difficult to separate noise-sensitive development from noisy activities, plans should contain an indication of any general policies which the local planning authority propose to apply in respect of conditions or planning obligations.

Noise exposure categories for residential development

8. This guidance introduces the concept of Noise Exposure Categories (NECs), ranging from A-D, to help local planning authorities in their consideration of applications for residential development near transport-related noise sources. Category A represents the circumstances in which noise is unlikely to be a determining factor, while Category D relates to the situation in which development should normally be refused. Categories B and C deal with situations where noise mitigation measures may make development acceptable. Annex 1 illustrates this approach in more detail. It also explains why the NEC procedure cannot be used in the reverse context for proposals, which would introduce new noise sources into areas of existing residential development.

9. The table in Annex 1 contains a recommended range of noise levels for each NEC covering day and night-time periods. However, in some cases it may be appropriate for local planning authorities to determine the range of noise levels which they wish to attribute to any or each of the NECs. For example, where there is a clear need for new residential development in an already noisy area some or all NECs might be increased by up to 3-dB (A) above the recommended levels. In other cases, a reduction of up to 3 dB (A) may be justified.

Development control

Noisy development

10. Much of the development which is necessary for the creation of jobs and the construction and improvement of essential infrastructure will generate noise. The planning system should not place unjustifiable obstacles in the way of such development. Nevertheless, local planning authorities must ensure that development does not cause an unacceptable degree of disturbance. They should also bear in mind that a subsequent intensification or change of use may result in greater intrusion and they may wish to consider the use of appropriate conditions.

11. 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 will require special consideration. In addition to noise from aircraft landing and taking off, noise from aerodromes is likely to include activities such as engine testing as well as ground movements. The impact of noise from sport, recreation and entertainment will depend to a large extent on frequency of use and the design of facilities. More detailed advice on factors to consider in relation to the major noise sources including roads, railways, airports, industrial and recreational noise and their measurement is given in Annex 3. Separate advice on the control of noise from mineral working sites is provided in Minerals Planning Guidance Note 11 - "The Control of Noise at Surface Mineral Workings" (MPG 11).

Noise-sensitive development

12. Local planning authorities should consider carefully in each case whether proposals for new noise-sensitive development would be incompatible with existing activities. Such development should not normally be permitted in areas which are - or are expected to become -subject to unacceptably high levels of noise. When determining planning applications for development which will be exposed to an existing noise source, local planning authorities should consider both the likely level of noise exposure at the time of the application and any increase that may reasonably be expected in the foreseeable future, for example at an airport. Annex 3 gives guidance on the assessment of noise from different sources. Authorities will also wish to bear in mind that, while there will be sites where noise is significantly lower at night than during the day, other sites may be subjected to night-time noise, for example from traffic, at a level which is little below the daytime level. These sites warrant particular protection: noise-sensitive development should not normally be permitted where high levels of noise will continue throughout the night, especially during the hours when people are normally sleeping (23.00 to 07.00).

Measures to mitigate the impact of noise

13. A number of measures can be introduced to control the source of, or limit exposure to, noise. Such measures should be proportionate and reasonable and may include one or more of the following:

- (i) **engineering:** reduction of noise at point of generation (eg by using quiet machines and/or quiet methods of working); containment of noise generated (eg by insulating buildings which house machinery and/or providing purpose-built barriers around the site); and protection of surrounding noise-sensitive buildings (eg by improving sound insulation in these buildings and/or screening them by purpose-built barriers);

(ii) **lay-out:** adequate distance between source and noise-sensitive building or area; screening by natural barriers, other buildings, or non-critical rooms in a building;

(iii) **administrative:** limiting operating time of source; restricting activities allowed on the site; specifying an acceptable noise limit.

14. Early consultation with the applicant about the possible use of such measures is desirable and may enable them to be incorporated into the design of the proposal before it is formally submitted for determination. Alternatively it may be appropriate for a local planning authority to ensure that such measures are introduced by imposing conditions.

Conditions

15. The appropriate use of planning conditions can enable many development proposals to proceed where it would otherwise be necessary to refuse permission. General advice on the use of conditions is contained in DOE Circular 1/85. Conditions should only be imposed where they are:

- necessary
- relevant to planning
- relevant to the development to be permitted
- enforceable
- precise
- reasonable in all other respects.

16. Some examples of model conditions are given in Annex 4, but local planning authorities should give careful consideration to the individual circumstances of each application before imposing any conditions. In particular, authorities should not use the opportunity presented by an application for minor development to impose conditions on an existing development, which already enjoys planning permission. In the case of aerodromes, for example, limits on hours of operation and the number and type of aircraft may be applied to new aerodromes, but in the case of existing aerodromes they should only be sought where the proposed development is likely to have a material effect on use. Conditions which set noise limits raise particular issues on which detailed guidance is given in Annex 5.

17. Where it is proposed to grant permission for noise-sensitive development in areas of high ambient noise, planning conditions should be imposed to ensure that the effects of noise are mitigated as far as possible. For example, intervening buildings or structures (such as garages) may be designed to serve as noise barriers. In some cases sound insulation measures may be considered appropriate. (Such measures will mainly apply to windows: additional guidance is given in Annex 6.) However, it should be remembered that the sound level within a residential building is not the only consideration: most residents will also expect a reasonable degree of peaceful enjoyment of their gardens and adjacent amenity areas.

18. There will also be circumstances when it is acceptable - or even desirable in order to meet other planning objectives - to allow noise generating activities on land near or adjoining a noise-sensitive development. In such cases, local planning authorities should consider the use of conditions or planning obligations to safeguard local amenity. Care should be taken to keep the noisiest activities away from the boundary or to provide for measures to reduce the impact of noise. Authorities should also take into account the fact that the background noise level in some parts of suburban and

rural areas is very low, and the introduction of noisy activities into such areas may be especially disruptive.

19. Where an authority's planning objectives cannot be achieved by imposing a planning condition (because, for example, they require the developer to make a financial contribution, or they relate to development, roads or buildings other than those covered by the planning application), it may be appropriate to enter into a planning obligation under section 106 of the Town and Country Planning Act 1990 (as substituted by section 12 of the Planning and Compensation Act 1991). Advice on the use of such obligations is given in DOE Circular 16/91.

Designated areas and the countryside

20. Special consideration is required where noisy development is proposed in or near Sites of Special Scientific Interest (SSSIs). Proposals likely to affect SSSIs designated as internationally important under the EC Habitats or Birds Directives or the Ramsar Convention require extra scrutiny. Further advice will be given in a forthcoming PPG on Nature Conservation. Special consideration should also be given to development which would affect the quiet enjoyment of the National Parks, the Broads, Areas of Outstanding Natural Beauty or Heritage Coasts. The effect of noise on the enjoyment of other areas of landscape, wildlife and historic value should also be taken into account.

21. In some cases, noisy development may have a serious effect on the welfare of livestock on nearby farms. The degree to which different species will be affected will vary, so, when considering applications which could affect livestock, local planning authorities may wish to consult the Ministry of Agriculture, Fisheries and Food (Land Use Planning Unit).

Environmental Assessment

22. EC Directive 85/337 requires environmental assessment (EA) for certain types of project to be carried out before planning permission is granted. It has been implemented for projects that require planning permission by the Town and Country Planning (Assessment of Environmental Effects) Regulations 1988. For a limited number of projects listed in Schedule 1 to the Regulations, such as major aerodromes, EA is required in every case; for a wider range of projects listed in Schedule 2 to the Regulations, including local roads, other new aerodromes, industrial estate development, disposal of non-toxic waste and mineral extraction, EA is required if the proposal is likely to have significant environmental effects. Where EA is required, the likely effects of noise will be one of the considerations to be dealt with in the environmental statement prepared by the developer and submitted to the local planning authority with the planning application.

Other statutory controls

23. Additional statutory powers to control noise exist outside the planning system. The granting of planning permission does not remove the need to comply with these controls. The major legislative instruments are:

- (i)** Part III of the Environmental Protection Act 1990, as amended by the Noise and Statutory Nuisance Act 1993, which requires local authorities to serve abatement notices where the noise emitted from any premises, or from vehicles, machinery and equipment in the street, constitutes a statutory nuisance; and
- (ii)** Part III of the Control of Pollution Act 1974, which gives local authorities powers to control noise from construction sites, and also introduced the concept of the Noise Abatement Zone (NAZ).

Implementation of this legislation usually falls to the Environmental Health Department of a local authority.

24. Other means of tackling noise include:

- (i)** the Noise at Work Regulations 1989, which are enforced by inspectors of the Health and Safety Executive (HSE);
- (ii)** the Building Regulations 1991, which impose standards for sound insulation between dwellings (see paragraph 25); and
- (iii)** the Civil Aviation Act 1982, which provides for noise mitigation measures at designated aerodromes.

Codes of Practice giving guidance on how to reduce or minimise noise from various activities have been produced, some of which have been approved as statutory codes under the Control of Pollution Act 1974. Certain noise producing appliances are subject to product standard controls.

25. More information on other noise control regimes is given in Annex 7. The bodies and authorities responsible for offering advice or for implementing these controls will often have expertise or experience which planning authorities may find helpful in assessing proposals for development. For example, in the case of proposals for noisy indoor or outdoor sports developments, authorities should liaise with the regional office of the Sports Council and with the governing body for the sport, who may be able to advise on ways of minimising the disturbance. In the case of landfill waste disposal sites, much of the advice contained in MPG11 "The Control of Noise at Surface Mineral Workings" will be relevant, but waste regulation authorities should in any

case be consulted at an early stage to discuss the need for specific noise controls. Where development is proposed near an aerodrome, liaison with the aerodrome management will be essential. Annexes 3 and 7 give further guidance on some of these points.

26. In some cases it will be particularly important for local planning authorities to liaise with the relevant body because some part of the activity for which planning permission has been sought may be subject to another more appropriate means of control or licensing condition. The planning permission should not seek to duplicate such controls or conditions. For example, the Government considers that the Building Regulations are the most appropriate means of control for sound insulation between dwellings and local planning authorities should not therefore use planning conditions to control sound insulation in such cases.

Cancellation of advice

27. The following advice is hereby cancelled insofar as it relates to England:

- DOE Circular 10/73
- model planning conditions 5 - 10 in Appendix A to DOE Circular 1/85.

Glossary

Below are explanations of terms as they are used in the PPG; they are not definitions.

Aerodrome: any area of land, water, or space on the roof of a building, which is commonly used to provide facilities for the landing and departure of aircraft - including types capable of descending or climbing vertically. The term is generic and embraces other terms such as airport, airfield and heliport. For a formal definition see the Civil Aviation Act 1982.

Decibel (dB): a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB(A): decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

Hertz (Hz): unit of frequency, equal to one cycle per second. Frequency is related to the pitch of a sound.

$L_{A10,T}$: the A weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise such as that from road traffic. $L_{A10,18h}$ is the arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06.00 to 24.00.

$L_{A90,T}$: the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1990 it is used to define background noise level.

$L_{Aeq,T}$: the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is written as L_{eq} in connection with aircraft noise.

L_{Amax} : the highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated.

Noise and Number Index (NNI): A composite measure of exposure to aircraft noise that takes into account the average peak noise level and the number of aircraft in a specific period. Now generally superseded by L_{eq} .

Noise index: a measure of noise over a period of time which correlates well with average subjective response.

Rating level: the noise level of an industrial noise source which includes an adjustment for the character of the noise. Used in BS 4142: 1990.

R_w : single number rating used to describe the sound insulation of building elements (also see Annex 6). It is defined in BS 5821: 1984.

Annex 1

Noise Exposure Categories For Dwellings

1. When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) the proposed site falls, taking account of both day and night-time noise levels. Local planning authorities should then have regard to the advice in the appropriate NEC, as below:

NEC	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

2. A recommended range of noise levels is given below for each of the NECs for dwellings exposed to noise from road, rail, air, and "mixed sources". Annex 2 provides a detailed explanation of how the boundaries of each of the NECs have been derived. Paragraph 9 of the main text explains that in some cases local planning authorities may be able to justify a range of NECs of up to 3 dB(A) above or below those recommended.

3. The NEC noise levels should not be used for assessing the impact of industrial noise on proposed residential development because the nature of this type of noise, and local circumstances, may necessitate individual assessment and because there is insufficient information on people's response to industrial noise to allow detailed guidance to be given. However, at a mixed noise site where industrial noise is present but not dominant, its contribution should be included in the noise level used to establish the appropriate NEC.

4. The NEC procedure is only applicable where consideration is being given to introducing residential development into an area with an existing noise source, rather than the reverse situation where new noise sources are to be introduced into an existing residential area. This is because the planning system can be used to impose conditions to protect incoming residential development from an existing noise source but, in general, developers are under no statutory obligation to offer noise protection measures to existing dwellings which will be affected by a proposed new noise source. Moreover, there would be no obligation on individuals with an interest in each dwelling affected to take up such an offer, and therefore no guarantee that all necessary noise protection measures would be put in place.

5. Thus, where new industrial or commercial development is proposed near a residential area the effect of the new noise source on the surrounding area will have to be assessed in accordance with existing procedures. In many cases where a new source of noise is to be introduced by a project that

requires environmental assessment (EA) (see paragraph 22), the effect of noise will be considered in this context; but it must be accepted that in these circumstances the options to control noise are likely to be more limited than where residential development is proposed in an area with an existing noise source. It must also be borne in mind that when dealing with new roads and aerodromes, schemes may exist to provide insulation in specified circumstances.

Other noise-sensitive development

6. Developments such as offices, hospitals and schools will contain buildings and activities which are noise-sensitive. But these developments are likely to occupy sizeable sites and to contain a proportion of buildings and activities which are less noise-sensitive. The NEC principle cannot therefore be sensibly applied to such developments and it will be more appropriate to refer to specific guidance on internal noise standards in respect of each activity. General information can be found in BS 8233 1987. Information about guidance for health and hospital buildings is available from NHS Estates, an Executive Agency of the Department of Health, 1 Trevelyan Square, Boar Lane, Leeds LS1 6AE. The Department for Education publishes guidance for schools (see Annex 8).

Noise index and measurement positions

7. Traditionally, different indices have been used to describe noise from different sources, and limits have been set over different time periods. This has caused confusion, and this PPG follows the move towards consistency advocated in BS 7445: 1991 by expressing all noises in terms of $L_{Aeq,T}$. The recommended time periods are 07.00-23.00 and 23.00-07.00.

8. Values in the table below refer to noise levels measured on an open site at the position of the proposed dwellings, well away from any existing buildings, and 1.2m to 1.5m above the ground. The arithmetic average of recorded readings should be rounded up. Where that average falls on the boundary between NECs B and C it will be for the local planning authority to determine which is the more appropriate NEC for the proposal.

9. Levels of noise from road and rail traffic are often specified at one metre from a facade, and these facade levels should be assumed to be 3 dB(A) higher than levels measured away from any buildings, unless a more accurate figure is available. For road traffic noise in NECs C and D, $L_{Aeq,16h} \simeq L_{A10,18h} - 2$ dB.

10. For aircraft, the noise levels refer to aircraft noise exposure contour values which are specified at 1.2m above the ground and published at 3 dB(A) intervals (each 3 dB(A) increment represents a doubling of noise energy). Because most aircraft noise originates from above, contours include the effects of ground reflection (see Note 2 below).

Recommended Noise Exposure Categories For New Dwellings Near Existing Noise Sources

Noise Levels ⁰ Corresponding To The Noise Exposure				
Categories For New Dwellings $L_{Aeq,T}$ dB				
	Noise Exposure Category			
Noise Source	A	B	C	D

road traffic				
07.00 - 23.00	<55	55 - 63	63 - 72	>72
23.00 - 07.00 ¹	<45	45 - 57	57 - 66	>66
rail traffic				
07.00 - 23.00	<55	55 - 66	66 - 74	>74
23.00 - 07.00 ¹	<45	45 - 59	59 - 66	>66
air traffic ²				
07.00 - 23.00	<57	57 - 66	66 - 72	>72
23.00 - 07.00 ¹	<48	48 - 57	57 - 66	>66
mixed sources ³				
07.00 - 23.00	<55	55 - 63	63 - 72	>72
23.00 - 07.00 ¹	<45	45 - 57	57 - 66	>66

Notes

⁰**Noise levels:** the noise level(s) ($L_{Aeq,T}$) used when deciding the NEC of a site should be representative of typical conditions.

¹**Night-time noise levels (23.00 - 07.00):** sites where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).

²**Aircraft noise:** daytime values accord with the contour values adopted by the Department for Transport which relate to levels measured 1.2m above open ground. For the same amount of noise energy, contour values can be up to 2 dB(A) higher than those of other sources because of ground reflection effects.

³**Mixed sources:** this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the table. The "mixed source" NECs should only be used where no individual noise source is dominant.

To check if any individual noise source is dominant (for the purposes of this assessment) the noise level from the individual sources should be determined and then combined by decibel addition (remembering first to subtract 2 dB (A) from any aircraft noise contour values). If the level of any one source then lies within 2 dB(A) of the calculated combined value, that source should be taken as the dominant one and the site assessed against the appropriate NEC for that source, rather than using the "mixed source" NECs. If the dominant source is industrial noise see paragraph 19 of Annex 3.

If the contribution of the individual noise sources to the overall noise level cannot be determined by measurement and/or calculation, then the overall measured level should be used and the site assessed against the NECs for "mixed sources".

Annex 2

Noise Exposure Categories: Explanation Of Noise Levels

1. The following is an explanation of how the boundaries of each of the noise exposure categories (NECs) in the table in Annex 1 have been calculated or derived. Wherever possible figures have been based on research findings or figures contained in statutory regulations. However, the NEC table attempts to give guidance across a broad spectrum of situations and not all of these are covered by existing research work or regulations. In these instances assessments and interpolations have had to be made and these are also explained below.
2. The explanations under each heading make specific reference to each of the transport modes: road, rail, and air. However, separate explanations of "mixed sources" are not given. The "mixed source" values are based on the lowest numerical values of the single source limits in the table.
3. The values given in the NEC table are free-field levels, together with an addition of 2 dB(A) for ground reflection of air traffic noise. Details of correction factors to convert between facade levels and free-field where appropriate are given below. For night-time levels typical insulation values for window installations that are likely to be used in each NEC have been assumed. Because the insulation performance of different window installations is likely to vary, these values are nominal.

Noise levels at the boundary of NEC A and NEC B

Daytime

4. There is no recent, major, U.K.-based research from which to take figures for road or rail traffic. The level at the boundary of NEC A and NEC B is therefore based on guidance provided by the World Health Organisation¹ that "general daytime outdoor noise levels of less than 55 dB (A) L_{eq} are desirable to prevent any significant community annoyance". The figure of 55 dB(A) has been taken to be free-field and therefore no adjustments have been necessary for road and rail traffic noise levels before inserting them in the table. In respect of air traffic noise a considerable amount of research has been carried out². 57 dB(A) L_{eq} (previously 35 NNI) relates to the onset of annoyance as established by noise measurements and social surveys.

Night-Time

5. As for daytime, there is no recent, major, U.K.-based research from which to take figures for road or rail traffic. There has been research on the effects of aircraft noise, most recently on sleep disturbance³, which looks at noise levels at which people are awoken from sleep. The nighttime noise level at the boundary of NEC A and NEC B is based on the WHO guideline previously referred to which states that for nighttime: "based on limited data available, a level of less than 35

¹ Environmental Health Criteria 12 - Noise. World Health Organisation, 1980.

² Directorate of Operational Research and Analysis "The Noise and Number Index" DORA Communication 7907, Second Edition, September 1981
Brooker, P et al "United Kingdom Aircraft Noise Index Study: Final Report" Civil Aviation Authority DR Report 8402, January 1985
Critchley, JB and Ollerhead, JB "The Use of L_{eq} as an Aircraft Noise Index" Civil Aviation Authority DORA Report 9023, September 1990.

³ Report of a field study of aircraft noise and sleep disturbance. Department for Transport, 1992.

dB(A) is recommended to preserve the restorative process of sleep" and this is considered more relevant when seeking to achieve the best practicable conditions for rest and sleep.

6. For a site to fall within NEC A noise should not be a determining factor when granting planning permission. It follows that residents may reasonably expect to sleep with their windows open sufficiently to provide adequate ventilation. No guidance is given in the WHO document on the allowance to be made for the sound insulation qualities of a partially open window. This is usually taken to be 10 - 15 dB(A)⁴ and for the purposes of the NEC table a reduction of 13 dB(A) from the facade level has been assumed. This would give a recommended maximum figure of 48 dB(A) at the facade. However, as the NEC figures are free-field a correction of -3 dB(A) is necessary giving 45 dB(A) in the table for road and rail noise. For air traffic noise 2 dB(A) has been added to 45 dB(A) to allow for ground reflection, making 47 dB(A). The level in the table of 48 dB(A) is the nearest aircraft dB(A) L_{eq} contour value.

Noise levels at the boundary of NEC B and NEC C

Daytime

7. The daytime noise levels for all three transport modes at the boundary of NEC B and NEC C are based on the levels that trigger official grant schemes. For road traffic noise the trigger level is 68 dB $L_{A10,18h}$ ⁵ at a facade. This has been converted to an $L_{Aeq,18h}$ level by subtracting 3 dB, and to an $L_{Aeq,16h}$ value by adding 1 dB, giving 66 dB $L_{Aeq,16h}$ at a facade. Finally, this figure has been converted to a free-field level by subtracting 3 dB, thus arriving at 63 dB $L_{Aeq,16h}$ in the table.

8. For railway noise the proposed trigger level⁶ is 68 dB $L_{Aeq,18h}$ at a facade. This has been converted to 66 dB $L_{Aeq,16h}$ free-field.

9. For air traffic noise, 66 dB(A) $L_{Aeq,16h}$, previously 50 NNI, was the daytime criterion for noise insulation schemes at Heathrow, Gatwick and Stansted.

Night-time

10. The night-time level at the boundary of NEC B and NEC C for road traffic is, like that at the boundary of NEC A and NEC A, based on the WHO figure of 35 dB(A). Because noise should be taken into account when determining planning applications in NEC B, it has been assumed that the minimum amelioration measure available to an occupant at night will be to close bedroom windows. Single glazed windows provide insulation of about 25 dB(A)⁷. Therefore, in order to achieve 35 dB(A) inside a bedroom, the facade level should not exceed 60 dB(A). This facade level requires a further 3 dB(A) adjustment to convert it to the free-field level of 57 dB(A) for road traffic at the boundary of NEC B and NEC C. For rail traffic, the level proposed to trigger the official grant scheme has been adopted. This level is 63 dB $L_{Aeq,6h}$ and it has been converted to 59

⁴ Transportation Noise Reference Book: Edited by Paul Nelson, published by Butterworths, 1987.

⁵ Noise Insulation Regulations, 1975: SI 1975:1763

⁶ Draft Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1993, issued for consultation October 1993.

⁷ Transportation Noise Reference Book: Edited by Paul Nelson, published by Butterworths, 1987 and Sound Control For Homes, published by the Building Research Establishment and CIRIA, 1993 [BRE report 238, CIRIA report 127].

dB $L_{Aeq,8h}$ free-field. For air traffic, the level proposed to trigger the recent grant scheme at Stansted airport⁸ has been adopted. This level is the 57 dB(A) L_{eq} contour value.

Noise levels at the boundary of NEC C and NEC D

Daytime

11. The noise level at the boundary of NEC C and NEC D for road traffic is based on a Building Research Establishment (BRE) survey⁹ which has shown that the insulation package supplied under the Noise Insulation Regulations is inadequate for road traffic noise levels of 78 dB $L_{A10,18h}$ and above at a facade. This figure is equivalent to a free-field level of 75 dB $L_{A10,18h}$; which in turn is equivalent to 73 dB $L_{Aeq,16h}$. The 73 dB $L_{Aeq,16h}$ has been reduced by 1 dB to 72 dB $L_{Aeq,16h}$ in the table at the boundary of NEC C and NEC D, which is the maximum external level that the standard noise insulation package will reduce to an acceptable internal level.

12. For rail traffic noise no reliable data are available on which to base the level at the boundary of NEC C and NEC D. However, there is some evidence¹⁰ that noise from rail traffic causes less disturbance than noise from road traffic at the same level. Therefore, the level at the boundary of NEC C and NEC D has been set 2 dB higher than the free-field level for road traffic noise.

13. For air traffic noise the value put forward in Circular 10/73, which is now well established, has been used. This is 60 NNI or 72 dB $L_{Aeq,16h}$, including a 2 dB allowance for ground reflection.

Night-time

14. The night-time levels at the boundary of NEC C and NEC D are, like those at the boundary of NEC A and NEC B, based on the WHO figure of 35 dB(A). The standard noise insulation package provides insulation of about 35 dB(A). Therefore at a facade level of 70 dB(A) or above the internal limit for a bedroom of 35 dB(A) may not be achieved. The level of 70 dB(A) has therefore been reduced by 1 dB(A) and a correction factor of 3 dB(A) applied to derive the free-field level of 66 dB(A) in the table at the boundary of NEC C and NEC D for road and rail noise. For air traffic noise the level of 66 dB(A) is the nearest aircraft dB(A) L_{eq} contour value to provide equivalent protection.

⁸ Department for Transport Consultation Paper: Proposed Stansted Noise Insulation Grants Scheme, September 1990.

⁹ Utley W. et al "The effectiveness and acceptability of measures for insulating dwellings against traffic noise" (Journal of Sound and Vibration (1986) Vol 109(1), pages 1-18).

¹⁰ "Railway Noise and the Insulation of Dwellings" Mitchell Committee Report, published February 1991.

Annex 3

Detailed Guidance On The Assessment Of Noise From Different Sources

Noise from road traffic

1. For established roads it will normally be sufficient to base assessments on the current measured noise level (paragraph 8 of Annex 1 refers). When considering potential new development near major new or recently improved roads, local planning authorities should ascertain forecast noise levels (eg over the next 15 years) with the assistance of the local highway authority. In some cases highway authorities will have prepared predictions of the effects of traffic noise for the purposes of the Noise Insulation Regulations 1975 and the Noise Insulation Amendment Regulations 1988. Otherwise highway authorities should be consulted on the traffic flow data needed for the preparation of predictions in accordance with "Calculation of Road Traffic Noise" (Department for Transport (DOT) and Welsh Office, 1988). Use by highway authorities of traffic management schemes and powers in the Road Traffic Regulation Act 1984 may also be appropriate. Research undertaken by the Transport Research Laboratory for DOT indicates that structural damage of buildings through vibration from road traffic is unlikely to occur. Advice is available in "Design Manual for Roads and Bridges" Vol 11, Section 3, Part 7 - "Traffic Noise and Vibration". But if vibration remains a concern, advice on acceptable levels can be found in BS 6472:1992, and advice on levels that may result in damage to structures in BRE Digest 353 "Damage to structures from ground-borne vibration".

Noise from railways

2. Railway noise emanates from a variety of sources. For noise from operational railway lines the noise exposure categories in Annex 1 will be appropriate; local noise from station activities, freight distribution depots, and marshalling yards should be treated in the same way as noise from industrial and commercial sources. Local planning authorities are advised to ask the developer to provide details of the present levels of noise; and to consult the railway operator to find out if there are proposals for significant operational changes.

3. In considering the long distance traffic effects of developments which would result in the use of rail transport (for example the carrying of aggregates from extraction sites, or goods from freight terminals), it will be appropriate to take into account the railway noise aspect.

4. The likelihood of significant ground-borne vibration will depend on the nature of the ground and the types of train. The possibility of vibration and re-radiated noise caused by trains running in tunnels should not be overlooked. Advice on acceptable levels of vibration can be found in BS 6472:1992.

5. In October 1993 the DOT published draft noise insulation regulations for new railway lines, with the aim of providing equity with The Noise Insulation Regulations 1975 (as amended) which apply to new roads. Draft technical guidance, in a form similar to "Calculation of Road Traffic Noise" (DOT and Welsh Office, 1988), was made available at the same time.

Noise from aircraft

6. For major aerodromes, NNI contours have been produced for many years to aid development control. In September 1990 the Department for Transport adopted a new index and now expresses noise exposure contours in terms of $L_{eq}dB(A)$ over the period 07.00-23.00. This index is equivalent to $L_{Aeq,T}$ used for other types of noise. General advice on this index can be obtained from the Department for Transport, CA4, 2 Marsham Street, London SW 1 P 3EB (Tel: 071 276 6269). Technical advice on the index and on production of noise contours can be obtained from the Department of Safety, Environment and Engineering, Civil Aviation Authority, 45-59 Kingsway, Holborn, London WC2B 6TE (Tel: 071 379 7311).

7. Using forecast contours, it should be possible to determine approximately which areas are likely to fall within the different noise exposure categories. For small aerodromes local planning authorities should not rely solely on L_{eq} where this is based on less than about 30 movements a day. Local planning authorities should also be aware that in some circumstances the public perceive general aircraft noise levels as more disturbing than similar levels around major airports.

8. Recommended noise exposure categories for new dwellings exposed to aircraft noise are given in Annex 1, but $60 L_{eq} dB(A)$ should be regarded as a desirable upper limit for major new noise sensitive development. Where replacement schools, clinics, and other community facilities are needed to serve the existing population in high noise areas, expert consideration of sound insulation measures will be necessary. When determining applications to replace schools and build new ones in such areas, local planning authorities should have regard to the likely pattern of aircraft movements at the aerodrome in question which could cause noise exposure during normal school hours/days to be significantly higher or lower than shown in average noise contours.

9. Where land is, or is likely to become, subject to significant levels of aircraft noise, local planning authorities should determine approximately which areas are likely to fall within the different noise exposure categories. In order to do this, they will need to seek the co-operation of the aerodrome management to arrive at the most appropriate longer-term forecasts of air traffic (and its effect on the noise contours). The objective will be to achieve a clear and stable' pattern of constraints against which development control policies can be formulated and incorporated in local plans and Part II UDPs.

10. Beyond the extremities of the published contours, noise will still be audible near the arrival and departure routes. The former are generally predetermined by the orientation of the runway and safety considerations; however, departure routes can usually be designed to avoid, as far as possible, noise in built-up areas. The use of these routes may change over time because of changes in aircraft mix and operations. The departure routes often comprise a wide corridor of tracks. Local planning authorities should consult National Air Traffic Services where appropriate.

11. Information concerning noise from Heathrow, Gatwick and Stansted airports is available from the Department for Transport (CA4, 2 Marsham Street, London SW1P 3EB, Tel: 071 276 5323) and for most other aerodromes from the appropriate aerodrome management. Where noise contours expressed in $L_{eq}dB(A)$ are not available, local planning authorities should approach the aerodrome management to secure early compilation of contours.

12. If the construction or development of an aerodrome with a basic runway length of 2,100 metres or more is proposed, it will fall within Schedule 1 to the Town and Country Planning (Assessment of Environmental Effects) Regulations 1988 (see paragraph 22 of this PPG), and environmental assessment (EA) will be mandatory. If the construction of an aerodrome is proposed which does not fall within Schedule 1 to the Regulations, EA will be required if the development is likely to have

significant environmental effects. Where a major aerodrome is the subject of a proposal which will affect its capacity, there will be a need to prepare or revise forecast noise contours to estimate the resulting noise climate.

Military aerodromes

13. The noise exposure categories should be used for assessing proposals for new developments near military aerodromes. Because many of these are in rural locations, however, there will often be the flexibility to ensure that new residential developments are located within noise exposure category A, while still taking full account of other planning constraints. This option will not apply to proposals for residential development involving extension, conversion, or change of use of existing buildings. When determining such applications local planning authorities should take account of the differences between civil and military operations. Military jet aircraft can generate very high noise levels, particularly during take off, and occasionally the effectiveness of noise abatement flight procedures normally adopted may be limited by operational requirements. Changes in aircraft type and number of movements may also occur over a short period, resulting in unpredictable changes in noise levels. However, military flying is usually concentrated into weekday working hours when the public sensitivity to noise is at its lowest.

14. For aerodromes where a Ministry of Defence (MOD) noise insulation grant scheme has been introduced, authorities will already hold an MOD map showing $L_{Aeq,T}$ contours. These are based on a 12 hour period, not a 16 hour period as is used at designated civil aerodromes. Other information and advice may be obtained from the Ministry of Defence, DLS, Leatherhead Road, Chessington, Surrey, KT9 2LU (Tel, 081 397 5266 or 081 391 3459). Liaison with the aerodrome commander and the MOD Land Agent may also be helpful.

Helicopters and heliports

15. When determining a planning application for a heliport the predicted noise should not be assessed in isolation - account should be taken of local circumstances including the existing level of noise disturbance in the area surrounding the site and factors such as whether the area is already exposed to noise from fixed wing aircraft. Local planning authorities will need to consider the effect of further disturbance resulting from the proposal.

16. Helicopter noise has different characteristics from that from fixed wing aircraft, and is often regarded as more intrusive or more annoying by the general public. The noise exposure categories should be applied with caution. Further research on this subject has been commissioned by the Department for Transport and should be published in 1994.

17. Helicopter routes may be established over cities and near aerodromes, although often their use will not be mandatory. Planning applications for helicopter landing/take-off facilities should be accompanied by information about the proposed take-off/landing flight paths and air traffic routes where appropriate. Preferably, these paths should have been discussed and agreed in principal with National Air Traffic Services (NATS) beforehand. Where such information does not accompany the application, but is considered necessary, the local planning authority should request it and suggest that the applicant has discussions with NATS.

18. Increased use of helicopters has led to movements from the gardens of private houses and from commercial premises, such as factories, offices and hotels. For safety reasons, helicopters may only operate from elevated sites if given special approval by the Civil Aviation Authority. All these movements can cause local annoyance. However, they may often be incidental or ancillary to the principal use of the land and as such do not generally require a separate planning permission. The

construction of hardstanding, installation of landing lights etc may be regarded as development requiring planning consent.

Noise from industrial and commercial developments

19. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that: "A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance." Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (eg day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987, and guidance on the control of noise from surface mineral workings can be found in MPG 11.

20. Commercial developments such as fast food restaurants, discos, night clubs and public houses pose particular difficulties, not least because associated activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the attendant problems of noise that may be made by customers in the vicinity. The disturbance that can be caused by traffic and associated car parking should not be underestimated.

Noise from construction sites

21. Detailed guidance on assessing noise from construction sites can be found in BS 5228, parts 1-4. In particular, Part 1: 1984, "Code of practice for basic information and procedures for noise control" will be useful because as well as giving general advice it describes a method for predicting noise from construction sites.

Noise from recreational and sporting activities

22. For these activities (which include open air pop concerts), the local planning authority will have to take account of how frequently the noise will be generated and how disturbing it will be, and balance the enjoyment of the participants against nuisance to other people. Partially open buildings such as stadia may not be in frequent use. Depending on local circumstances and public opinion, local planning authorities may consider it reasonable to permit higher noise emission levels than they would from industrial development, subject to a limit on the hours of use, and the control of noise emissions (including public address systems) during unsocial hours. A number of sports activities are the subject of Codes of Practice, and further details of these can be found in annex 7. Some noisy activities enjoy permitted development rights granted by Part 4 of Schedule 2 to the Town and Country Planning General Development Order 1988, and so may not require specific planning permission provided that they only occur on a temporary basis. However, this permission may be withdrawn by making a direction under Article 4 of the Order. Further details are contained in annex 7. Additional advice on sport and noise can be found in PPG17 "Sport and Recreation".

Noise from landfill waste disposal sites

23. Conditions attached to waste disposal licences generally set limits on the amount of waste, frequency of deliveries and hours of operation, and prescribe screening requirements. These will have indirect effects on the amount of noise generated, but site licence conditions can also relate specifically to noise control in the interests of protecting local amenity. This will be particularly relevant when dealing with sites where the operator is working with the benefit of an Established Use Certificate (as defined in section 36(2) of the Environmental Protection Act 1990) or a planning permission not subject to a noise condition. Local planning authorities and waste regulation authorities should consult closely at an early stage when considering the need for specific noise controls to be imposed by appropriate conditions in any planning permission or in the subsequent site licence.

24. The main sources of noise will be from vehicular movement, tipping operations, and site plant. Appropriate planning or licensing conditions might therefore relate to hours of working; the number and/or capacity of vehicles using the site and their points of ingress and egress; and the provision of acoustic screening. Useful information on predicting the noise will be found in BS 5228: Part 1: 1984. In addition, general guidance can be found in paragraph 9 of MPG 11.

Annex 4

Examples Of Planning

Conditions

Authorities should follow the guidance given in Department of the Environment Circular 1/85 "The Use of Conditions in Planning Permissions". Conditions should be used selectively. By virtue of Article 25 of the Town and Country Planning General Development Order 1988, reasons must be given for the imposition of every condition, and local planning authorities must be in a position to give their full reasons. The examples below cannot cater for all situations. Planning departments may need expert advice, usually from environmental health departments, when considering the imposition of, and monitoring compliance with, some of these conditions.

Comments in brackets () give additional information and do not form part of the planning condition.

Conditions to minimise the effect of noise on new noise-sensitive development

1. Construction work shall not begin until a scheme for protecting the proposed [noise-sensitive development] from noise from the has been submitted to and approved by the local planning authority; all works which form part of the scheme shall be completed before [any part of] the [noise-sensitive development] is occupied.

(Authorities should give applicants guidance on the maximum noise levels to be permitted within or around the noise-sensitive development so as to provide precise guidelines for the scheme to be submitted.)

2. The building envelope of plot number(s) shall be constructed so as to provide sound attenuation against external noise, not less thandB(A), with windows shut and other means of ventilation provided.

(This condition is appropriate where, for example, individual dwellings need to be protected against external noise. The term "building envelope" is intended to include the external windows, doors, walls, and roof, through which noise could enter the building. Other methods of specifying sound insulation are given in BS 5821: Part 3: 1984, but this is likely to be replaced by a European Standard.)

Conditions restricting use of an aerodrome or part of an aerodrome

3. The total number of movements shall not exceed [] per [period of time], except in an emergency.

4. Movements shall take place only between [hours of day] on [days of week], except in an emergency.

5. The [development] hereby permitted shall not be used by any aircraft with an authorised weight exceeding [], except in an emergency.

6. The total number of movements by aircraft exceeding [] maximum all-up weight shall not exceed [] in any [period of time].

(The maximum all-up weight of an aircraft is its weight when fully loaded.)

7. The runways shall not be used by [class of aircraft], except in an emergency.

(With definition of "class" if necessary.)

8. The total number of "touch and go"* movements shall not exceed [] per [period of time].

9. "Touch and go"* movements shall take place only between [hours of day] on [days of week].

(* "touch and go" refers to a landing immediately followed by a take off, as in testing and training flights.)

10. Auxiliary power units shall not be used between [hours of day] on [days of week].

("Auxiliary power unit" refers to a small engine used to power the aircraft's primary systems when its engines are not running.)

Condition restricting the use of industrial or commercial buildings**

11. The building shall be used for and for no other purpose (including any other purpose in Class of the Schedule to the Town and Country Planning (Use Classes) Order 1987 or in any provision equivalent to that Class in any other statutory instrument revoking and re-enacting that Order).

Conditions restricting noise emitted from industrial or commercial buildings and sites**

12. Before the use commences, the [specified building(s)] shall be insulated in accordance with a scheme agreed with the local planning authority.

(Authorities using this condition should advise the applicant on the degree of sound insulation considered necessary to achieve an acceptable external noise level.)

13. Before the development hereby permitted commences a scheme shall be agreed with the local planning authority which specifies the provisions to be made for the control of noise emanating from the site.

(These provisions could include physical and/or administrative measures.)

14. [Specified activities] shall not take place anywhere on the site except within [specified building(s)].

(The condition should describe precisely the activities to be controlled as well as the particular building(s) in which they are permitted to take place.)

15. The building shall be [constructed/adapted] so as to provide sound insulation against internally generated noise of not less than dB(A), with windows shut and other means of ventilation provided.

(Other methods of specifying sound insulation are given in BS 5821: Part 3: 1984, but this is likely to be replaced by a European Standard.)

16. The level of noise emitted from the site shall not exceed [A] dB between [T] and [T] Monday to Friday and [A] dB at any other time, as measured on the [specified boundary/boundaries] of the site at [location(s) of monitoring point(s)].

Specify: A - noise level expressed as $L_{Aeq,T}$ over a time period X (eg 1 hour)

T - time of day

17. The rating level of the noise emitted from the site shall [not exceed] [be lower than] the existing background noise level [determined to be [A] dB] by [more than] [at least] [B] dB between [T] and [T] Monday to Friday and [B] dB at any other time. The noise levels shall be determined at [the nearest noise-sensitive premises] [specified locations)]. The measurements and assessment shall be made according to BS 4142:1990.

Specify: A - background noise level expressed as $L_{A90,T}$ over time period T

B - noise level difference between rating level and background level

T - time of day

18. No [specified machinery] shall be operated on the premises before [time in the morning] on weekdays and [time in the morning] on Saturdays nor after [time in the evening] on weekdays and [time in the evening] on Saturdays, nor at any time on Sundays, Bank Holidays or Public Holidays.

19. Before [any] [specified plant and/or machinery] is used on the premises, it shall be [enclosed with sound insulating material] [and] [mounted in a way which will minimise transmission of structure borne sound] in accordance with a scheme to be agreed with the local planning authority.

(Advice should be appended to the permission indicating the sound insulation required, or the maximum permitted noise level at a specified monitoring point.)

20. Notwithstanding the provisions of Article 3 of the Town and Country Planning General Development Order 1988, no further plant or machinery shall be erected on the site under or in accordance with Part 8 of Schedule 2 to that Order without planning permission from the local planning authority.

****Note:** For industrial and commercial sites, local authorities may wish to consider imposing two types of planning condition, as detailed below. The first type (conditions 16 and 17) set a noise limit over a given period at a specified point - such as outside the nearest noise-sensitive building or at the site boundary. The second type (conditions 11-15 and 18-20) specify the type of activity that may take place, any restrictions necessary on the hours of operation, and details of the construction and layout of the development.

The first type of condition allows the developer to achieve the required noise level in whatever way he considers most cost effective - so it may be suitable for speculative developments. A further advantage is that it controls noise in the long term since any future changes within the development must be made in such a way that the limits are not exceeded. However, a disadvantage of this type of condition is that in order to ensure compliance, noise emissions must be monitored. Whilst monitoring may be costly and time-consuming this should not be regarded as sufficient reason for not using noise conditions where they are appropriate.

Compliance with the second type of condition is easier to check and they may prove more effective against certain noise problems. For example, conditions on the location of the access to the development may help to solve the problem of noise in neighbouring residential areas that arises from traffic (particularly heavy vehicles) generated by the development. But control of activity, construction and layout may prove less effective than noise limits in controlling noise resulting from future changes within the development. In practice, therefore, a combination of both types of condition may prove advantageous. This could entail the developer being given, at an early stage, target noise limits for use in drawing up a scheme of building and operation for the development. If a local planning authority is content that the proposals would satisfy these noise limits, the scheme could be incorporated into a planning condition.

Annex 5

Specifying Noise Limits

If a local planning authority wishes to impose a planning condition which will specify an acceptable noise limit from a new source, the following points should be considered.

1. Type of limit

Depending on circumstances, it may be appropriate to set either:

- (a) an absolute limit based on the average level of noise which should not be exceeded in a specified time period;
- (b) a relative limit based on the permitted increase in noise level with respect to the background level. This is the approach used in BS 4142:1990.

Generally, relative limits are not appropriate where the permitted increase in noise over background is substantial - eg 15 dB or more. Because background noise varies during the day, the background noise level determined should be representative of a typical quiet period during the working day.

Either type of limit may be a single value over the relevant period, or different values for, say, day and night. It may be appropriate to set an evening value as well where the noise source lends itself to fine control.

A noise limit which is close to the background level will be difficult to monitor and the advice given in BS 4142 should be followed. This is particularly important at quiet sites where the $L_{Aeq,T}$ may be 10 dB or more above the $L_{A90,T}$ - even when the noise source is not operating.

The idea of setting an additional overriding maximum level is often attractive, but may be hard to enforce because with unattended monitoring stations it is difficult to exclude extraneous noises (which will increase the measured level). There may also be the administrative difficulty of dealing with occasional transient high noise levels from the site.

Where the noise will only be produced inside buildings and the maximum frequency spectrum levels are known, it may be appropriate to set a standard for the sound insulation of a building envelope rather than a noise limit at an external monitoring point.

2. Noise index

Because noises vary over time and have different characteristics many indices have been developed to describe noise levels. The equivalent continuous noise level over a time period T ($L_{Aeq,T}$) has emerged as the best general purpose index for environmental noise. For road traffic noise $L_{A10,18h}$ is still widely used; and to describe background noise $L_{A90,T}$ is appropriate. To describe the sound insulation of a component of a building envelope (eg a window) R_w (BS 5821: Part 3: 1984) is appropriate. It is more difficult to specify the insulation of the whole building envelope because the value depends on different insulation values for the various building elements such as windows, walls and roof structure, as well as the type of noise source and its location.

These indices are explained in the Glossary. Additional information may be found in BS 7445: 1991.

3. Monitoring point(s)

Normally the noise limit will be chosen to protect the nearest noise-sensitive premises and the best position for the monitoring point(s) will often be outside the sensitive premises. However, this does not mean that the monitoring point must always be close to the premises. Normally noise limits refer only to noise from the source under consideration and not to the total measured value which may include, for example, traffic noise. In situations where extraneous noise makes monitoring difficult it may be easier to monitor a suitably adjusted level at the boundary of the site instead of outside the premises to be protected. This approach requires that the noise level at the boundary monitoring point is a reliable indicator of the level at the building to be protected and this may not be the case if the noise source is mobile. Monitoring points should be accessible to all parties concerned.

4. Meteorological conditions

The noise level measured at a monitoring point will be affected by wind speed and direction, and temperature gradients, particularly when the monitoring point is remote (>30m) from the source. The size of these effects is hard to predict, and so measurements (or predictions) should be made under reasonably stable conditions. A suitable condition is a light wind with a vector component up to 2 m/s from source to receiver; this will increase the noise level by about 2 dB(A) compared with the no wind case.

Annex 6

Insulation Of Buildings Against External Noise

1. Noise from outside a building can enter a room through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path and it is therefore important to ensure that their insulation is specified correctly. This Annex summarises the main issues to be considered in specifying adequate sound insulation of windows. More detailed guidance is given in BRE Information Paper IP 6/94 "The sound insulation provided by windows".
2. The sound insulation of a window increases with the thickness (or mass) of glass subject to other limiting factors, such as air gaps. Therefore to provide good insulation a window must be fitted with effective seals.
3. Double windows can provide higher levels of sound insulation than single panes, and in general the wider the spacing between the panes the higher the insulation. However, the insulation over a band of frequencies can be seriously reduced by a resonance in the cavity between the panes. The frequency of this resonance is dependent on the cavity width and mass of the panes, and is usually in the range 50 to 300 Hertz (Hz). This should be considered when specifying windows to provide protection against low frequency noise such as traffic. For example, secondary window systems have a wider cavity (and a lower resonance frequency) than thermal double glazing; the effect of this is that secondary windows provide better insulation than thermal windows against noise with energy at high frequencies, such as electric trains, but may be only marginally better against noise with low frequency energy such as that from road traffic (see Table 1). Proprietary systems can be designed to optimise the performance.
4. Because the sound insulation of a window (and other components of the building envelope) varies with the frequency (or pitch) of the sound, the overall noise reduction provided by a window will depend, among other factors, on the spectrum of the external noise. Table 1 shows typical reductions in noise levels from common sources which would be expected from various types of window installations fitted in brick/block walls in a dwelling. For other buildings such as offices and schools the proportion of glazing to brickwork may be greater and this will result in a lower noise reduction. In addition, the type of furniture in these buildings will absorb less sound than domestic soft furnishings. The insulation provided by any type of window when partially open will be in the region of 10-15 dB (A).

Table 1: Typical noise reduction of a dwelling facade with windows set in a brick/block wall

Difference between dB(A) levels outside and inside

Noise Source	Single Glazing	Thermal Double Glazing	Secondary Glazing
Road Traffic	28	33	34
Civil Aircraft	27	32	35
Military Aircraft	29	35	39
Diesel Train	28	32	35
Electric Train	30	36	41

Note: The values in the Table are the difference between dB(A) levels measured outside and inside typical dwellings; they have not been corrected for reverberation time or window area, and so cannot be compared with values obtained under other conditions. The Table is intended to give an idea of the insulation likely to be achieved in practice - not under ideal conditions. Secondary glazing systems in particular will perform better in installations where sound insulation is not limited by poor sealing or by flanking sound paths such as through doors or acoustically weak parts of window bays. The values for single glazing are representative of well sealed windows.

5. If the walls or roof are constructed from lightweight materials they may allow transmission of significant amounts of sound into the building. This could limit the overall improvement achieved by improving the performance of other elements such as the windows.

6. To provide adequate insulation against external noise it is necessary to keep closed those windows and ventilators which have not been designed to provide sound insulation (even when closed some ventilators may still not be adequately sealed). Therefore alternative methods of providing ventilation and control of summertime temperatures must be considered. Sound insulating ventilators may be "whole house" systems or individual units installed where necessary. Ventilators of the type specified in the Noise Insulation Regulations will limit the insulation against traffic noise to about 38 dB(A). Further guidance can be found in BRE Digests 338 "Insulation against external noise" and 379 "Double glazing for heat and sound insulation".

7. The sound insulation of building elements such as windows is often measured in a laboratory. The insulation is expressed in terms of R_w (BS 5821: Part 3: 1984). This is a single number that describes the insulation over a frequency range of 100 Hz to 3150 Hz. The value allows different products to be compared, but it cannot be used directly to determine the sound insulation that will be achieved when the element is installed in a building.

8. Guidance on suitable internal noise levels can be found in BS 8233: 1987.

Note: the transmission of airborne and impact noise between new or converted dwellings is controlled under Part E of the Building Regulations (see Annex 7, paragraphs 9 and 10).

Annex 7

More Information On Other Noise Control Regimes

1. It is not the purpose of the planning system to tackle existing noise problems. Other means are available for this, and should be seen as complementing the planning system in this context. Applicants should be aware that being granted planning permission, and complying with any conditions attached, will not necessarily protect them from legal action subsequently brought by the local authority or private citizens.

The Environmental Protection Act 1990

2. Part III of the Environmental Protection Act 1990 (the 1990 Act) gives local authorities in England and Wales considerable and wide ranging powers to tackle noise problems. Where a local authority is satisfied that the noise emitted from any premises is prejudicial to health or a nuisance, it must serve an abatement notice on the person responsible for the noise. This notice may require the abatement of the nuisance or prohibit or restrict its occurrence or recurrence, and may also require the execution of such works and the taking of such steps as are necessary for this purpose. If an abatement notice is not complied with, local authorities may bring proceedings in a magistrates' court. Fines of up to £5,000 are available where the nuisance arises on domestic premises, and up to £20,000 where the nuisance arises on industrial, trade or business premises.

3. Section 82 of the 1990 Act also gives individuals the power to complain direct to a magistrates' court about a noise problem. Magistrates' courts are able to make orders requiring the abatement of the nuisance and specifying whatever measures are necessary for this purpose, and to award costs. A person who without reasonable excuse contravenes any requirement of such an order may be guilty of an offence and can be fined.

The Noise and Statutory Nuisance Act 1993

4. This Act gives local authorities powers to tackle noise caused by vehicles, machinery or equipment in the street where they are satisfied that the noise amounts to a statutory nuisance, and allows them to adopt provisions relating to the operation of loudspeakers in streets and the control of noise from audible intruder alarms on premises. It also reinstates a power that local authorities used to have under the Public Health Act 1936 to recover expenses incurred in abating statutory nuisances by putting a charge on the premises where it is the owner of those premises that is or was responsible for the nuisance. With the exception of the audible alarm provisions, the Act came into force on 5 January 1994.

The Control of Pollution Act 1974

5. Part III of the Control of Pollution Act 1974 (the 1974 Act) was largely repealed in England and Wales by the Environmental Protection Act 1990. However, those sections that are extant give local authorities powers to control noise from construction sites, and noise from loudspeakers in streets. The Act also introduced the concept of the Noise Abatement Zone (NAZ) which provides a more sophisticated means of controlling, and, where justified, reducing noise from commercial and industrial premises, particularly in areas of mixed development. Although NAZs have been criticised for their complexity, and few have been designated in recent years, the powers available in such zones (for example noise reduction notices) remain a potentially useful means of tackling some types of urban noise problem.

Codes of Practice

6. Under the 1974 Act the Secretary of State also has the power to prepare and approve Codes of Practice giving guidance on how best to minimise or reduce noise. To date four Codes of Practice have been approved by the Secretary of State. These are:

Code of Practice on Noise from Audible Intruder Alarms	HMSO 1982
Code of Practice on Noise from Ice Cream Van Chimes Etc	HMSO 1982
Code of Practice on Noise from Model Aircraft	HMSO 1982
Code of Practice on Noise Control on Construction and Open Sites (BS 5228: Parts 1 and 3	HMSO 1984
Part 4)	HMSO 1986

Further Codes may be issued. In addition, many of the governing bodies of sport have produced codes of conduct which are used when organising events, and these should be consulted when new sites are being selected. The Sports Council, for example, has published reports on Providing for Motorsports (1986) and Providing for Motorised Water Sport (1990). These codes do not have the force of law, but may be of assistance to local authorities and magistrates' courts in the exercise of their powers and functions under the 1974 and 1990 Acts.

By-laws

7. Some noise sources may be controlled by bylaws made by local authorities, particularly certain kinds of noise taking place in streets or in parks and recreation grounds. There are also certain old by-laws in some areas which cover other types of noise nuisance now subject to control under the 1974 or the 1990 Acts: such by-laws may still be valid, but no new by-laws of this kind are likely to be confirmed unless they can be shown not to duplicate existing legislation.

European Community Directives

8. The European Community has issued directives focused on limiting noise from products, particularly modes of transport, construction equipment and other specific products such as lawnmowers and household appliances. The major directives are as follows:

70/157 (as amended)	Council Directive relating to the permissible sound level and the exhaust systems of motor vehicles.
78/1015 (as amended)	Directive on the permissible sound level and exhaust system of motorcycles.
74/151 (as amended)	Directive relating to certain parts and characteristics of wheeled agricultural or forestry tractors.
79/113 (as amended)	Directive relating to the determination of the noise emission of construction plant and equipment.
84/532	Directive on the approximation of the laws of the Member States relating to common provisions for construction plant and equipment.

86/662	Directive on limitation of noise from hydraulic excavators, rope-operated excavators, dozers, loaders and excavator loaders.
80/51 (as amended)	Directive on the limitation of noise from subsonic aircraft.
84/538 (as amended)	Directive on the approximation of the laws of the Member States relating to the permissible sound power level of lawnmowers.
86/188	Directive on the protection of workers from the risks related to exposure to noise at work.
86/594	Directive on airborne noise emitted by household appliances.

Building Regulations

9. The Building Regulations 1991 impose requirements for sound insulation between dwellings. The Building Regulations 1991 Approved Document E (Resistance to the passage of sound) (ISBN 0 11 752315 1) gives practical guidance on how the required standards of sound insulation can be achieved.

10. The Building Regulations 1991 came into force on 1 June 1992, and were extended to cover sound insulation between converted flats by including provisions that are as close to new build as is practical. The Government considers that the Building Regulations are the most appropriate means of control for sound insulation in such conversions, and local planning authorities should not therefore use planning conditions to control sound insulation in such cases. However, this does not preclude the use of conditions where planning approval is required for change of use to a noisy activity (eg a conversion to a cafe, discotheque or other noisy undertaking) where dividing walls or a floor separate a dwelling from such a use.

Motor vehicles

11. The Road Vehicles (Construction and Use) Regulations 1986 (as amended) contain safety and environmental standards for the construction and use of all classes of vehicle. In terms of noise, the Regulations include drive-by noise limits and test procedures for new vehicles, and requirements for the design and use of vehicle horns, reversing and theft alarms. The use of a vehicle so as to cause excessive noise which could be avoided is also prohibited and any exhaust system must be maintained and not modified to cause additional noise.

Noise at work

12. The Noise at Work Regulations 1989, which are enforced by inspectors of the Health and Safety Executive (HSE), require employers to take a number of steps to protect employees from exposure to excessive noise.

Aircraft

13. The manner in which aircraft may be flown is specified in Section 76 of the Civil Aviation Act 1982 and the Rules of the Air Regulations 1991. Under Section 76 of the Civil Aviation Act aircraft are exempt from action in respect of trespass or nuisance, including noise nuisance, as long as they comply with the provisions of any Air Navigation Order. Rule 5 of the Rules of the Air Regulations states that with certain exemptions an aircraft should not fly at below 1500ft over heavily populated

areas or below 500ft elsewhere, except when taking off or landing. Should these limits be broken the pilot may be reported to the Civil Aviation Authority.

Temporary use of land

14. Under Part 4 of Schedule 2 to the Town and Country Planning General Development Order 1988, certain temporary activities enjoy permitted development rights. These allow the land to be used for up to 28 days (14 days in the case of temporary markets/car boot sales and motor sports) in any one calendar year without the need to apply for planning permission. A local authority may make a direction under article 4 of this Order which withdraws the general permission and so requires anyone wishing to institute the particular use to make a specific planning application. If an article 4 direction is to remain in force for more than six months, then the approval of the Secretary of State for the Environment is necessary. Compensation may be payable if permission on a subsequent planning application is refused, or is granted subject to conditions.

Annex 8

Statutory Instruments

The Noise Insulation Regulations 1975. (SI 1975: 1763)

The Education (School Premises) Regulations 1981. (SI 1981: 909) (to be revised)

The Town and Country Planning (Use Classes) Order 1987. (SI 1987: 764) (as amended)

The Town and Country Planning (Assessment of Environmental Effects) Regulations 1988. (SI 1988: 1199) (as amended)

The Town and Country Planning General Development Order 1988. (SI 1988: 1813) (as amended)

The Noise Insulation (Amendment) Regulations 1988. (SI 1988: 2000)

The Noise at Work Regulations 1989. (SI 1989: 1790)

The Building Regulations 1991. (SI 1991:2768)

British Standards

BS 5228: 1984 (parts 1-3), 1992 (part 4), Noise control on construction and open sites.

BS 5821: 1984, Rating the sound insulation in buildings and of building elements.

BS 8233: 1987, Sound insulation and noise reduction for buildings.

BS 4142: 1990, Method for rating industrial noise affecting mixed residential and industrial areas.

BS 7445: 1991, Description and measurement of environmental noise.

BS 6472: 1992, Guide to evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz).

Guidance

Department for Education Design Note 17: Guidelines for Environmental Design in Educational Buildings (to be revised).

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