

London Boroughs of:
Hillingdon;
Hounslow;
Richmond upon Thames

Supplementary Planning Document

Noise Generating and Noise Sensitive Development

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Supplementary Planning Document (SPD)

Development Control for Noise Generating and Noise Sensitive Development

Part 1: Policy

1.0 INTRODUCTION

This Supplementary Planning Document (SPD) has been produced by the three London Boroughs of Richmond Upon Thames, Hounslow and Hillingdon in order to address common noise issues affecting all three Boroughs and assist in providing a consistent approach to development where noise is an issue. This SPD supplements each Borough's Local Plan by providing interpretation of national planning and noise policy in a local context along with advice on the technical requirements that the Boroughs regard as relevant to meeting those requirements.

The SPD is split into two main parts.

Part 1 deals with the policy context, aims and objectives.

Part 2 deals with the technical aspects of acoustic design and contains details on requirements relating to design criteria for noise sensitive and noise generating development.

1.1 PURPOSE OF THE SPD

Noise can have a significant effect on the environment, and on the health and quality of life enjoyed by individuals and communities. Consequently, noise needs to be considered when new developments may create noise and when new developments would be sensitive to the existing noise conditions.

Noise can interfere with residential and community amenity and the utility of noise sensitive land uses. Furthermore, noise exposure can lead to effects including sleep disturbance and annoyance which impact on health and quality of life. Across the three Boroughs, noise arises from a variety of existing sources, in particular Heathrow Airport and aircraft arriving and leaving the airport, major roads (e.g. M4, A4, A40 and A316) and railways (e.g. London Underground, the lines to and from Paddington, and Marylebone stations and the Heathrow Express lines). There are also numerous industrial and commercial sources of noise.

This SPD will form part of the Local Plan for each Borough. A formal consultation process will be undertaken before it is officially adopted. This SPD details the main requirements of the three Boroughs as "Local Planning Authorities" (LPAs) with regard to planning and noise. The main purpose is to assist developers, decision makers, agents, residents and others to identify issues to be addressed in any application for development in which noise and/or vibration will be an important consideration when assessing that application. Applicants should always check whether there are any additional requirements with regard to planning and noise that are specific to a particular Borough, or a specific area within a Borough.

It is important that acoustic design is considered at an early stage of the development control process. This SPD contains guidance intended to help protect occupiers of new or existing noise sensitive buildings from existing or introduced noise sources respectively and to seek to protect and improve the residential amenity of the three Boroughs overall. It is government policy that noise should not be considered in isolation or separately from the economic, social and other environmental dimensions of proposed development. However there may be circumstances where noise considerations could override other planning concerns and advice is provided in this SPD on when this situation is likely to arise.

2.0 REGULATORY FRAMEWORK

2.1 NATIONAL POLICY

The Government's planning policies for England are contained in the [National Planning Policy Framework 2012](#) (NPPF). This sets out the key requirements for the planning system and provides a framework by which local policy should be made to reflect local needs and priorities.

NPPF policies are supplemented by additional advice contained in [National Planning Practice Guidance](#) (NPPG). Revised and updated advice on how planning can help to manage potential noise impacts was first published on 6 March 2014, the most recent advice can be found [here](#).

The NPPF does not contain specific policies for nationally significant infrastructure projects for which particular considerations apply. These considerations are set out in the Planning Act 2008 and relevant national policy statements. These [national policy statements](#) (NPSs) form part of the overall framework of national planning policy, and are a material consideration in decisions on relevant planning applications.

The long term vision and aims of the Government's policy on noise is contained in the [Noise Policy Statement for England](#) (NPSE).

2.2 REGIONAL POLICY

At the regional level, both the [London Plan](#) and the [Mayor's Ambient Noise Strategy](#) promote the efficient management of noise in London and the application of good acoustic design principles. Policy 7.15 of the London Plan, "Reducing Noise and Enhancing Soundscapes", seeks to minimize the impacts of noise and to separate noise sensitive development from major sources of noise.

It is intended that this SPD will assist in achieving the objectives of the Mayor's Ambient Noise Strategy. The Mayor has also published a number of [factsheets on sound conscious urban design](#) that illustrate a range of ways in which buildings and public spaces can be designed to improve city soundscapes.

2.3 LOCAL POLICY

Strategic local policy priorities include the provision of homes, jobs, suitable transport infrastructure, and the reduction of pollution and the conservation and enhancement of the natural and historic environment. All of these strategic priorities require the effective management of noise within the context of sustainable development.

Where appropriate and in the context of the Government's policies on sustainable development, all three Boroughs are committed to securing high quality design and to preventing, avoiding, mitigating and minimising the adverse effects of noise and vibration on residents, residential amenity and noise sensitive land use. Relevant policies will be applied both to development that generates noise and to development that is sensitive to noise. The boroughs will also seek to improve and enhance the acoustic environment when suitable opportunities arise and will aim, in the longer term, to develop local policies to promote appropriate soundscapes, including identifying and protecting Quiet Areas and relatively tranquil places.

Further information on each Borough's Local Plan and planning policies can be found via the following web sites:

London Borough of Hillingdon - <http://www.hillingdon.gov.uk/planning>

London Borough of Hounslow - <http://www.hounslow.gov.uk/planning>

London Borough of Richmond upon Thames - <http://www.richmond.gov.uk/planning>

3.0 DEVELOPMENT CONTROL: GENERAL APPROACH

3.1 PRINCIPLES AND REQUIREMENTS

The following broad principles for the consideration of noise (and vibration) will be applied in the planning process:

PRINCIPLES & REQUIREMENTS
<ul style="list-style-type: none">• Avoid significant adverse effects of noise on people living and working in the Boroughs;
<ul style="list-style-type: none">• Mitigate and reduce to a minimum the adverse effects of noise within the context of sustainable development;
<ul style="list-style-type: none">• Prevent development which is unacceptable in terms of noise
<ul style="list-style-type: none">• Encourage good acoustic design as far as is reasonably practical;
<ul style="list-style-type: none">• Improve living and working conditions where the acoustic environment already has a significant adverse effect on people's quality of life; and
<ul style="list-style-type: none">• Improve and enhance the acoustic environment and promote soundscapes that are appropriate for the local context, including the promotion of a vibrant acoustic environment where this is appropriate and the protection of relative tranquillity and quietness where such features are valued.

3.2 AVIATION NOISE

In regard to aviation noise the Boroughs have taken into account that the UK is a signatory to international treaties on the subject. Particularly relevant to this SPD is the UK's adoption of the International Civil Aviation Authority's (ICAO) "Balanced Approach to Aircraft Noise Management" which is designed to produce a transparent process for managing the problem of aviation noise on an airport-by-airport basis. It recognises and is based on the principle that solutions need to be tailored to the specific characteristics of the airports concerned which in this case are Heathrow and Northolt. It calls for an assessment of all available options before the most appropriate one is selected.

The four elements of the Balanced Approach are outlined below

- Reduction of noise at source
- Land-use management and planning;
- Noise abatement operational procedures; and
- Operating restrictions on aircraft.

The ICAO balanced approach has been considered throughout the drafting of this document which as a consequence places a number of requirements and restrictions on developers in relation to acoustic design and the location of noise sensitive development. For example, by presuming that noise sensitive development will be prevented in locations with unacceptably high aviation noise levels; and in locations where aviation noise is less than such a level, but is still likely to have adverse effects, requiring the design

of noise sensitive development to include measures to suitably mitigate and minimise the adverse effects of aviation noise.

3.3 EXISTING BUSINESS

It is our intention that existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because future noise sensitive uses are subsequently permitted (including by a change of use) and where people may object to the inevitable noise that is produced. The Boroughs will therefore expect proposed new noise sensitive developments to follow good acoustic design principles and to incorporate adequate mitigation measures to ensure appropriate acoustic conditions in the new developments

3.4 BROWNFIELD DEVELOPMENT

Policies to encourage the use of brownfield land in order to minimise pressure on open space may well challenge a desire to separate conflicting land uses. Policies to increase housing supply may mean that some of the noisier locations in the Boroughs will have to be considered for future development. Where such circumstances arise and where a site is deemed suitable within the wider context of sustainable development, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles.

3.5 GENERAL APPROACH TO NOISE SENSITIVE DEVELOPMENT (NSD)

The LPA will consider carefully in each case whether proposals for new noise sensitive development (including by a change of use) would be incompatible with existing activities. Such new noise sensitive development will not normally be permitted in areas which are, or are expected to become, subject to high levels of noise or an otherwise unacceptable acoustic environment. When determining planning applications for development which will be exposed to an existing noise source, the local LPA will consider both the likely noise exposure at the time of the application and any change that may reasonably be expected in the foreseeable future e.g. from future intensification of transportation noise sources or commercial/industrial activities. Where the application site is considered to be otherwise suitable then the principle requirement will be to secure and achieve acceptable acoustic standards through the application of good acoustic design.

There will be a general presumption against new noise sensitive development that is likely to experience significant adverse effects from noise unless it can be demonstrated that the economic and/or social and/or environmental benefits associated with the proposed development outweigh the adverse effects.

3.6 GENERAL APPROACH TO NOISE GENERATING DEVELOPMENT (NGD)

Much of the development which is necessary for the creation of jobs and the construction and improvement of essential infrastructure will generate noise. In some circumstances noise may be an inevitable consequence of an essential or desirable activity. The planning system should not place unjustifiable obstacles in the way of such development.

The LPA will consider carefully in each case whether proposals for new development that may generate noise (including by a change of use) would be incompatible with existing noise sensitive activities and any noise sensitive activities that may reasonably be expected in the foreseeable future. The applicant will be expected to demonstrate, as part of the planning application, that noise has been mitigated and reduced to a minimum and that the principles of good acoustic design have been followed.

For schemes that may generate noise, developers must consider the cumulative noise impact from their proposed scheme and the existing acoustic environment; and where appropriate the future cumulative impact of any already permitted or proposed noise generating development in the vicinity. There will be a general presumption against development which gives rise to significant adverse effects from noise unless it can be demonstrated that the economic and/or social and/or environmental benefits associated with the proposed development outweigh the adverse effects.

4.0 ASSESSMENT OUTCOMES

In determining the impact and effect of the noise assessment outcome the Boroughs will take account of the acoustic environment and in doing so consider:

Determining the Noise Impact and Effect
<ul style="list-style-type: none">• Whether or not an unacceptable adverse effect is occurring or likely to occur;
<ul style="list-style-type: none">• Whether or not a significant adverse effect is occurring or likely to occur;
<ul style="list-style-type: none">• Whether or not an adverse effect is occurring or likely to occur;
<ul style="list-style-type: none">• Whether or not a good standard of amenity can be achieved;
<ul style="list-style-type: none">• Whether or not a good acoustic design process has been followed and whether or not appropriate acoustic standards have been achieved; and
<ul style="list-style-type: none">• Whether or not opportunities have been taken to improve or protect the existing acoustic environment where relevant.

Following the SPD guidance will lead to the choice of one of four possible recommendations regarding the acoustic acceptability of the development proposal:

Planning Outcome
A. Planning consent may be granted without any need for noise conditions;
B. Planning consent may be granted subject to the inclusion of suitable noise conditions;
C. Planning consent should be refused on noise grounds unless there are reasons to the contrary (“avoid”);
D. Planning consent should be refused on noise grounds regardless of other considerations (“prevent”).

4.1 A- GRANT CONSENT WITHOUT THE NEED FOR NOISE CONDITIONS

In some cases there may well be no effect or no adverse effect arising from noise as a consequence of the proposed development. In such circumstances the LPA will not require any specific measures and it should be possible to expedite consideration of the planning application on noise grounds and to make a

recommendation that planning consent may be granted without the need for noise conditions requiring further assessment.

4.2 B- GRANT CONSENT WITH SUITABLE NOISE CONDITIONS

In some circumstances it may be necessary to make a recommendation that planning consent may be granted subject to the inclusion of suitable noise conditions, for example to address specific acoustic design aspects of a particular site.

In most circumstances it is likely that adopting the SPD guidance, in particular following a good acoustic design process and producing an accompanying noise report including an Acoustic Design Statement, should reduce delays and reduce the need for noise conditions.

4.3 C- REFUSAL OF NEW RESIDENTIAL DEVELOPMENT ON NOISE GROUNDS- AVOID

Unless there are overwhelming reasons to the contrary, the Boroughs will recommend that a new housing development or new noise generating proposal should be refused on noise grounds if:

- There is a failure to follow a good acoustic design process OR
- There is a failure to observe SPD internal L_{Aeq} noise guidelines (i.e. failure to achieve internal noise levels); OR
- There is an unacceptable "external amenity area noise assessment"

4.4 D- REFUSAL OF NEW RESIDENTIAL DEVELOPMENT ON NOISE GROUNDS- REFUSE

In the particular circumstances where high noise levels or otherwise unacceptable acoustic conditions remain despite following a good acoustic design process, then the proposed NSD or NGD should be prevented on noise grounds, notwithstanding any case for the development to proceed in the context of Government policy on sustainable development, if:

- There is a failure to observe SPD internal L_{Aeq} noise guidelines by $\geq +5$ dB (i.e. "unreasonable" internal noise levels) AND either there is an unacceptable "external amenity area noise assessment" or an unacceptable "assessment of other relevant issues"; OR
- There is a failure to observe SPD internal L_{Aeq} noise guidelines by $\geq +10$ dB (i.e. "unacceptable" internal noise levels).

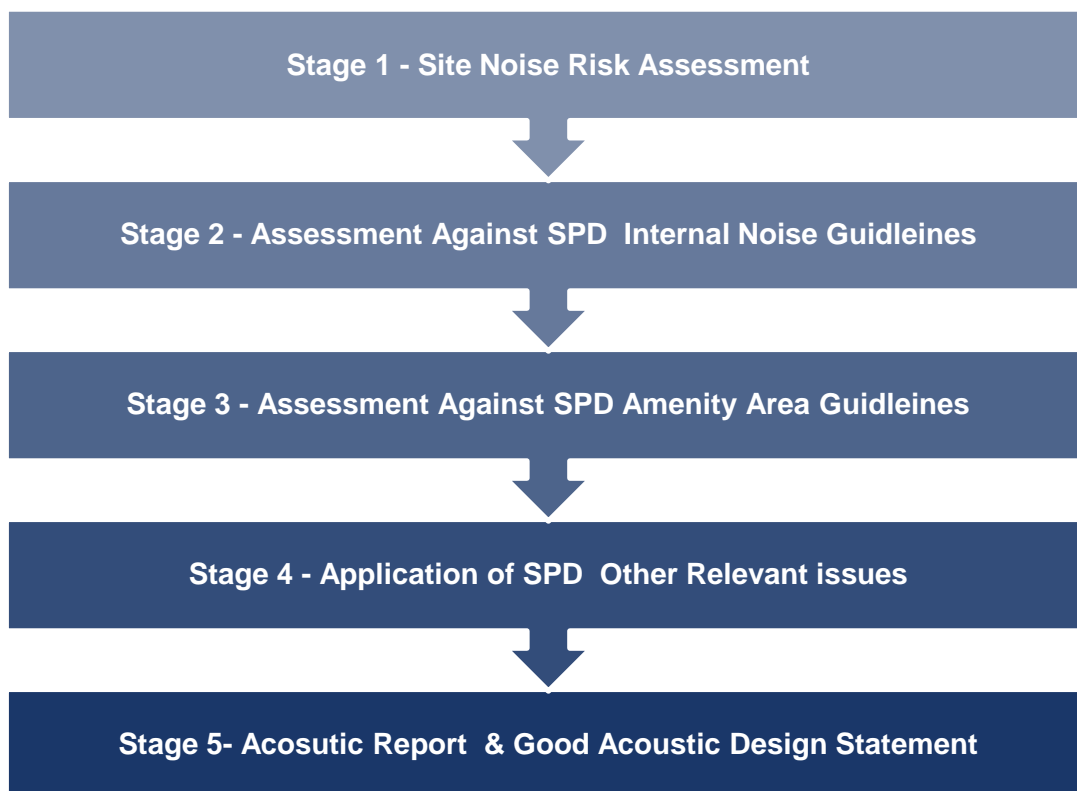
PART 2: TECHNICAL REQUIREMENTS

5.0 NOISE SENSITIVE DEVELOPMENT

Noise sensitive development includes residential properties, residential institutions, educational establishments and hospitals as well as noise sensitive land such as certain parks and gardens. The main environmental noise sources affecting noise sensitive development within the three Boroughs are road traffic, aircraft over flight, and rail traffic. Other common sources of noise affecting noise sensitive development include building services plant and commercial / industrial premises and Licenced premises and the night time economy

The following process diagram describes the stages that the assessment of noise for NSD proposals must take into account.

Figure 1: Noise Sensitive Development- Noise Assessment Process



5.1 STAGE 1 – SITE NOISE ASSESSMENT

An initial noise site assessment should be conducted by a competent noise practitioner at the earliest opportunity, preferably before any planning application is submitted. The noise assessment should seek to determine the appropriate Noise Risk Category (NRC figure 2) of the site, without proposed mitigation, prior to development. This assessment should include the acoustic effect of any site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development

proceeds. The initial site risk assessment should not include any new noise mitigation measures that may be proposed as part of a subsequent planning application.

The site noise assessment may be based on measurement or prediction (or a combination) as appropriate, and should aim to describe noise levels during at least a typical worst case 24 hour period. The assessment should include the combined free-field noise level from all sources of transport noise that affect the site. In the case where industrial or commercial noise is present but not “dominant” (i.e. where the effect would not be rated as adverse if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the appropriate NRC (and if included, this should be clearly stated). Where industrial/commercial noise is considered to be “dominant” then the NRC approach should not be used for the industrial or commercial noise and regard should be had to the guidance in BS4142:2014.

It should be stressed that the allocated NRC is not the basis for the eventual recommendation to the decision maker. The NRC approach is intended to give the developer, the noise practitioner, and the decision maker an indication only of the likely suitability of the site for new residential development from a noise perspective. Figure 2 summarises the Initial Site Assessment and includes indicative noise levels for each of the four NRCs derived from current guidance documents and experience as well as a description of the potential effect of noise were no further noise mitigation to take place as well as additional pre-planning application guidance.

Figure 2: Initial Site Noise Risk Assessment

External Transportation Noise Risk Assessment (measured/predicted, empty site, pre-mitigation)

Noise Risk Category*	Potential Effect if <u>unmitigated</u>	<u>Pre-Planning Application Guidance</u>
0 – Negligible $L_{Aeq,16hr} < 50dB$ $L_{Aeq,8hr} < 40dB$	No adverse effect on health and quality of life	Development proposal is likely to be acceptable from a noise perspective. Noise assessment /report required to demonstrate no adverse impacts Good acoustic design encouraged to improve existing environment
1 – Low $L_{Aeq,16hr} 50-63dB$ $L_{Aeq,8hr} 40-55dB$	Adverse effect on health and quality of life	Noise environment likely to cause adverse impacts Noise assessment /report required to demonstrate how adverse impacts will be minimised and how good acoustic design will be implemented. Planning conditions and other measures to control noise are likely to be required.
2 – Medium $L_{Aeq,16hr} 63-69dB$ $L_{Aeq,8hr} 55-60dB$ $L_{ASmax} < 82dB$	Significant adverse effect on health and quality of life	Noise environment likely to cause significant adverse impacts and development may be refused unless Noise assessment /report required to demonstrate how significant adverse impacts will be avoided and other adverse impacts <u>minimised</u> and how good acoustic design will be implemented Planning conditions and other measures to minimise noise will be necessary.
3 – High $L_{Aeq,16hr} > 69dB$ $L_{Aeq,8hr} > 60dB$ $L_{ASmax} < 82dB$	Unacceptable adverse effect on health and quality of life	Noise environment likely to cause unacceptable adverse impacts and development likely to be refused even if a good acoustic design process is followed, unless there is an overriding case for development in the context of Government policy on sustainable development.

Fig 2 Notes:

- *NRCs use the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but not “dominant”.
- The site will fall into the particular NRC if any of the noise criteria are exceeded.
- For the specific purposes of the NRC assessment, industrial/commercial noise should be taken as “dominant” where the effect would be likely to be rated as adverse if a BS4142:2014 assessment was to be carried out. The judgement on whether or not to undertake a BS4142 assessment should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient.
- It should always be clearly stated whether an industrial/commercial noise contribution has been included or excluded from the assessment of the NRC.
- LAeq,16hr is for daytime 0700 – 2300, LAeq,8hr is for night-time 2300 – 0700.
- **LASmax criteria will place the site in NRC3, regardless of other acoustic criteria, if the maximum noise level is likely to be exceeded more than 10 times a night (2300 – 0700).

5.2 STAGE 2 - INTERNAL DESIGN NOISE LEVELS

The Boroughs will normally seek to achieve the design noise levels contained in Table 4 of BS8233:2014 in all noise sensitive rooms. It should be noted that the acoustic integrity of the building envelope will be compromised in the event windows are opened for ventilation purposes, typically reducing the insulation to no more than 10 to 15 dB(A). The use of good acoustic design should aspire to achieve the internal design levels in noise sensitive rooms with windows partially open, although on certain sites the Boroughs may agree to assess the proposal assuming windows are closed. In many sites classified as NRC 0 then it should be possible to achieve the design noise levels with windows open.

Table 1: Internal Ambient Noise Levels for Dwellings

Situation	Location	07:00 – 23:00 hrs.	23:00 – 07:00 hrs.
Resting	Living room	35 dB LAeq,16 hour	-
Dining	Dining room/area	40 dB LAeq, 16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16 hour	30 dB LAeq, 8 hour
Sleeping	Bedroom	-	45 dB LAMax (several times in any one hour)

(Source: BS8233:2014, page 24, Table 4 “Indoor Ambient Noise Levels”)

Notes:

- The Table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.
- The levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a logistic hub with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the Table.
- These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.
- 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 LAMax,F, depending on the character and number of events per night. Sporadic noise events could require separate values.

- (v) If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.
- (vi) Attention is drawn to the Building Regulations.
- (vii) In certain circumstances where external noise levels above WHO guidelines, but development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

With regard to noise from individual noise events, the Boroughs consider that for a reasonable standard in noise sensitive rooms at night (i.e. bedrooms) individual noise events measured with F time weighting should not normally exceed 45dB LA_{max} more than 10 times a night. This guideline is supported by advice contained in the WHO community Noise Guidelines (2000).

5.3 STAGE 3 - DESIGN NOISE LEVELS FOR EXTERNAL AMENITY SPACES

The acoustic environment of external amenity areas shall always be assessed and noise levels should ideally not be above the range 50 to 55dB LA_{eq,16hr}. It may be necessary to carefully locate and design amenity areas and/or to provide acoustic screening in order to meet this goal.

Developers are encouraged to enter into pre application discussion where noise levels in proposed amenity spaces are likely to be above 55dB LA_{eq,16hr}. In such cases, the availability of reasonable access to an outdoor recreational area away from but close to the development site, that meets the above target external levels will be taken into account in deciding whether the scheme is acceptable in noise terms. Soundscape management techniques, including psychological masking, may also help to provide a suitable outdoor acoustic environment in otherwise noisy locations. It is accepted that, in some circumstances it may be appropriate to vary, or not to apply, these goals in order to meet wider planning objectives. BS8233:2014 (Section 7.7.3.2 Design criteria for external noise) contains the following guidance:

“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.

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.”

5.3.1 VENTILATION AND COOLING DESIGN

Ideally, the above internal design noise levels could be met with windows open. However on some of the potentially noisy sites in the Boroughs, high specification acoustic glazing maybe necessary to achieve the above internal design noise levels. In such circumstances alternative means of ventilation and cooling will be required. Where whole house ventilation is provided then acoustically treated inlets and outlets should ideally be located away from the façade(s) most exposed to noise (and any local sources of air pollution). The consideration of heating, cooling and ventilation proposals should align with wider planning objectives for sustainable design. For example, ground source heat options could be used to heat premises during the winter and be used for cooling during the summer months.

All schemes for ventilation (ideally passive ventilation) shall comply with [Approved Document F Building Regulations](#). The acoustic design calculations for the building envelope must take into account the acoustic performance of the proposed means of ventilation. Some useful information is contained in “BRE Information Paper IP4/99: Ventilators: Ventilation and Acoustic Effectiveness (Oct 1999)”. The Boroughs may also refer to additional guidance e.g. the DCLG’s Code for Sustainable Homes, particularly when windows have to be kept closed to meet the internal design noise levels.

5.4 STAGE 4 - ASSESSMENT OF OTHER RELEVANT ISSUES

The fourth element of then process is an assessment of other relevant issues. For this element the SPD reflects and extends the advice contained in Government policy and guidance documents such as the NPSE and Noise Action Plans.

- Source and absolute level of the noise;
- Time of day noise occurs;
- The number, frequency and pattern of noise events;
- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content);
- The character of the noise (i.e. the presence of tones or other features such as impulsiveness),

PPG-Noise(Planning Practice Guidance-Noise) also mentions some wider acoustic-related factors such as the planned character of the area (this should include consideration of the acoustic environment); the possible need to keep windows closed “most of the time” to keep out the noise; the possible need to provide acoustically suitable outdoor amenity space; and the potential effect on an existing business.

It is recommended that the following additional issues should always be included as part of a systematic assessment of other relevant issues before making a judgement about the noise aspects of a particular planning proposal for new residential development:

Not all of the issues discussed above will arise in each and every planning application and some may already have been addressed as an inherent part of good acoustic design. In addition, LPAs may wish to add other relevant issues depending on local circumstances and priorities.

5.4.1 Magnitude and Extent Of Compliance With SPD

It is recognised that it may not always be possible to achieve the recommended internal noise level guidelines in all rooms within noise-sensitive developments. Where it is not possible to achieve good acoustic standards in every respect, regard should be had to the number of dwellings and number of habitable rooms in each of the dwellings where the good standard cannot be achieved. Similarly, the external amenity area noise assessment is multi-faceted and, where it cannot be met in its entirety, regard should be had to the extent to which the guidance has been followed.

5.4.2 Likely Occupants of the Development

The Boroughs will bear in mind the extent to which occupants are likely to be able to exercise choice about living with the acoustic conditions in and around the proposed residential development. In addition, certain groups such as families with young children, students and the elderly may all have different requirements and sensitivities as regards acoustic conditions and, in particular, varying needs for access to quiet external space. Care should additionally be taken as far as possible to anticipate future changes in types of occupancy that may result in differing acoustic requirements.

5.4.3 Acoustic Design V Unintended Adverse Consequences

Design measures taken to reduce intrusion by noise may have unintended adverse consequences for the building or the nearby environment and may affect the attractiveness of the living environment for the occupants. Examples include sealed up balconies that result in a lack of connection with the external environment, roadside barriers that remove views or prevent crossing roads, specialist ventilation / thermal comfort measures that affect personal control over the internal environment etc. Such unintended consequences should normally be avoided by good acoustic design.

5.4.4 Acoustic Design V Wider Planning Objectives

Some wider planning objectives may have unforeseen acoustic implications. For example, the encouragement of 'active facades' that overlook public footpaths etc. to ensure 'safe by design' could result in some residential units facing noisy streets or railways. The encouragement of active outdoor lifestyles may require the careful protection of amenity spaces from sources of transport noise. The creation of vibrant mixed use commercial and residential neighbourhoods can introduce particular challenges that will need to be overcome by careful acoustic design.

5.5 OTHER NOISE SENSITIVE DEVELOPMENT

New housing is the most common type of residential development in the Boroughs. However, the general principles outlined above will be applied to other types of residential development such as residential institutions, care homes etc.

There are other types of noise sensitive development. For example, many, but not all, activities undertaken at schools (including "free schools"), and other educational establishments are considered to be noise sensitive. Applicants are advised to refer to "Building Bulletin 93: Acoustic Design of Schools" for further

advice. Because some activities at educational establishments are also likely to generate noise then any such applications will be assessed on a case by case basis.

Advice on the acoustic design of hospitals is contained in Health Technical Memorandum 08-01.

The Boroughs do not prescribe noise and vibration standards for hotel bedrooms although it is recommended that hotels are designed to meet the criteria provided in BS 8233:2014.

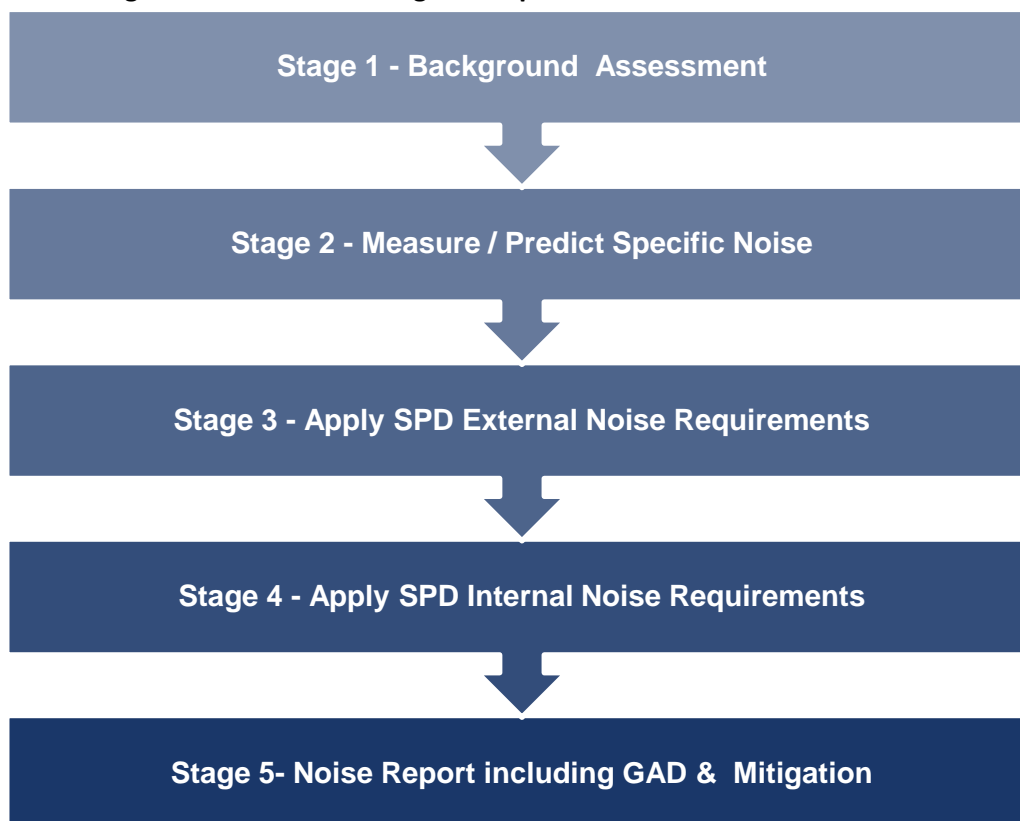
Other types of noise sensitive development will be dealt with on a case by case basis using similar principles and with reference to any authoritative specialist acoustic design guidance.

6.0 NEW NOISE GENERATING INDUSTRIAL AND COMMERCIAL DEVELOPMENT

The Boroughs recognise the contribution of industrial and commercial developments in helping to achieve wider sustainable development goals. However, there are many kinds of industrial and commercial developments that have the potential to generate noise. In the Boroughs some of the most commonly occurring noise issues with commercial developments are associated with building services plant, usually air-conditioning equipment or kitchen extraction systems. In addition to plant noise, noise associated with deliveries or collections and an increase in traffic noise levels may also impact on local residents.

An assessment of the impact of noise from these types of development will be required. Applicants should be aware that the Boroughs will always seek to encourage good acoustic design and will prevent development where unacceptable acoustic conditions are anticipated either inside or outside nearby noise sensitive premises as a result of noise from new industrial or commercial development.

Figure 3: Noise Generating Development – Noise Assessment Process



6.1 NOISE STANDARDS FOR NEW INDUSTRIAL AND COMMERCIAL DEVELOPMENT

All industrial and commercial development with the potential to generate noise will be assessed and, where relevant, controlled by planning conditions in order to protect residential amenity. Conditions may be used, for example, to restrict noise levels and to control hours of operation. The most relevant standard for assessing new industrial and commercial development is BS4142:2014

6.2 BS4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

The standard describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The standard is applicable to the determination of the following;

- rating levels for sources of sound of an industrial and/or commercial nature
- ambient, background and residual sound levels, for the purposes of:
 - (i) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature;
 - (ii) assessing sound at proposed new dwellings or premises used for residential purposes

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. The greater this difference, the greater the magnitude of the impact.

A difference of around +10 dB or more is likely to be an indication of a significant adverse impact

Depending on the context.

A difference of around +5 dB is likely to be an indication of an adverse impact

Depending on the context.

The lower the rating level is relative to the measured background sound level

The less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

As a general rule, the Boroughs will seek to achieve the external noise standards detailed in **Table 2** below (all terms are as defined in BS4142).

Table 2: New Industrial and Commercial Development - External Noise Standards

Noise Impact From Relevant Proposed Industrial Or Commercial Premises Or Plant	Development Outcome
Rating Level (L _{Ar} ,Tr) is at least 5 dB(A) below the Background Level LA ₉₀	Normally acceptable
Rating level (L _{Ar} ,Tr) is no more than 5 dB(A) above the Background Level LA ₉₀	Acceptable only if there are overriding economic or social reasons for development to proceed
Rating level (L _{Ar} ,Tr) is more than 5 dB(A) above the Background Level LA ₉₀	Normally unacceptable

Note: All terms as defined in BS4142

The Boroughs will not impose unreasonable restrictions on businesses but applicants should be aware that it is usually simpler and less expensive to design in noise management and noise control measures at the planning stage rather than wait for complaints to arise.

6.3 INTERNAL NOISE LEVELS IN NEARBY DWELLINGS

In addition to an assessment of external noise, in some cases it will also be necessary to predict internal noise levels at the closest and/or worst affected noise sensitive premises and to demonstrate the means of achieving suitable internal noise levels within noise sensitive rooms (with windows partially open for ventilation where this is the norm for the building likely to be affected, with windows closed where this is part of the mitigation of the existing noise climate and the potentially affected noise sensitive building is provided with adequate alternative means of ventilation).

In some cases, for steady continuous noise without a specific character", the guidance on suitable internal noise levels found in Table 4 of BS8233 may be relevant. The application should demonstrate that these levels can be complied with. In other cases, it may be necessary to seek to achieve better standards in nearby dwellings, for example where the proposed industrial or commercial development may emit noise with a tonal, impulsive or other discrete characteristics the LPA may consider it appropriate to apply a character correction for internal noise standards.

6.4 DESKTOP ASSESSMENT

In certain circumstances i.e the installation of a single air conditioning unit, a desktop noise assessment maybe be submitted where the applicant can demonstrate that the plant will achieve the set criteria below and therefore negate the need for a full acoustic report.

The applicant will have to achieve either of the following requirements

1. [MCS Planning Standards](#) for permitted development installations air source heat pumps on domestic premises or
2. Assume at least 5dB below background criteria to achieve compliance based on a daytime & night time background of 45 & 35dB LA90 respectively.

The report will have to include:

1. The location of the nearest residential window that may be affected by noise from the proposed plant.
2. Indicate the distance of the window from the source in metres and any natural barrier or shielding to the noise path.
3. The proposed operational hours of the plant,
4. The assumed background noise level assessment (LA90 _{15 minutes}) over the proposed hours of operation. (daytime 45 dB(A), night time 35dB(A))
5. Manufacturers noise specifications of plant: Sound Power/Sound pressure Level, octave band spectral levels.
6. Calculations for the predicted noise level 1 metre from the window of the nearest residential property. Include any proposed attenuation measures.

6.5 LOW FREQUENCY NOISE

If the proposed development is expected to produce significant low frequency noise then the assessment must take this into account and specialist advice should be sought. The standard [DEFRA NANR 45](#) Procedure for assessment of low frequency noise, provides a possible method of assessment.

6.6 CREEPING BACKGROUND AND AMBIENT NOISE LEVELS

Creeping outdoor background and ambient noise levels may occur in situations where there are an increasing number of noise sources in an area, each of which makes a small contribution to an overall deteriorating and locally unacceptable situation. Typically, this may occur, where there are multiple mechanical services installations on a number of commercial premises in close proximity to residential development. It may also be necessary to prevent creeping outdoor background noise levels affecting any specially designated quiet and/or tranquil areas in the Boroughs.

In such circumstances the LPA may apply more stringent conditions to the control of noise from industrial and commercial premises. This will be dealt with on a case by case basis and the LPA will justify their position accordingly when making such a decision.

6.7 DELIVERY AND COLLECTIONS

In certain situation the noise impact from deliveries and collections will need to be determined and form part of the noise assessment. It is possible that restrictions on operating hours will be imposed and these will reflect the sensitivity of the area and be in the context of wider sustainability aims.

Where Sunday or late night deliveries/collections or retiming of deliveries are proposed, the applicant should specifically demonstrate the need for this and what measures will be implemented to prevent undue disturbance to neighbours. Further guidance on managing noise from deliveries and collections is also available at: [Noise Abatement Society's Silent Approach™ Quiet Night Time Delivery Scheme](#) and [Freight Transport Association Guidance Delivering the Goods](#) – a toolkit for improving night-time deliveries.

A Service Yard Management Plan may also be required and should include details of:

- Times and frequency of deliveries and collections;
- Effective enclosure and sealing of loading bays and service areas and/or locations away from noise sensitive premises;
- Vehicle movements, including forklift vehicles;
- Quiet reversing methods; preference will be given to broadband reversing alarms or alternative quiet safety methods for reversing;
- Good practice working methods to minimise noise from the use of cages, trolleys, pallets and forklift vehicles; mitigation measures, such as barriers, low noise wheels on cages, low noise surfaces on tail lift decking and delivery routes for trolleys, silent electronically operated shutters etc.

6.8 MULTI USE GAMES AREAS (MUGA’S) AND ARTIFICIAL GRASS PITCHES (AGP’S)

Both, Multi Use Games Areas and Artificial Grass Pitches are becoming a more common feature in school and community redevelopments and play a key role in developing sporting opportunities for school children and the wider community. However, if inappropriately located and operated they can cause noise and other forms of disturbance to residents and business’s located in the vicinity of the development.

Recent guidance has been produced by [Sports England; Artificial Grass Pitches \(AGP\) Acoustics- Planning Implications](#). This guidance provides information on the application of appropriate noise criteria, assessment methods as well as examples of noise mitigation measures that can be implemented.

Table 3: MUGA & AGP - External Noise Standards

Noise Impact From MUGA or AGP	Development Outcome
50dB(A) LAeq,1hour	Normally acceptable

The Boroughs would expect that in most cases for any new or modified MUGA’s or AGP’s the Sports England guidance is applied and the application should demonstrate that these levels can be complied with both internally and externally. In other cases, it may be necessary to seek to achieve better standards due to particular sensitivity of the location or hours of proposed use. In such cases it is recommended that early discussion are undertaken between the applicant and the Local Planning Authority.

7.0 PLACES OF ENTERTAINMENT (CLUBS, PUBS AND BARS...)

The Boroughs recognise that clubs, public houses, bars and other places of entertainment help to achieve wider sustainable development goals. However, places of entertainment can also cause significant levels of noise disturbance and pose particular noise issues, not least because associated activities are often at their peak in the evening and late at night. Developers will need to bear in mind not only the noise that is generated within the premises from music but also the attendant problems of noise that may be made by customers arriving, leaving and congregating outside the venue.

Table 3 below details the entertainment noise standards that will be applied in situations where entertainment noise exposure is likely to arise as a result of new development in the Boroughs. These noise standards will normally be applied to any proposals that may generate new noise from entertainment sources within a mixed use area and for noise sensitive development that is proposed in a mixed use area containing entertainment establishments

Proposed developments will be assessed on a case by case basis and the design criteria may be modified depending on the nature of the business, frequency, time, duration and number of entertainment events and sensitivity of the area. It is expected that any likelihood of structure borne sound (and vibration) transmission problems will be separately assessed and that effective control measures will be included in proposals. Developers are encouraged to enter into pre-application discussions with the LPA to discuss these issues at an early stage.

Table 4: Entertainment Noise - Noise Standards

Location	Time	Criteria
External	9am to 11pm	$L_{Aeq,5min}$ EN minus $L_{Aeq,5min}$ or $L_{A90,5min}$ WEN = 0 to +5 dBA.
		$L_{Ceq,5min}$ EN minus $L_{Ceq,5min}$ or $L_{C90,5min}$ WEN = 0 to +5 dBC.
	11pm to 9am	$L_{Aeq,5min}$ EN minus $L_{Aeq,5min}$ or $L_{A90,5min}$ WEN = -5 to +3 dBA.
		$L_{Ceq,5min}$ EN minus $L_{Ceq,5min}$ or $L_{C90,5min}$ WEN = -10 to +3 dBC.
Internal	9am to 11pm	EN = Noise Rating NR25-35 $L_{eq,5mins}$
		$L_{Ceq,5min}$ EN minus $L_{Ceq,5min}$ or $L_{C90,5min}$ WEN = -10 to +5 dBC.
	11pm to 9am	EN = Noise Rating NR15-25 $L_{eq,5mins}$
		$L_{Ceq,5min}$ EN minus $L_{Ceq,5min}$ or $L_{C90,5min}$ WEN = -10 to 0 dBC.

Note 1:

EN = Representative, or predicted, entertainment noise level,

WEN = Representative noise level without the entertainment noise, measured or predicted 1 m from the facade of noise-sensitive premises.

Note 2

The transmission of noise through a structure or party construction usually means the spectrum inside the receptor premises is normally biased towards the low frequency content compared to transmission via airborne pathways. Furthermore, structurally transmitted noise is likely to be heard in a greater proportion of connected sensitive premises; compared to where the noise is primarily transmitted by airborne pathways where windows can be closed to mitigate the impact and where often only a relatively small proportion of the premises is impacted as only rooms on a

façade exposed to the airborne transmission of noise are affected. Consequently, residents affected by airborne transmission of noise can often reduce the impact by moving to another part of their home that is less affected. This means that it can be appropriate to use the criteria listed above for between 23:00 to 07:00 hrs outside of these times when noise is transmitted through a structure or party construction.

Measurement Note

External Assessment

For the appropriate period (pre and post 23:00 hrs), the WEN ambient or background noise level is determined as per Advisory Note A below and rounded to the nearest decibel. This is then compared with the total noise level, including entertainment noise. If the total noise level exceeds the WEN value by the specified criterion, then a significant effect is deemed to occur.

Internal Assessment

Where internal noise assessment is possible either through measurement or prediction a relative or absolute EN maybe assigned. The measurement of the internal EN and WEN should follow Advisories A and as appropriate, with the addition of Advisory C.

Representative noise levels

Advisory Note A: For assessment purposes it is unduly onerous to use the very highest EN level that may be measured and instead a representative typical value should be used; as an example, the EN could be the whole integer value of the measurement closest to the 75th percentile of all the 5-minute measurements made in the last hour of the operation of the premises at its highest entertainment noise levels, i.e. it does not include any “cool-down period” when MNLs might be reduced below normal operational levels.

Advisory note B: For assessment purposes it is unduly onerous to use the very lowest WEN level that may be measured and instead a representative typical value should be used; as an example, WEN could be the whole integer modal average, i.e. the most commonly occurring value of the twelve WEN 5-minute measurements during the last hour of the operation of the premises without entertainment noise occurring. For existing premises where it is impracticable to stop the entertainment noise for the last hour of operation, the measurement period shall be twelve WEN 5-minute periods totalling an hour after entertainment noise at the premises has ceased, excluding any measurements that contain noise from patrons or other sources associated with dispersal from the premises under assessment.)

Advisory note C: Internal measurements should be undertaken at a representative position, e.g. bedhead or chair position and where necessary be the same for both the EN and WEN assessments. The height of the measuring microphone should be between 1.2 to 1.5 m above the floor and 1 m away from any sound reflecting or absorbing surfaces

7.1 OUTDOOR CONCERTS

The guideline noise values presented in Table 5 are based on the current Code of Practice on Environmental Noise Control at Concerts (1995) which is considered to provide suitable guidance for noise control at concerts and similar large music events held in sporting stadia, arenas, open air sites and within lightweight buildings. The code is under review at the time of writing. These noise guidelines are outdoor levels and will normally be applied to proposals for outdoor concerts but each application will be dealt with on a case by case basis.

For outdoor events held between 0900 and 2300 the Music Noise Level (MNL) when assessed at the prediction stage or measured during sound checks or concerts should not normally exceed the guidelines in the table below.

Table 5: Guideline Music Noise Levels for Outdoor Concerts

Concert days per Year	Venue Category	Guideline
1 to 3	Urban Stadia & Arenas	The MNL should not exceed 75dB(A) over a 15minute period
1 to 3	Other Urban & Rural Venues	The MNL should not exceed 65dB(A) over a 15minute period
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15dB(A) over a 15 min period

Note: The Music Noise Level (MNL) value is the LAeq,15minute, due to music measured or predicted at a distance of 1 metre from the facade of any noise sensitive premises (all terms as defined in the Code of Practice).

In certain circumstances low frequency noise may be an issue which needs to be addressed and it is recommended that early discussions are undertaken with the Environmental Health Department to agree a set of low frequency noise criteria and limit levels appropriate for the event.

8.0 SOUND INSULATION BETWEEN COMMERCIAL AND RESIDENTIAL DEVELOPMENT

The requirements of the Building Regulations are usually deemed to be adequate for the control of sound insulation between dwellings. However, the requirements of the Building Regulations can be inadequate where certain types of commercial use adjoin residential use. The level of sound insulation performance required will be dependent upon the use type, for example a higher level of airborne sound insulation performance will typically be required for a proposed commercial catering unit located below a residential flat than will be required for a small café. A high level of airborne and impact sound insulation, often only achievable by complex design methods that structurally isolate the noise generating and noise sensitive premises, will be required where music and dancing activities adjoin a residential use. Each case will take into account the specific circumstances of the proposed development, however, the examples in Table 5 demonstrate the typically range that may need to be applied dependent on the circumstances (more stringent values may apply in some cases).

Table 6: Sound Insulation Examples - Commercial to Residential

Performance Standards for separating walls, separating floors and stairs that have a separating function		
Commercial to Residential	Airborne Sound Insulation Performance DnTw + Ctr dB	Impact Sound Transmission Performance LnTw + Ctr dB
Walls	48-60	-
Floors and Stairs	48-60	58-53

If, as a result of a planning application, a situation arises where a residential use and a commercial use will share a separating floor or wall then an assessment of the required sound insulation performance of the floor or wall should be submitted together with the construction details proposed to achieve the required standard of sound insulation.

A sound insulation test may also be required by the LPA in order to demonstrate that the sound insulation performance standard has been achieved.

9.0 VIBRATION

Human response to vibration varies with the magnitude, the frequency and duration of exposure. Significant vibration within the three Boroughs (apart from temporary construction works) is most likely to be generated by railways, including underground railways. Road traffic is unlikely to generate significant vibration where the road surface is in reasonable repair. Consequently, the LPA will normally require a vibration assessment where railways, either surface or underground, are within 30m of a proposed development site. The need for a vibration assessment at other sites will be assessed on a case by case basis.

Excepting from construction, raw vibration acceleration (ms^{-2} rms) shall be measured at foundation level in each of the three orthogonal directions x, y and z in better frequency resolution than 1/3 octave. The Vibration Dose Values ($\text{ms}^{-1.75}$) (VDV) should be calculated and assessed from the measured acceleration levels in accordance with BS6472-1:2008. For residential development, the VDV after any required mitigation should not exceed the levels in **Table 6** below (taken from Table 1 of BS 6472-1:2008).

Table 7: Residential Development - Vibration Dose Values

07:00 – 23:00	23:00-07:00
16 hour day	8 hour night
< 0.2 ms^{-1.75}	< 0.1 ms^{-1.75}

The VDV's given in **Table 6** above are for in-property levels of exposure. Measurements made on an undeveloped site should allow for transfer functions from the ground into foundations, and amplification of vibration magnitudes in suspended floors. Where a site has existing buildings, vibration should, if possible, be measured on the foundations, ground beams or pile caps, as well as on the ground. Measurements made within existing buildings need to be corrected to derive VDV which would apply to the new buildings on the same site.

Re-radiated noise, as a result of vibration from adjacent railways and other sources, shall not exceed 35 dB $L_{A_{max}}$ (slow) within habitable residential rooms. Where it is predicted that noise from this source will exceed 35dB $L_{A_{max}}$ (slow), proposals to mitigate re-radiated noise to acceptable levels shall be submitted to and approved in writing by the LPA. However, due to the high cost of mitigating vibration effects, this should be subject to early discussion with the LPA.

All building services plant and equipment such as air conditioning and air handling plant can generate vibration which in turn can re-radiate as noise within buildings. All services and equipment plant shall be supported on proprietary anti-vibration mounts. Any permission granted for the installation of services and equipment plant will normally contain a condition necessary to control plant vibration

The content of a vibration assessment report shall follow the format suggested in Annex A (informative) of BS 6472-1:2008.

10.0 CONSTRUCTION AND DEMOLITION WORK

The primary legislation for the control of noise from construction sites is the Control of Pollution Act 1974 sections 60 and 61 and this will typically be used to control noise and vibration issues from sites. However in certain situations, for instance where there is a proposal for a substantial development and/or where the proposed site is close to other noise and vibration sensitive premises, a Noise & Vibration Demolition Method Statement and Construction Management Plan will be required as part of planning consent.

10.1 NOISE AND VIBRATION DEMOLITION METHOD STATEMENT AND CONSTRUCTION METHOD STATEMENT

The Noise and Vibration Demolition Method Statement (DMS) and Construction Method Statement (CMS) will typically include an acoustic report undertaken by a suitably qualified and experienced consultant and should include all the information below:

- Baseline Noise Assessment – undertaken for a least 24-72hours under representative conditions.
- Piling - Where piling forms part of the construction process, a low noise and vibration method must be utilised wherever possible, and good practice guidelines should be followed e.g. BS 5228.
- Noise Predictions and Significance Effects - Predictions should be included for each phase of the demolition, and construction, vehicle movements and an assessment of the significance effect must be included e.g. as per BS 5228.
- Vibration Predictions and Significance Effects - Predictions should be included for each phase of the demolition, and construction, and an assessment of the significance effect must be included e.g. as per BS 5228.
- Noise and Vibration Monitoring – Permanent real time web enabled and/or periodic noise and vibration monitoring must be undertaken for the duration of the demolition and construction phases which may result in a significant impact. The location, number of monitoring stations and the measurement data must be agreed with the LPA prior to the start of construction.

Appendix 1: Working Party

This SPD has been produced by a working party consisting of:

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The working party would also like to acknowledge the work undertaken by the ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development Consultation Draft which has helped inform the content of the SPD.

Appendix 2: Good Acoustic Design

The use of good acoustic design is an inherent part of the recommended approach that is described in the SPD and will help to deliver noise policy objectives. Good acoustic design should help produce sustainable buildings that provide healthy conditions for future occupants, that are sensitive to the likely expectations of future occupants and to the acoustic characteristics of the location, that are efficient in the use of resources and energy both during construction and subsequent occupation, and that are matched by an appearance that demonstrates good aesthetics as far as possible. Figure 4 below presents the areas that should be considered when applying good acoustic design.

Figure 4: Good Acoustic Design Principles



Noise Sensitive Development - Good Acoustic Design

In the context of this SPD, good acoustic design is that which will achieve good acoustic standards, as far as is reasonably practicable, both internally (inside noise sensitive parts of the building(s)) and externally (in spaces to be used for amenity purposes). Consideration of what is reasonable will include the practicability and availability of technical solutions as well as the associated costs and financial implications, legal requirements and health and safety issues.

Good acoustic design must also provide an integrated solution whereby good acoustic design principles are aligned with, or do not otherwise conflict with, other design aspects that will affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other means may be available to achieve good acoustic standards or to reduce the need to rely on sound insulation of the building envelope, is not regarded as good acoustic design.

Good Acoustic Design Critical Steps

The following questions illustrate the types of consideration that will help to achieve the good acoustic design of a noise sensitive scheme:

Noise Sensitive Development - Acoustic Design Critical Steps
<ul style="list-style-type: none"> • Has noise from the surrounding area been taken into consideration in arranging the site layout? For example, have residential units been located as far away as practicable from an adjacent noise source?
<ul style="list-style-type: none"> • Is it practicable to use screening by existing structures or methods incorporated into the proposal to reduce noise levels affecting the sensitive facades and parts of the scheme?
<ul style="list-style-type: none"> • Where practicable has the surrounding acoustic environment been taken into account in relation to the internal layout of residential units? Are bedrooms located on the quieter facades? Are gable ends and non-noise sensitive facades orientated towards the dominant source in preference to noise sensitive facades?
<ul style="list-style-type: none"> • Will there be part of the habitable space in each unit which does not overlook the significant noise source? Have sensitive rooms been placed on the quietest façade? NB: Single aspect units where all the habitable space overlooks the significant noise source should be avoided.
<ul style="list-style-type: none"> • Has consideration been given to suitable noise insulation of the building envelope? Remember that this is not currently covered by Building Regulations and can be overlooked if not considered at the planning stage. How will this affect the residential amenity and utility of the proposed scheme?
<ul style="list-style-type: none"> • Has consideration been given to the acoustic quality of private or communal outdoor spaces within the scheme? What measures have been included to enhance the acoustic quality of any outdoor amenity spaces? Where access to private or communal quiet outdoor amenity space cannot be, or has not been, provided within a scheme then is there ready access to a suitable quiet outdoor amenity space nearby?

The Boroughs will consider the use of Section 106 agreements to contribute to the improvement and enhancement of the acoustic environment; including, engagement by developers with the owners and operators of existing noise generating land uses to explore how noise emissions at source or on the transmission pathway beyond the proposed noise sensitive site boundary may be reduced or better managed. It is recognised that it may not always be possible to achieve good acoustic standards in all rooms within noise sensitive developments or at all external amenity spaces associated with new residential development. Where it is not possible to achieve good standards in every respect, the acceptability of the proposed development will be considered having regard to:

- The degree (extent and magnitude) to which good acoustic standards cannot be achieved and whether acceptable acoustic standards can be achieved instead;
- Measures which may help to off-set adverse impacts on certain parts of the dwelling or building. For example, whether there is access to a habitable room/s on a relatively quiet façade (i.e. a façade where noise is at least 15 dBA lower than the most exposed façade) or access to a relatively quiet external amenity space¹; and
- Whether the achievement of good acoustic standards will give rise to undesirable consequences for other aspects of the living or working environment. For example, having to keep windows closed may result in adverse consequences on the comfort and health of occupants, and having to provide acoustic barriers or screens may result in significant visual impacts.

Noise Generating Development - Good Acoustic Design & Noise Control Measures

A mitigation hierarchy should be used as part of the design process. Noise control measures applied at source will be preferred to noise control on the transmission path from source to receiver. Façade protection measures represent the least preferred method of noise control. Noise control measures should be proportionate and reasonable and may include one or more of the following:

Noise Control Measures
<ul style="list-style-type: none">• Engineering: reduction of noise at point of generation (e.g. by using quiet machines and/or quiet methods of working); containment of noise generated (e.g. by insulating buildings which house machinery and/or providing purpose-built barriers around the site);
<ul style="list-style-type: none">• 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;
<ul style="list-style-type: none">• Administrative: limiting operating time of source; restricting activities and noise limits .

¹ The quiet facade principle is normally inappropriate for noise from aircraft in flight as usually the noise emanates from above and tends to affect every facade approximately equally; unlike road or rail noise where the noise is normally transmitted laterally from at or near ground level (excepting viaducts, embankments and raised roadways – where nearside barriers can be effective), and a significant difference in level can be found on the opposite side of the building from the source. Where the noise climate is dominated by noise from aircraft in flight the quiet façade principle will not normally be applied.

Early consultation between the applicant and the LPA about the possible use of such noise control measures is desirable and may enable the measures to be incorporated into the design of the proposal before it is formally submitted for determination. This is likely to reduce costs in the long run and will help facilitate quicker decision making. The LPA may, otherwise, or in addition, seek further clarification on noise control measures which may introduce delays, and they may ensure that adequate noise control measures are included by applying planning conditions.

The NPPF places emphasis on good design in managing and mitigating the environmental impacts both from and on new development. This SPD recognises the importance of good acoustic design and we wish to emphasise to developers that noise problems can often be prevented or resolved through the careful design of noise sensitive and noise generating development at an early stage in the planning process.

The overall goal of this SPD is to encourage and reward good acoustic design and to ensure that noise is appropriately taken into account and that the measures used to mitigate and manage the impact of noise do not unacceptably compromise other planning objectives.

Good Acoustic Design Critical Steps

The following questions illustrate the types of consideration that will help to achieve the good acoustic design of a noise generating scheme:

Noise Generating Development - Acoustic Design Critical Steps
<ul style="list-style-type: none">• Has the noise sensitivity and the typical existing acoustic environment of the surrounding area been taken into consideration in arranging the site layout? Have noise generating activities and/ or plant been located as far away as possible from noise sensitive receptors?
<ul style="list-style-type: none">• Is it practicable to use screening by existing structures or are other methods incorporated into the proposal to reduce noise from the scheme affecting the sensitive facades and other parts of nearby noise sensitive land uses?
<ul style="list-style-type: none">• Has consideration been given to including appropriate noise insulation of the building envelope to parts of the scheme that will generate noise? Are any doors and windows in sensible locations as regards noise impact on any neighbours? What about the roof or ceiling construction, it's often an acoustic weak point in commercial buildings?
<ul style="list-style-type: none">• Has the need to appropriately manage noise emissions from the site been taken into account in selecting plant and equipment?

Appendix 3: Assessment by Competent Person

The assessment of noise is a complex task requiring specialist training, experience, techniques and equipment. Consequently, noise surveys, impact assessments, mitigation design and report writing is best carried out by suitably qualified persons with appropriate knowledge, skills and experience. The Boroughs are not able to endorse or recommend the services of individual consultants. However, details of acoustic consultants may be obtained from:

The Institute of Acoustics

77A St Peter's Street, St Albans, Hertfordshire, AL1 3BN, UK
Tel: +44(0) 1727 848195; www.ioa.org.uk

The Association of Noise Consultants

105 St Peter's Street, St Albans, Hertfordshire, AL1 3EJ, UK
Tel: +44(0) 1727 896092; www.association-of-noise-consultants.co.uk

The Chartered Institute of Environmental Health

Chadwick Court, 15 Hatfields, London, SE1 8DJ
Tel: +44 (0) 207 827 6307; <http://www.cieh.org/advisoryservices.html>

Appendix 4: Requirements for Noise General Requirements for Acoustic Reports

It should be noted that noise assessment and report writing is a skilled operation and should be undertaken only by competent persons. Notwithstanding the inevitable technical content of the subject matter the best acoustic reports are written using plain English and should be possible for a lay person to understand. The acoustic report should be well structured and precise in its use of language and presentation of data. A typical acoustic report should include the following information.

1. Introduction:

- a. Outline the scope, aims and objectives of the report.
- b. Include the site address or other location details.
- c. Include a brief description of the development proposal it relates to (with the correct case reference number).
- d. Clearly identify the client and/or person who commissioned the survey(s).

2. Executive Summary:

This should contain the summary of the whole report and a clear statement regarding delivery of the aims and objectives.

3. Title Page:

Shall have a title page identifying the person and organisation undertaking the survey and writing the report and their qualifications and contact details, the date of the report, and shall be signed by the author and quality control reviewers. Document references i.e. revision and version numbers should be included to indicate the development of the report and its status e.g. draft for comment, final etc.

4. Contents Page:

Here the contents of the report shall be listed.

5. Methodology:

- a. Clearly identify applicable policies, guidelines and standards from this SPD.
- b. Detail any other standards / policies to be used and give a brief outline of why they have been chosen.
- c. Provide detail and justification where accepted standards have not been used.
- d. Outline the process to be followed.

6. Site Description and Noise Measurements:

- a. A brief qualitative description of the site and its surroundings is useful here.
- b. Labelled and annotated photographs are often very useful in communicating the nature and character of the site and its environs.
- c. Details of how any noise survey was carried out and any observations made during the survey e.g. on typical or unusual noise sources making up the acoustic environment
- d. Detail the location, dates and times of all measured data and provide suitable summaries of results obtained. Clearly state the height above ground, ground conditions and proximity of any acoustic

reflecting surfaces (i.e. façade, free-field or reverberant conditions). Photographs of noise measuring equipment in-situ may be useful here.

- e. Clearly state the reasons for the chosen measurement positions.
- f. Provide clear explanations for any unusual or anomalous results.
- g. Provide details of the equipment used i.e. make model and serial numbers of sound level meters, field calibrators etc.; details of equipment calibration history; details of field calibration
- h. Detail the weather conditions during the survey period. Include wind speed, wind direction, temperature and precipitation. Average wind speeds above 5 m/sec and persistent heavy rain are not conducive to effective noise measurements, although intermittent light rain and gusts over 5 m/sec can be tolerated.

7. Noise Predictions

Where it has been necessary to predict noise levels, then a brief explanation of how this has been undertaken, the data used, the software used, the prediction standards used, and any assumptions made are required. Details of any validation checks should be included.

8. Noise Source Emission Levels

Whether the scheme is noise sensitive or is likely to generate noise the report should include the following:

- Details of the type, number, location and spatial relationship of noise sources and receptors
- Details of the noise emission from each noise source, at and/or within each noise sensitive receiver
- Details of how the noise emission levels were derived.

9. Assessment

- a. Give details of the assessment made based on measured and/or predicted data.
- b. State any assumptions made.
- c. Show any calculations to sufficient detail that they could be checked for accuracy (possibly in an Appendix)

10. Outcome of Pre-Survey Discussions with The LPA, Including Potential Noise Conditions

Here the report should discuss the outcome of any pre-survey discussions with the LPA, including any acoustic standards the LPA wishes to see used on the scheme; and the details and justification of any alternatives the applicant may wish to propose.

11. Mitigation

The report should clearly identify any mitigation measures that may be required in order to comply with the policies, guidance and standards in this SPD.

All proposed noise management measures that have been considered and their effectiveness should be presented and discussed so as to enable informed recommendations on suitable mitigation measures.

12. Recommendations and Conclusions

This section should clearly reflect the scope, aims and objectives of the report. Where the report is supporting a planning application then it should normally recommend what noise management measures should be taken by the developer in order to demonstrate that:

- a. The adverse effects of noise as a consequence of the new development have been mitigated and minimised in accordance with the policies in this SPD.
- b. Good acoustic design principles have been considered and applied given the particular circumstances of the proposed development in accordance with the policies in this SPD.

13. Appendices

The amount of material included in any Appendices should be proportionate to the assessment and may typically include the following:

- a. Plans, maps, photographs showing site location and monitoring/prediction locations,
- b. Unabridged details of noise monitoring where critical to recommendations and conclusions,
- c. Details of any calculations relied upon,
- d. Copies of equipment calibration certificates.

Note:

Further practical guidance on undertaking and reporting environmental noise and vibration measurements can be found in the "ANC Green Book" - Environmental Noise Measurement Guide and the "ANC Red Book" - Measurement and Assessment of Groundborne Noise and Vibration: both available from the Association of Noise Consultants.

Appendix 5: Glossary of Terms

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

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

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

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

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

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

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

Design Noise Levels. These are the internal and external noise standards (as appropriate) that the Boroughs will normally expect to achieve in new residential development. See Section 5 of this SPD.

External Amenity Space: An outdoor area near to a residential building which is designed and intended primarily for leisure and recreational use by the occupants of the dwelling. This will include gardens, patios, balconies, roof gardens and terraces.

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

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

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

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

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

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

Noise: Unwanted sound.

Noise assessment: A basic evaluation of an acoustic environment by a suitably qualified person to assist in the determination of a planning application..

Noise impact: the noise level of the source under consideration, and/or any change in noise levels due to the scheme, and/or the relationship between the noise level of the source under consideration and a descriptor of the existing noise climate; at a receptor or group of receptors.

Noise effect: the consequence of the noise impact e.g. annoyance, sleep disturbance, speech interference, disruption of learning/teaching, health consequences, fauna displacement etc. Noise impact and noise effect are related to each other and the noise effect is related to the magnitude of the noise impact as well as other factors e.g. sensitivity of the receptor, duration of the noise, how frequently it occurs, the time of day or night it occurs, whether the noise is temporary, reversible or permanent etc.

Noise level (Lp): the logarithmic measure of the RMS sound pressure of a sound relative to a reference value that represents the threshold of hearing. It is measured in decibels (dB) e.g. $L_p = 20 \lg (p/p_0)$ dB re 20 μ Pa for air.

Noise sensitive premises / developments: Principally comprising residential premises, hospitals, schools and hotels. Other premises and sites may be deemed to be noise sensitive depending upon circumstances.

Rating Level: The noise level of an industrial noise source which includes an adjustment for the character of the noise, as used in BS4142:1997.

Spectrum adaptation term (Ctr): A correction added to a sound insulation quantity to take account of a specific (traffic noise) spectra. See BS EN ISO 717-1:1997.

SEL: Sound Exposure Level – An Leq noise level of an acoustic event normalised to a 1 second reference period.

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