

Surrey County Council Guidelines for Noise and Vibration Assessment and Control

**Minerals, Waste and Other
County Development**

Prepared by
RPS Group PLC

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SURREY
COUNTY COUNCIL

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1 Introduction

Scope and Application of these Guidelines

- 1.1 Surrey County Council as the County Planning Authority (CPA) deals with planning applications for minerals, waste and for other County developments, such as schools. The CPA needs to ensure that noise (including vibration) from new development does not have an unacceptable adverse effect on the natural environment, human health or quality of life. Therefore, it is important that the CPA has careful regard to noise impacts when determining planning applications. To assist in the assessment of noise impacts from development proposals, the County Council has produced these Guidelines for Noise and Vibration Assessment and Control.
- 1.2 These Guidelines replace the CPA's previous Guidelines for Noise Control: Minerals and Waste Disposal [1], which were published in September 1994 and have been widely used since for the assessment and control of noise from minerals working and waste disposal sites. There have been substantive changes in national noise policy, guidance and standards over recent years since the publication of the previous Guidelines and these are referenced in the appropriate sections of this document.
- 1.3 The scope of these revised Guidelines has also been widened to cover other countywide developments of interest, which fall within the CPA's responsibilities, e.g. some roads, industrial noise sources in County developments, schools and construction works associated with County developments.
- 1.4 The content of these Guidelines is not exhaustive and the reader should refer to the relevant documents referenced herein for further and more detailed information on the requirements, limitations and applications of the various criteria, methodologies, guidance and policies.
- 1.5 A glossary of technical terms and acronyms is provided at the end of this document and a summary of relevant national policy, guidance and British Standards is provided in Appendix A.

2 Environmental Noise and Vibration Assessments for Developments

Introduction

- 2.1 Excessive noise and/or vibration from a development can cause loss of amenity for residents within the vicinity and other noise sensitive uses including but not limited to educational establishments, hospitals, care homes, offices and public recreation areas. Therefore, noise and vibration are important considerations in the determination of planning applications and, where noise and/or vibration issues are likely to arise, these should be identified at an early stage in the process.
- 2.2 The types of development within the County that have the potential to generate noise include: minerals sites; oil and gas sites including exploratory wellsites; waste sites including waste disposal facilities, material recovery facilities (MRFs), waste transfer facilities, energy from waste (EfW) facilities, anaerobic digestion facilities and energy facilities (i.e. gas extraction and power generation from landfill); new roads infrastructure, or modifications to existing road infrastructure; sports pitches and multi use games areas (MUGAs); mechanical plant for schools, fire stations or any other type of development; construction from any site and other industrial uses.
- 2.3 The types of development within the County that have potential to generate vibration include: minerals sites; oil and gas sites including exploratory wellsites; some waste sites (as listed above); and some constructions works including piling, tunnelling, blasting and use of vibratory plant and equipment.
- 2.4 In addition to the above, some development is noise sensitive and would require an assessment of existing sources of noise to ensure that the site chosen is suitable for development for this use. The main example of this within the County is schools and other educational uses. Existing sources of vibration are unlikely to be an issue for developments within the County.
- 2.5 Where a noise and/or vibration assessment is required, this should be carried out by a suitably qualified and experienced specialist [2]. The information required for the assessment will vary depending upon whether the assessment is a stand-

alone noise and/or vibration impact assessment (NVIA), or an assessment required under the Environmental Impact Assessment (EIA) regulations. Further details of the required information is provided within the Technical Appendix to this document.

3 Minerals

Introduction

- 3.1 The preparation of the ground and the extraction of minerals can result in noise and vibration effects and the potential sources are described below. Noise is the main consideration as vibration levels, except where blasting is required for hard rock quarries, rarely propagates beyond the site boundary.

Sand, Gravel and Clay (including stone, chalk etc.)

Introduction

- 3.2 Minerals working and associated use of plant and equipment can involve a range of potential noise and vibration generating activities including: soil, subsoil and overburden stripping; the construction and removal of soil storage mounds and heaps and noise attenuation bunds; the construction of new landforms; the extraction, processing and exporting of minerals; and the construction and use of haul roads. This working is categorised and described further below.

Site Preparation

- 3.3 Typical site activities will include the removal of trees and vegetation and the stripping of soils and overburden which will be stored in soil storage mounds and may be used to create earth bunds to screen the minerals workings and haul routes both visually and acoustically from nearby properties. These activities are generally short-term and associated with each phase of a quarry development.
- 3.4 Initial site preparation and final site restoration normally occur over durations at the start and end of the quarry development but with soil and overburden stripping and bund construction at distinct times during the development of the site as each phase is progressed. The plant normally used is large and powerful in order to complete the tasks in a reasonable period of time. Noise levels may be quite high but noise exposure at any one location will normally be limited to a relatively short period as the site is established and bunds etc. completed. At large sites, it may be possible to maintain views enjoyed by residents by delaying construction of some bunds or removing others before all working has been completed but only where noise effects are acceptable.

- 3.5 The Government's national Planning Practice Guidance for Minerals (PPG-M) [3] provides guideline noise limits for minerals working. This guidance allows for an increase in daytime noise limits for a temporary period of up to eight weeks, over a 12 month period, for activities associated with site preparation. The recommended working hours for minerals sites are 07:00 to 19:00 Mondays to Fridays. Recommended noise and vibration limits and further details of the PPG-M are provided in Appendix A.

Site Operations

- 3.6 This category of working includes activities associated with longer term extraction of minerals (typically sand and gravel or clay) and their transport to processing plant either on or off-site. Processing plant would include screens to separate grades of sand and gravel and to remove any oversize or reject material. Examples of associated plant include conveyors, excavators, wheeled loaders and dozers and bagging plant. Included within the process would be dump trucks or conveyors delivering material from the working area to the processing area and HGVs exporting material offsite. The PPG-M guidance on noise limits for long term minerals extraction operations at noise sensitive properties is summarised in Appendix A.
- 3.7 Many of these sites will also be subject to backfilling with inert materials and the same noise limits apply to this activity which may occur at the same time as the extraction activity. At certain times, depending on how the phasing operates, you may have a cumulative effects situation where there is site preparation on the next phase and continued minerals extraction and backfilling and/or restoration on the last phase. These cumulative effects need to be considered.

Site Restoration

- 3.8 Activities associated with site restoration are generally phased and will produce similar levels of noise and vibration to site preparation. Any acoustic screening provided by soil storage mounds can be lost at this stage of the process as they will be used to re-instate the soils and overburden across the restoration area. Intermittent work over an extended period can be expected for agricultural cultivation and settlement compensation. Restoration is generally to a level approved within the planning consent which may be the same, lower or higher than the original levels.

Processing and Manufacture

- 3.9 In addition to the minerals extraction process, a range of processing plant including crushers, graders, screeners, washing plant and concrete batching plant could operate. Brick and other product manufacture could also occur.
- 3.10 The fixed plant used for processing the mineral or manufacturing products will, on most sites, be in place for many years. Its location, type and arrangement should be considered with care from the outset to ensure the minimum environmental noise impact. For instance, noise sources should be kept low and can often be screened by suitably located stockpiles.
- 3.11 For sites that do not include minerals extraction, i.e. separate sites that contain minerals processing plant but with no extraction activity, or where the primary activity is manufacturing with secondary or ancillary minerals activity, it is appropriate to assess the noise impact using criteria in BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' [4] that are applied to permanent industrial and commercial installations. Further details of the BS 4142:2014 methodology and criteria are provided in Appendix A and Section 4 of this document.

Hours of Work

- 3.12 The hours of work cited above are derived from the national guidance provided in the PPG-M; they therefore represent what may be acceptable in all areas. However, ambient and background noise levels vary significantly throughout the CPA area and throughout the day and night periods. On this basis, the hours of work contained within the PPG-M, as included above, should not be viewed as appropriate for all sites or locations. A later start and/or earlier finish may be necessary if the background and ambient noise levels are very low but this would need to be considered on an individual basis. This should be undertaken by considering what time the background and ambient noise levels rise in the morning and fall in the evening. The presumption should be for shorter hours unless the full 12 hour working period can be allowed without detriment to residential amenity. Any deviation from the hours proposed in the PPG-M should be assessed, explained and justified.

Traffic Generation

- 3.13 If there is significant traffic generation associated with a development, then an assessment of noise change on local roads should be carried out. However, this aspect can be scoped out depending on the quantity of traffic generated relative to existing traffic, and the proximity of NSRs. For more details regarding traffic noise assessments on public highways, refer to Section 5 of this document. Traffic on access routes that are part of the development should be considered as part of the normal site operations assessment.

Noise Monitoring

- 3.14 Noise monitoring may be required under some circumstances, which would be determined by the CPA on an individual basis. Details regarding requirements for noise monitoring are provided in Section 6 of this document. Should this be required, i.e. where sensitive receptors are proximal to any potentially significant noise generating development, this will be identified within the conditions attached to the planning consent. Often this may just be required at the commencement of work for each phase or within six months of plant commissioning to discharge planning conditions etc.

Oil and Gas

Introduction

- 3.15 Conventional recoverable hydrocarbons (oil and gas) are those that are trapped in porous reservoirs (e.g. sandstone and limestone) and are relatively easy to extract. Conventional gas and oil has been extracted on-shore in the UK for over 100 years.
- 3.16 There are three phases of onshore hydrocarbon developments: exploration, testing (appraisal) and production. All of these will usually require a noise and vibration assessment.

Environment Agency (EA) Onshore Oil and Gas Sector Guidance

- 3.17 The EA has published Onshore Oil & Gas Sector Guidance [5] aimed at oil and gas companies, their consultants and other technical audiences, setting out which environmental permits are needed for onshore oil and gas exploration and extraction operations in England.

3.18 The guidance includes information on:

- planning / permitting interface;
- when operators will need an environmental permit or other permission and the options available;
- the information applicants will need to submit as part of their application;
- standards and, where appropriate, the best available techniques (BAT) that are required; and
- information on operational monitoring and compliance.

3.19 The guidance does not cover underground coal gasification.

3.20 The guidance identifies that the Mineral Planning Authority (MPA) may require an EIA for a scheme and that the EA will be a statutory consultee in such circumstances. The need or otherwise for an EIA can be confirmed by the applicant submitting a request for a Screening Opinion to the CPA, in accordance with the Regulations. If the Screening Opinion identifies that the development may result in significant environmental effects, then a formal EIA will be required in accordance with the Regulations. A Scoping Opinion may also be submitted by the applicant to identify which aspects of the development the CPA considers may result in significant effects and require assessment. If this includes noise, then the ES should include a chapter on this aspect.

3.21 Whether the development is considered EIA or not, the assessment should contain the information stated in the guidance with the main difference being that, for an EIA, the assessment should consider the sensitivity of the receptors, the magnitude of impacts and consequently the significance of effects. Proposals for site limits and for monitoring should also be included.

Exploratory Phase

3.22 The PPG-M guidance describes the exploratory phase as seeking to acquire geological data to establish whether hydrocarbons are present. It may involve seismic surveys, site establishment, exploratory drilling and site clearance. For conventional hydrocarbons, exploration drilling onshore is generally a short-term but intensive activity. Typically, site establishment, drilling and site clearance may take around 12 to 25 weeks dependant on horizon depth, well problems etc.

3.23 For unconventional hydrocarbons, exploratory drilling may take considerably longer, especially if there is going to be hydraulic fracturing and, in the case of coalbed methane, removing water from the coal seam.

Testing/Appraisal Phase

3.24 The testing/appraisal phase takes place following exploration when or if the existence of oil or gas has been proven but the operator needs further information about the extent of the reservoir and/or its production characteristics to establish whether it can be economically exploited. The appraisal phase can take several forms including additional seismic work, longer term flow tests, or the drilling of further wells from the same or additional well heads. This may involve additional drilling at another well head away from the exploration site or additional wellheads at the original exploration site to explore the extent of the productive horizon/s.

Production

3.25 The production phase normally involves the drilling of a number of wells. These may be wells used at the sites of the exploratory and/or appraisal phases of hydrocarbon development, or from a new site. Associated equipment such as pipelines, processing facilities and temporary storage tanks are also likely to be required and may remain operational for many years. Ongoing maintenance would be required as well as well workovers to maintain production levels.

Guideline Levels for Noise

3.26 Activities within onshore oil and gas developments which will require a noise assessment include:

- site investigation and preparation including the construction of access roads and materials and plant delivery;
- well pad construction;
- well set-up and testing;
- drilling (vertically and horizontally, as required);
- pumping and flow back recovery equipment;
- hydrocarbon extraction and on site processing;
- flaring (over range of gas flows);
- well maintenance;

- service and import/export vehicle movements; and
- well/s de-commissioning and site restoration.

3.27 For the above oil and gas activities, the criteria provided in Tables A.1 and A.2 of Appendix A would apply. For ancillary plant and operations associated with production, the BS 4142:2014 assessment and criteria would be appropriate (see Table A.3). Offsite vibration effects associated with the above are expected to be minimal and further consideration should only be necessary if particular sources with high vibration levels may be required as for some seismic equipment.

4 Waste

Introduction

- 4.1 Waste disposal facilities, material recovery facilities (MRFs), waste transfer facilities, energy from waste (EfW) facilities, anaerobic digestion facilities and energy facilities (i.e. gas extraction and power generation from landfill) generally involve various potentially noisy plant and activities that may warrant control and mitigation. These facilities, which may be within buildings or on open sites, also include: haulage roads; weighbridges and receiving halls; waste shredders, turbines and incinerators; crushers and graders; wood chippers; and mobile plant including excavators, wheeled loaders and dozers.

Main Site Activities

- 4.2 Noise from waste facilities should be assessed following the methodology in BS 4142:2014, which is summarised below with further details provided in Appendix A; this is unless they are associated with a minerals extraction site either operating in tandem or sequentially when the minerals criteria should apply.

Evaluation of Residual and Background Sound Levels

- 4.3 Baseline sound monitoring should be carried out at locations that are representative of the noise sensitive receptors that will be most affected by the facility, which should be agreed in consultation with the CPA. The monitoring should be carried out over a sufficient period to determine the representative residual (L_{Aeq}) and background (L_{A90}) sound levels over the times which the facility will be in operation in accordance with the standard. Normally this would require a long term monitor to be installed over a period of at least one week, weather permitting, but a shorter period may be agreed on a case-by-case basis; for example, where it is not practical to install a long term monitor. BS 4142:2014 provides guidance on the requirements for monitoring which should be followed.

Evaluation of the Specific Sound Level from the Facility

- 4.4 For new development, the specific sound level (L_s) should be determined by prediction based on either a computer generated model or a spreadsheet calculation following a suitable prediction method. ISO 9613-2 'Acoustics -

Attenuation of sound during propagation outdoors - Part 2: General method of calculation' [6] is commonly used, but other methods could be used, provided there is sufficient justification for their use. Sound data for significant noise sources should be provided in octave or 1/3rd octave bands and the source of the data should be cited. Details of any parameters used in the prediction and any assumptions made should also be provided, including how sound power levels have been derived for plant; how these have been modelled; heights and locations of plant; parameters for ground effect and air absorption; locations and heights of acoustic bunds or fences and other buildings or structures that provide screening. The specific sound should be determined over a suitable time period, which would normally be 1-hour during the daytime and 15-minutes during the night-time.

Evaluation of the Rating Level

- 4.5 The rating level ($L_{Ar,Tr}$) should be determined from the specific sound level for the facility including any adjustments for character following the method in Section 9 of BS 4142:2014. It should be noted that different character corrections may apply at different receptors, depending upon the most prominent sound sources at each location. Different plant may also operate day and night if the development operates on a 24 hour basis and hence different specific sound levels and rating levels may apply for these different periods.

Initial Assessment

- 4.6 The initial assessment should be carried out by considering the difference between the rating level and the background sound level at each assessment location. The significance of the initial evaluations that should be made are provided in Appendix A.

Consideration of Context

- 4.7 BS 4142:2014 states that the following factors are pertinent when considering the context:
- the absolute level of the sound;
 - the character and level of the residual sound compared to the character and level of the specific sound; and

- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

4.8 The above factors should be evaluated for each receptor at which an impact may occur and used to determine whether the initial assessment needs to be revised. In consideration of the context, it may also be necessary to draw upon other guidance including the World Health Organisation (WHO) 'Guidelines for Community Noise' [7] and 'Night Noise Guidelines for Europe' [8].

Final Assessment

4.9 Where an adverse impact or significant adverse impact is identified following the BS 4142:2014 method identified above, the applicant must demonstrate that the noise has been mitigated as far as is reasonably practicable in accordance with the NPSE and PPG-N. Where a significant adverse impact is still expected to occur following mitigation, then the application should normally be refused.

Other Considerations

4.10 Waste related sites also require an environmental permit following the Environmental Permitting Regulations, further details of which are provided in Appendix A.

4.11 If the site requires an assessment under the EIA Regulations, then an assessment of construction noise and vibration and traffic impacts may also be required. Further details are provided in Section 2 of this document.

5 Other County Development

Introduction

- 5.1 This section covers other development which the CPA carries out itself (or jointly with other parties). The CPA has the power to itself determine such planning applications (as opposed to the applications being determined by the relevant district or borough councils which are the normal local planning authorities for such development) in accordance with *Regulation 3* of the Town and Country Planning General Regulations 1992 (as amended).
- 5.2 The majority of *Regulation 3* planning applications are for schools and their related facilities (including facilities such as Multi Use Games Areas (MUGAs)) but can also relate to fire stations, infrastructure proposals (such as bridges), provision of accommodation for persons with special needs or libraries (this is not an exhaustive list).
- 5.3 The noise implications of such proposals will need to be considered and the CPA's *Local List for the Validation of County Development and County Matters Planning Applications* (in particular Annex 3 which relates to County Development under Regulation 3) document sets out broad guidelines for when such planning applications need to provide noise information. Generally noise information will be needed if the proposal will itself be a generator of noise, or in circumstances where a proposed noise sensitive development is to be located close to an existing noise source.
- 5.4 Regulation 3 planning applications can generate noise through increases in traffic (for example new schools or large expansions to existing schools), the installation of plant such as air conditioning or CHP boilers or generators, or through the introduction of facilities which might have some noise impact on neighbouring properties, such as MUGAs or community use sports facilities. Sometimes the construction works themselves can be generators of noise.
- 5.5 Below is additional guidance on what might be required with the submission of Regulation 3 planning applications which have noise implications.

Road Traffic

- 5.6 Procedures for the calculation and evaluation of road traffic noise impacts and changes in road traffic noise levels are described in the Department of Transport, Welsh Office document: Calculation of Road Traffic Noise (CRTN) 1988 [9] and the HMSO publication: Design Manual for Roads and Bridges (DMRB) 2011 [10]. Further details of these are provided in Appendix A.
- 5.7 For the majority of applications which just include traffic generation, the guidance within the DMRB for the classification of magnitude of noise impact in the long term would be applied, as provided in Table 5.1 below.

Table 5.1 DMRB Classification of Magnitudes of Noise Impacts in the Long Term

Change in Noise Level dB(A)	Magnitude of Noise Impact
0.0	No Change
0.1 – 2.9	Negligible
3.0 – 4.9	Minor
5.0 – 9.9	Moderate
≥ 10	Major

Other Vehicle Noise

- 5.8 For most planning applications for schools development, technical information on the noise impacts of additional traffic which would be generated on the public highway would not normally be required. The assessment of such proposals will however consider the impact of the traffic in general noise and disturbance terms on the amenity of neighbouring properties (which are often residential in nature). Technical noise information may be required where there may be noise implications of vehicles entering a site near sensitive noise receptors; an example of this would be the use of school sports facilities by the community outside of school hours in the evening involving visitors in vehicles accessing the site (see also the Sports Areas section below).

Industrial Sources of Noise in County Development

- 5.9 Other industrial sources which have the potential to generate noise include HVAC (heating, ventilation and air conditioning) plant and standby generators.

5.10 Fixed plant sources should be assessed in accordance with BS 4142:2014 as identified in Section 4. It is recommended for normal working hours (weekdays between 07:00 and 19:00 hours), that the difference between the rating levels and the background sound level should be no greater than +5 dB depending upon the context. Lower differences may be appropriate at other sensitive times of the day, depending upon the context.

5.11 If it is essential for plant to operate at times outside of normal working hours, other specific written limits will be set by the CPA which will be informed by the applicant's noise assessment.

Mechanical Plant Installations

5.12 Mechanical plant installations should be assessed following the guidance in BS 4142:2014 as identified in Section 4. It is recommended for normal working hours (weekdays between 07:00 and 19:00 hours) that the difference between the rating level and the background sound level should be no greater than +5 dB, depending upon the context. Lower differences may be appropriate at other sensitive times of the day, depending upon the context.

5.13 If it is essential for plant to operate at times outside of normal working hours, other specific limits will be set by CPA.

Sports Areas

5.14 Noise impacts from sports areas including sports pitches, all weather pitches (AWPs) and MUGAs can vary depending on a number of factors including location relative to noise sensitive receptors, design, size, hours of use, days of use and frequency of use. An appropriate noise assessment should be carried out where new sports areas, or extensions to hours of use of sports areas, are to be applied for.

5.15 The assessment should take into account the context of the existing/pre-development noise climate and the proposed hours of use, days of use and frequency of use of the sports areas. Where applicable, ancillary sources of noise including use of car-parks, access tracks or roads and pedestrian access should also be considered in the assessment. Should the application be for extended hours of use, days of use or frequency of use of a sports area, then the noise

climate should be established for the periods when use is sought, i.e. but during periods when there is no sports activity.

- 5.16 The existing baseline noise climate should be established at the nearest NSRs to the proposed sports areas; however, it is possible that other noise sensitive areas, e.g. ecological, could be present in the area and, if so, these should also be subject to appropriate assessment.
- 5.17 The noise levels from the sports areas should be evaluated in terms of the $L_{Aeq,1hr}$ for noise from general activity and the $L_{Amax,F}$ for impulsive noise (e.g. shouting, ball impact etc.) at the nearest affected NSRs to the sports areas. The change in noise levels from the baseline should be determined and an evaluation should be made of the prominence of the noise within the context of existing sources of noise in the vicinity of sports areas. The contextual consideration should include the likely response of the population affected.
- 5.18 Whilst there are no specific, fixed criteria for noise from sports areas, consideration should be given to the internal and external noise criteria for residential dwellings in the WHO Guidelines for Community Noise and the guidance provided by Sports England on the design and construction of sports areas which is available on the Sports England website [Artificial Grass Pitch \(AGP\) Acoustics - Planning Implications \(PDF\)](#) [11]. Noise assessments of sports areas should either demonstrate that noise from the development does not exceed 50 dB $L_{Aeq,1hr}$ at nearby residential dwellings or demonstrate why, in the circumstances of the case, a higher level may be acceptable.
- 5.19 However, where there is no specific methodology to assess a noise source, as for sports areas, it is usual to consider a range of indicators including absolute levels, noise change but also taking the character of the noise into account within the context of the environment surrounding the sports area.
- 5.20 The criteria in Table 5.2 shall apply as general indicators of acceptability. The assessment should be made in the context of the existing acoustic environment and likely sensitivity of the affected receptors. It is not recommended that these areas are allowed to be used during the night-time period (23:00 to 07:00 hours).

Table 5.2 Noise Limits for Playing Fields / Multi-Use Games Areas (MUGAs) / Play Areas

Hours of Use	Exceedance of these Criteria may Provide an Indication of an Adverse Effect Dependent upon the Context
Daytime (07:00 to 19:00 hours)	An external noise limit of 50 dB $L_{Aeq,1hr}(free\ field)$ at the nearest NSR.
Daytime (07:00 to 08:00 hours)	An internal noise limit internal of 35 dB $L_{Aeq,1hr}(free\ field)$ at the nearest NSR.
Daytime (08:00 to 09:00 hours)	A noise change of no more than 3 dB at the nearest NSR.
Evening (19:00 to 23:00 hours)	Predicted absolute noise levels assessed in the context of the existing baseline environment.
Evening (19:00 to 20:00 hours)	Predicted max levels assessed in the context of the existing baseline environment.
Evening (20:00 to 21:00 hours)	
Evening (21:00 to 22:00 hours)	
Evening (22:00 to 23:00 hours)	

5.21 Note: the assessment should provide a detailed breakdown for weekdays, Saturdays and Sundays for the above hours of use.

5.22 It is likely that the use of these areas will be conditioned by the hours and days of use rather than by specified noise limits. By providing such a detailed breakdown, the CPA will be able to determine the application based on all of the information presented and specify the hours and days of use on a case by case basis.

5.23 Where the assessment identifies that there would be a noise impact from the sports areas at the nearest NSRs, then appropriate mitigation for noise should be considered in the proposals. This could include relocation or orientation of the sports area and/or access routes; use of noise bunds or barriers; use of weldmesh fencing to reduce impact noise; and limiting hours and days of use.

5.24 In addition, it is also recommended that a Noise Management Plan is submitted with planning applications for sports areas.

Construction Works

5.25 Any construction works within County Development should be assessed following the guidance in BS 5228:2009-1+A1:2014 for noise generating works and BS 5228:2009-2+A1:2014 for vibration generating works, as required. Assessments should have consideration for the duration of the works and, where works are likely to take place for a prolonged period, i.e. 6 months or more, then lower noise limits, as also referred to in BS 5228:2009-1+A1:2014, may be appropriate to adopt. These lower limits are similar to those prescribed in the PPG-M for minerals extraction.

County Development near Existing Noise Sources

Acoustic Environment for Schools

5.26 The acoustic conditions in schools are controlled under Part E of the Building Regulations [12], the School Premises Regulations (SPR) and the Independent School Standards (ISS), which apply to new and existing schools. School premises are also subject to the Equality Act 2010.

5.27 Requirement E4 from Part E of Schedule 1 to the Building Regulations 2010 (as amended by SI 2002/2871) states:

‘Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.’

5.28 Approved Document E in support of the Building Regulations gives the following guidance:

‘In the Secretary of State’s view the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in Section 1 of Building Bulletin 93 ‘The Acoustic Design of Schools’, produced by DfES.’ (Note DfES is now DfE).

5.29 As the internal acoustic environment within schools is controlled via the Building Regulations, then the CPA would revert to the appropriate regulatory guidance in Section 1 of Building Bulletin 93 ‘The Acoustic Design of Schools’ (BB 93 2015) [13] when reviewing information regarding planning applications for schools.

Further details of the guidance in Section 1 of BB 93 2015 is provided in Appendix A.

Acoustic Environment for Other Developments

- 5.30 Other county developments that are noise sensitive may include sleeping areas for fire stations, care homes and other accommodation for persons with special needs and libraries. Acoustic design of these development should be based on the guidance contained within BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' [14].
- 5.31 Spaces used for patients' long-term living and sleeping (for example residential care homes and SEN accommodation) should be designed to meet the sound-insulation criteria for "rooms for residential purposes" as defined in Approved Document E of the Building Regulations [15].

6 Management Plans and Noise and Vibration Monitoring

Introduction

6.1 For large or complex sites, the provision of a Noise and Vibration Management Plan is considered good practice for any operator where a significant noise and/or vibration issue has been identified or may occur. In some circumstances, separate management plans and monitoring schemes for construction and operational phases may be required. In summary, management plans and monitoring schemes provide project specific reference documentation on the planning and execution of permitted development. They can:

- assist the operator in demonstrating compliance with any planning and/or permit conditions, and relevant guidance;
- assist the regulator in enforcement, and complaint investigation;
- identify responsibilities for managing noise;
- identify sensitive noise and vibration receptor locations and a scheme for measuring noise and vibration levels;
- define site staff competence, training and awareness requirements; and
- set out relevant procedures for internal and external communications with stakeholders.

Construction Noise and Vibration Management Plans

6.2 Construction Noise and Vibration Management Plans (CNVMP) should include the following information:

- date CNVMP prepared and any revision dates;
- site address and description;
- registered operator address (if different from site address);
- name and contact details for main point of contact on site;
- hours of work;
- overview of proposed works;
- construction programme;
- construction methods to be used in each stage of development;
- details of high impact activities;
- details of items of plant and equipment to be used;

- noise / vibration risk assessment to include predicted noise/vibration levels at identified sensitive receptors;
- proposed mitigation measures to reduce noise and vibration levels and sensitive noise/vibration receptors; and
- details of management and monitoring protocol to include: on-site management of noise and vibration levels; noise / vibration monitoring procedures; adopted site actions levels; complaints procedure.

Operational Noise and Vibration Management Plans for Minerals and Waste Developments

6.3 Operational Noise Management Plans (ONVMPs) should include the following information:

- date ONVMP prepared and revision dates;
- site address;
- registered operator address (if different from site address);
- name and contact details for main point of contact on site;
- brief description of site operations;
- site operating hours;
- scaled maps and site plans showing locations of noise sensitive receptors, sources and monitoring locations;
- noise sensitive receptor details and unique reference (type, extent, size);
- distance to site / operator boundary and/or noise sources;
- background $L_{A90,T}$ sound level (day and night-time) at each noise sensitive receptor and other noise metrics as appropriate;
- identification of sources of noise and/or vibration;
- hours of operation for each identified source of noise and/or vibration;
- details of any distinctive characteristics (tonal, impulsivity) for each identified source of noise and/or vibration;
- predicted specific noise levels (day and night-time) at each noise sensitive location when site and/or noise sources is operational;
- contribution to overall emissions at each noise sensitive receptor (categorised as medium or high);
- details of the proposed process for undertaking maintenance checks to minimise noise emissions from operations;

Compliance Failures

- details of all potential foreseeable scenarios that could increase noise and/or vibration levels which could lead to a non-compliance with planning / permit conditions;
- noise/vibration impact of a failure scenario including likely duration, details of noise/vibration level increases;
- immediate action to be taken in the event of a failure scenario; and
- proposed mitigation measured to prevent or reduce impact (e.g. closing doors, plant maintenance).

Noise and Vibration Monitoring

6.4 Noise and vibration monitoring may be required at different stages in the planning and execution of any development for:

- a) the establishment of baseline levels against which noise and/or vibration impacts may be determined;
- b) the derivation of activity source terms for the calculation of potential impacts; and/or
- c) compliance monitoring.

Continuous Noise Monitoring

6.5 Monitoring equipment should comply with all relevant standards and should be regularly calibrated in the field and in the laboratory at annual or bi-annual intervals.

6.6 Equipment options include:

- the logging of data over pre-set intervals;
- remote download of data via GSM modem or ethernet;
- flexible power supply options including battery, continuous power supply (110v or 240v), solar/hydrogen;
- an ability to set noise trigger values and send SMS text or email alerts when pre-set trigger values are exceeded; and/or
- audio recording / playback on trigger level exceedance.

6.7 For particularly sensitive locations, or those identified as requiring a complex or proactive noise monitoring programme, universal web interfaces are available

which support the viewing and reporting of data over web browser, on-demand accessibility of historic data via the internet and a real-time management live screen displaying instantaneous noise levels at each microphone position and the noise quota for a given period.

Continuous Vibration Monitoring

6.8 Continuous vibration monitoring involves the deployment of equipment with the following optional capabilities:

- the continuous logging of Peak Particle Velocity (PPV) and rms acceleration signals in the 3 orthogonal axes;
- the measurement of Vibration Dose Value (VDV) in accordance with the principles of BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings - Part 1: Vibration sources other than blasting' [16] to assess interference with human activities;
- remote provision of daily log of measured vibration values by email;
- email and/or text alerts following exceedance of threshold values;
- capture of short waveform information from events to enable more detailed investigation;
- external alarm beacon; and/or
- flexible power supply options including battery, continuous power supply (110v or 240v), solar/hydrogen.

Attended Monitoring

6.9 In addition to unattended continuous monitoring for the acquisition of robust data on background noise for statistical analyses etc., supplementary and complementary attended monitoring is an essential pre-requisite to obtain data at representative receptor locations in the vicinity of any development site and provide observations on the principal activities which influence diurnal and daily variations in ambient and background sound levels.

6.10 Such surveys can also be used to identify compliance with trigger actions levels and to support audits and complaint investigations.

6.11 More comprehensive guidance on equipment requirements and good practice in the field of environmental survey work can be found in the relevant standards referenced in previous sections, BS 7445 'Description and Measurement of

Environmental Noise' [17] [18] [19], the ANC Green Book 'Environmental Noise Measurement Guide' [20] and the ANC Red Book 'Measurement & Assessment of Groundborne Noise & Vibration' [21].

Glossary

Technical Terms

A-weighting/A-weighted

Weighting of the audible frequencies designed to reflect the response of the human ear to sound. The ear is more sensitive to sound at frequencies in the middle of the audible range than it is to either very high or very low frequencies. Sound measurements are often A-weighted (using a dedicated filter) to compensate for the sensitivity of the ear.

Ambient sound level / Ambient noise level

BS 4142:2014 defines the ambient sound level as the: 'totally encompassing sound in a given situation at a given time, usually from many sources near and far.' It is sometimes used to represent an environmental sound level defined specifically in terms of the L_{Aeq} index.

In the majority of other standards and guidance, the ambient sound level is referred to as the ambient noise level.

Background sound level / Background noise level

PPG-M refers to the background noise level as the: 'A-weighted sound pressure level of the residual noise at the assessment with no operation occurring at the proposed site, defined in terms of the $L_{A90,T}$.'

BS 4142:2014 defines the background sound level $L_{A90,T}$ as the: 'A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels' (i.e. a sound level defined specifically in terms of the L_{A90} index). The ambient sound level is a measure of the residual sound and the specific sound when present.

The terms 'ambient' and 'background' may be colloquially synonymous when describing environmental noise levels but this is not correct in formal terminology for acoustics terms.

Baseline sound or noise levels / Baseline sound or noise environment

The existing sound or noise levels before construction or operation of a development commences.

Decibel (dB)

Units of sound measurement and noise exposure measurement.

Equivalent continuous sound pressure level ($L_{Aeq,T}$)

Defined in BS 7445-2:1991 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time' i.e. it is a measure of the noise dose or exposure over a period. It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise including noise mapping. It is also the unit that best reflects community response.

Façade/Free-field

This applies to the positions for either measurement or prediction. A façade position is one that effectively represents sound levels at a building but is conventionally taken at a position 1 m from the building; this includes reflections from the building. A free-field position is one that is at least 3.5 m from a building where reflection effects are not significant. The difference between a sound level measured at a façade position and a free-field position, assuming that there is a specific sound source that causes reflections, is that levels are around 3 dB higher at the façade, due to the reflection effects.

Frequency

The pitch of the sound, measured in Hz. The tonal quality of a sound is described and measured in terms of the frequency content and is commonly expressed as octave or third octave bands; the latter being the division of the octave bands into three for finer analysis, across the frequency spectrum. The smaller the octave band or third octave band centre frequency number defined in terms of Hz, the lower the sound. For example, 63 Hz is lower than 500 Hz and is perceived as a deeper sound. The attenuation due to air absorption and natural barriers increases with frequency, i.e. low

frequencies are always the most difficult to control/mitigate. Frequency ranges for commonly occurring sounds include:

- the low notes on a bass guitar are typically around 40 to 50 Hz;
- the lowest string on a guitar is typically about 80 Hz;
- middle C is about 250 Hz;
- the C above middle C is about 500 Hz;
- sound from cars in a residential area is generally around 250 and 500 Hz;
- Greenwich Mean-time signal (pips) is around 1 kHz;
- bird calls are generally around 2 to 5 kHz; and
- a 'Shhh' sound made by the mouth is mostly around 4 kHz and above.

Hertz (Hz)

The unit of frequency in cycles per second.

$L_{Aeq,T}$

See 'Equivalent continuous sound pressure level'.

$L_{Amax,F}$

Maximum value of the A-weighted sound pressure level, measured using the fast (F) time weighting (in dBA).

L_{A90}

See 'Background sound level'.

Loudness/Loud

The measure of the subjective impression of the magnitude or strength of a sound as perceived by the human ear.

Noise and Sound

Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood. Sound can be measured by a sound level meter or other measuring system. Noise is related to a

human response and is routinely described as unwanted sound, or sound that is considered undesirable or disruptive.

Octave

The range between two frequencies whose ratio is 2:1.

Octave bands

Groups of frequencies defined by standards where the upper frequency of each band is equal to twice the lower frequency of the next higher band. Octave bands are usually named by their geometric centre frequency. For example, the octave band extending between 44.7 Hz and 89.1 Hz is called the 63 Hz octave band. The octave band extending between 89.1 Hz and 178 Hz is called the 125 Hz octave band. The full complement of octave bands in the audible frequency range is as follows: 31.5, 63, 125, 250, 500, 1,000, 2,000, 4,000, 8,000 and 16,000 Hz.

Rating level, $L_{Ar,Tr}$

BS 4142:2014 (Ref 15-11) defines the rating level as 'The specific noise level plus any adjustment for the characteristic features of the noise.'

Reflection

Sound can be reflected by hard surfaces including water which is acoustically hard and reflection effects can affect sound levels.

Slow/Fast Time Weighting

The response speed of the detector in a sound level meter. Slow response time is 1 second; fast response time is 1/8 second (0.125 seconds) and will detect changes in sound levels more rapidly than measurements made with Slow time-weighting.

Sound

See 'Noise and Sound'.

Sound Power Level (SWL, L_w)

A sound power level is a measure of the total power radiated as sound by a source in all directions. It is a property of the source and is essentially independent of the measuring environment. The sound power level of a source is expressed in decibels (dB) and is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the

source to a reference sound power. The reference sound power in air is normally taken to be 10^{-12} watt.

Sound Pressure Level (SPL)

Sound pressure is the dynamic variation of the static pressure of air and is measured in force per unit area. Sound pressure is normally represented on a logarithmic amplitude scale, which gives a better relationship to the human perception of hearing. The sound pressure level is expressed in decibels (dB) and is equal to 20 times the logarithm to the base 10 of the ratio of the sound pressure at the measurement location to a reference sound pressure. The reference sound pressure in air is normally taken to be 20 μ Pa, which roughly corresponds to the threshold of human hearing.

Sound spectrum

A sound represented by its frequency components.

Source term

The acoustic properties of a source defined as a sound power level or as a sound pressure level under specific measurement conditions. Source terms are sometimes provided as a spectrum.

Specific sound level, $L_{Aeq,Tr}$

BS 4142:2014 defines the specific sound level as the 'equivalent continuous A-weighted sound pressure level produced by the specific sound source over a given reference time interval'.

Third-octave bands / 1/3rd octave band

Frequency ranges where each octave is divided into one-third octaves.

Tonal

Sound sources sometimes contain audible or measurable components that can be identified as hums, whistles etc. The presence of these tonal components is sometimes considered to add an extra, annoying quality to the sound.

Abbreviations

AGP Artificial Grass Pitch

ANC Association of Noise Consultants

AWP	All Weather Pitch
BAT	Best Available Techniques
BB 93	Building Bulletin 93
BS	British Standard
CNVMP	Construction Noise and Vibration Management Plan
CPA	County Planning Authority
CRTN	Calculation of Road Traffic Noise
dBA	Decibels A-weighted
DCLG	Department for Communities and Local Government
DfE	Department for Education
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EIA	Environmental Impact Assessment
EfW	Energy from Waste
EHS	Environment and Heritage Service
Hz	Hertz
IANL	Indoor Ambient Noise Level
IOA	Institute of Acoustics
IPPC	Integrated Pollution Prevention Control
ISO	International Organisation for Standardisation
ISS	Independent School Standards

LOAEL	Lowest Observed Adverse Effect Level
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NSR	Noise Sensitive Receptor
NPSE	Noise Policy Statement for England
MPA	Minerals Planning Authority
MRF	Material Recovery Facility
MUGA	Multi-use Games Area
NIA	Noise Impact Assessment
ONVMP	Operational Noise and Vibration Management Plan
PPG 24	Planning Policy Guidance 24: Planning and Noise
PPG-M	Planning Practice Guidance for Minerals
PPG-N	Planning Practice Guidance – Noise
PPV	Peak Particle Velocity
SEPA	Scottish Environment Protection Agency
SOAEL	Significant Observed Adverse Effect Level
SPR	School Premises Regulations
UAE	Unacceptable Adverse Effect
VDV	Vibration Dose Value
WHO	World Health Organization

Reference

- 1 Surrey County Council. Guidelines for Noise Control, Minerals and Waste Disposal. 1994. [[back to reference 1 link](#)]
- 2 Appropriately qualified and experienced acoustician – relevant degree; at least 5 years direct experience; Member or better of the Institute of Acoustics; preferably, company or individual member of the Association of Noise Consultants [[back to reference 2 link](#)]
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- 18 British Standards Institution. British Standard 7445-2:1991 Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use. 1991. [[back to reference 18 link](#)]
- 19 British Standards Institution. British Standard 7445-3:1991 Description and measurement of environmental noise - Part 3: Guide to application to noise limits. 1991. [[back to reference 19 link](#)]
- 20 The Association of Noise Consultants Green Book. Environmental Noise Measurement Guide. ANC. 2013. [[back to reference 20 link](#)]
- 21 The Association of Noise Consultants Red Book. ANC Guidelines. Measurement & Assessment of Groundborne Noise & Vibration. 2nd Edition. ANC. 2012. [[back to reference 21 link](#)]