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CONSTRUCTION NOISE -

A good practice guide to the preparation, submission and management of Section 61 consents

Technical Note

Disclaimer

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Contents

1. Introduction

1.1 Working Group

This guide has been prepared with contributions from members of the Association of Noise Consultants' construction noise working group. The principal authors of the guide include:

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1.2 Context

One of the stated objectives of The Association of Noise Consultants is 'To maintain and, where possible, improve the standards of conduct and competence of consultants concerned with noise, acoustics and vibration'. In the field of construction noise and vibration, the association has identified a need for practical guidance to assist practitioners in adopting a consistent approach when applying for prior consent under Section 61 of the Control of Pollution Act 1974 and to demonstrate suitable levels of rigour and professionalism in preparing information for that purpose. The objective of this good practice guide is to provide guidance for that purpose.

This guide may also assist others (developers, project and programme managers, decision makers, local environmental health practitioners and members of the public) in improving consistency in the use of the Section 61 prior consent process. In addition, the guidance provided in this document may also serve to assist anyone involved in the preparation of construction noise and vibration management plans or other similar documents where the Section 61 process itself is not applicable.

It is generally accepted for construction sites where works are undertaken in close proximity to environmentally sensitive resources or where management of the construction programme is a key consideration, that seeking prior consent under Section 61 of the Control of Pollution Act 1974 [i] can be an effective way of ensuring that the desired project outcomes are achieved whilst affording the necessary level of protection to those potentially at risk from construction noise and vibration effects. However, demolition and construction can be complex and variable, making reliable predictions and assessments at times challenging, despite, and sometimes because of, the defined process identified in the British Standard 5228 [ii][iii], which is the statutory Code of Practice attached to the Control of Pollution Act 1974.

The level of detail contained within applications for prior consent has been observed to vary considerably across many aspects of the process, including:

- description of the proposed works;
- assumptions on the source noise levels of plant and equipment;
- approach to the noise level calculations;
- consideration of ambient noise levels;
- approach to addressing vibration;
- description and interpretation of Best Practicable Means (BPM) and proposed mitigation measures; and
- consideration of site-specific conditions and circumstances.

The variability may be due to a range of factors including; project scale and sensitivity; risk severity; and potentially a lack of competency and understanding of the technical and legal requirements.

This good practice guidance includes an explanation of the legislative framework for Section 61 applications for prior consent and the roles and interactions of those involved in their preparation. It also provides practical advice on: the preparation of the application including noise predictions; engagement with the relevant local authority and other key stakeholders; the application of best practicable means to minimise noise (and vibration); agreeing suitable consent conditions; and the monitoring and management of compliance with consent conditions. Advice is also given on the role and setting of noise and vibration limits or thresholds and the uncertainty associated with noise and vibration predictions.

The definition of best practicable means and its particular importance as part of a Section 61 application is explained in section 1.3.4 of this Technical Note.

1.3 Legislative Background

The Control of Pollution Act 1974 (CoPA) and the Environmental Protection Act 1990 [iv] (EPA) give local authorities powers to control noise[1] from construction sites and other similar worksites either before works start, or after they have commenced. CoPA under Section 61, has provision for contractors or persons arranging for works to be carried out to take a proactive approach to meeting the local authority's requirements in relation to noise and vibration, by applying for a prior consent for the works.

Section 61 applications are not mandatory. However Local Authority intervention, including the serving of notices under the relevant legislation, can directly impact on the delivery of the construction works by causing programme delays and other undesirable knock-on effects. If a notice is served after the works have commenced, then there can be more substantial consequences for contractors including greater risk of programme delays and unwanted costs.

Whilst Section 61 applications might not normally be appropriate for works that are not expected to give rise to appreciable noise or vibration, the decision on whether a Section 61 consent process is required will need to take into account the Local Authority preferences and whether the works can be managed adequately in other ways without Section 61 consent.

1.3.1 Control of Pollution Act 1974 – Section 60

Section 60 of CoPA provides powers to a local authority to impose controls on construction noise emanating from a site, before or after works have started. Under Section 60, a local authority can serve a notice on those responsible for the works and impose requirements as to the way in which the works are to be carried out. The notice may:

a. specify the plant or machinery which is, or is not, to be used;

b. specify the hours during which the works may be carried out;

c. specify the level of noise which may be emitted from the premises in question or at any specified point on those premises or which may be so emitted during specified hours; and

d. provide for any change of circumstances.

In acting under this section of CoPA the local authority shall have regard –

a. to the relevant provisions of any code of practice issued under this Part of this Act (BS5228:2009+A1:2014)

b. to the need for ensuring that the best practicable means are employed to minimise noise;

c. before specifying any particular methods or plant or machinery, to the desirability in the interests of any recipients of the notice in question of specifying other methods or plant or machinery which would be substantially as effective in minimising noise and more acceptable to them;

d. to the need to protect any persons in the locality in which the premises in question are situated from the effects of noise.

1 Noise includes vibration as defined in CoPA.

The provisions of Section 60 are applicable to works of the following description:

a. the erection, construction, alteration, repair or maintenance of buildings, structures or roads;

b. breaking up, opening or boring under any road or adjacent land in connection with the construction, inspection, maintenance or removal of works;

c. demolition or dredging work; and

d. (whether or not also comprised in paragraph a, b or c above) any work of engineering construction.

1.3.2 Control of Pollution Act 1974 – Section 61

As an alternative to risking the imposition of unexpected or undesirable controls under Section 60, the contractor may pursue a proactive approach and seek "prior consent" for the works under Section 61 of CoPA.

An application for prior consent under Section 61 should cover the specifications as set out in Section 60 (including plant and machinery, hours of work and noise levels expected to be emitted) and should also demonstrate that BPM will be employed to minimise noise. For further information on BPM see section 1.3.4 of this guidance. If the local authority considers that the application contains sufficient information for the purpose and that, if the works are carried out in accordance with the application, it would not serve a notice under Section 60 in respect of those works, the local authority shall give its consent to the application.

Consent Conditions

The local authority has the power to

- attach any conditions to a consent;
- limit or qualify a consent to allow for any change in circumstances; and
- limit the duration of a consent.

Further information on consent conditions is provided in Section 4 of this guidance.

Responsibilities of Contractor and Employer

It is an offence for any person who knowingly carries out the works, or permits the works to be carried out, in contravention of any conditions attached to a consent.

BS5228 explains that an employer or its agent can choose to place the responsibility on the contractor to secure the necessary consents and can impose this requirement through formal contractual arrangements.

Where a consent has been given under Section 61 and the works are carried out by a person other than the applicant for the consent, it is an offence to fail to take all reasonable steps to bring the consent to the notice of that other person.

It is essential, therefore, that the person who is granted the consent brings any conditions or limitations to the consent to the attention of all other parties involved in the construction of the project.

Since it is also an offence to permit works to be carried out in contravention of conditions attached to the consent it is good practice to ensure that both Contractor and Employer are involved in the application process, for example as joint signatories or with the employer acting in an assurance capacity during the drafting and application stages.

1.3.3 Defence to further enforcement action

Providing the Contractor undertakes the works in accordance with the Section 61 consent and any attached conditions it is a defence to any enforcement action under Section 60 of CoPA. It is also a defence to statutory nuisance action under Section 80 of the EPA to show that the alleged nuisance was due to activities covered by a Section 60 notice or Section 61 consent.

A Section 61 consent is not usually a defence to private nuisance actions under Section 82 of the EPA taken by aggrieved individuals. Further information on this matter is provided in Section 1.3.5 of this guidance.

Determining the Application

The local authority has 28 days in which to determine an application for prior consent, from the date it was formally submitted. For more complex applications it can therefore be beneficial (but is not mandatory) to submit a draft application by agreement with the local authority to obtain comments in advance of formally submitting the application.

If the local authority does not approve the application within 28 days, it is deemed to be refused, and the applicant can submit an appeal against the refusal within a further 21 days[2] from the date when the determination would have been due. Section 2 of this guide provides further guidance on the application and appeals process.

1.3.4 Best Practicable Means

It is a requirement that a Section 61 application demonstrates to the satisfaction of the local authority that the works are going to be carried out using BPM. Section 72 of CoPA (and Section 79(9) of the EPA) define BPM as follows:

- "Practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications.
- The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic[3] structures.
- The test of best practicable means is to apply only so far as compatible with any duty imposed by law, and in particular is to apply to statutory undertakers only so far as compatible with the duties imposed on them in their capacity of statutory undertakers[4].
- The test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.

The "current state of technical knowledge" has been interpreted to mean that the BPM can change and evolve. It also implies that unproven technology is precluded.

The "local conditions and circumstances" generally allow for site specific considerations and could mean that solutions which were applied elsewhere may not necessarily be appropriate in other cases, depending upon the likely adverse effects anticipated at a local level.

"Financial implications" mean that spending on additional noise control must be reasonable within the resources of the business or scheme, and has demonstrable cost benefit. There is case law recorded that it is not sufficient to rely solely on showing that there would be an adverse financial impact associated with a specific control measure, without including some context to also show what level of noise reduction the expenditure might afford. It is entirely reasonable for cost to be expended in cases where the resulting measure would provide widespread protection and benefit to the surrounding community.

It is generally accepted that demonstrating that BPM will be used to control noise and vibration is the primary requirement of a Sections 61 application. This means that where other guidance applies, for example, noise limits recommended by a Local Authority, the above definition of BPM prevails both in terms of the general duty to limit noise and the circumstances of what may be "practicable". Similarly, if a Local Authority has no specific guidance or local policies on construction noise or vibration, a Section 61 application must in any case seek to demonstrate controls on noise and vibration will be implemented in accordance with BPM.

Code of Practice

CoPA also states that in determining whether BPM has been employed, regard should be given to any relevant Code of Practice approved under Section 71 of CoPA.

BS5228:2009+A1:2014[5] has been approved as a Code of Practice by the Secretary of State under Section 71 of CoPA[6].

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2 The Statutory Nuisance (Appeals) Regulations 1995.

3 The word "acoustic" is omitted from S79(9) of EPA.

4 The clause is limited to the following in S79(9) of EPA "the test is to apply only so far as compatible with any duty imposed by law".

5 Part 1: Noise and Part 2: Vibration.

6 As confirmed here: https://www.legislation.gov.uk/uksi/2015/227/pdfs/uksiem_20150227_en.pdf

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1.3.5 Environmental Protection Act 1990

Section 79(g) of the EPA defines noise emitted from premises as to be prejudicial to health or a nuisance as a statutory nuisance. Construction noise is not exempted from this definition. The local authority can take action to require the person responsible for the nuisance to abate the nuisance or prevent its occurrence or recurrence by service of a notice under Section 80 or take such other steps as it thinks appropriate for the purpose of persuading the appropriate person to abate the nuisance or prohibit or restrict its occurrence or recurrence. If the nuisance is not abated within seven days starting with the day on which the authority was first satisfied that the nuisance existed, or was likely to occur or recur, then the local authority must serve the notice. It is an offence to fail to comply with the notice.

It is a defence to a Section 80 notice to show that a Section 61 consent was in force and that works were taking place in accordance with the consent. It is also a defence to demonstrate that BPM were used to prevent, or to counteract the effects of, the nuisance.

Section 82 of the EPA allows for any person aggrieved by the existence of a statutory nuisance to apply to a Magistrate's Court (the Sheriff's Court in Scotland) for an abatement order. The court may also impose a fine. The BPM defence applies to action taken under Section 82, but a Section 61 consent is not a defence against this action.

Often nationally important projects, which are typically consented through a Hybrid Bill or Development Consent Order process, will seek a derogation from Section 82 of the EPA. Such projects, which include High Speed 1, Crossrail, Thames Tideway Tunnel, Hinkley Point C and High Speed 2, have obtained derogation defining that compliance with a Section 60 notice or Section 61 consent is a defence against proceedings under Section 82. This enables the Contractor to carry out its works, as approved by the local authority, with greater certainty.

As an example, the Development Consent Order for the Hinkley Point C project states:

a. *the defendant shows that the nuisance – (i) relates to premises used by the undertaker for the purposes of or in connection with the construction or maintenance of the authorised project and that the nuisance is attributable to the carrying out of the authorised project in accordance with a notice served under section 60 (control of noise on construction site), or a consent given under section 61 (prior consent for work on construction site) or 65 (noise exceeding registered level), of the Control of Pollution Act 1974(3)*

1.3.6 Government Policy

The advice set out in the National Planning Policy Framework[v] is based upon the vision and aim of the Noise Policy Statement for England[vi] (NPSE). The NPSE, issued in March 2010, aims to provide clarity regarding policies and practices to enable noise management decisions to be made within the wider context of the project and the Government's policies regarding sustainable development. The NPSE states the following Noise Policy Vision:

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

The long-term vision is supported by the following Noise Policy Aims:

> *Through the effective management and control of environmental, neighbour and neighbourhood [7] noise within the context of Government policy on sustainable development:*
>
> *Avoid significant adverse impacts on health and quality of life;*
>
> *Mitigate and minimise adverse impacts on health and quality of life; and,*
>
> *Where possible, contribute to the improvement of health and quality of life.*

NPSE provides the following guidance regarding the terms "significant adverse" and "adverse":

> *NOEL – No Observed Effect Level – This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
>
> *LOAEL – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected.*
>
> *Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*

7 "Neighbourhood noise" includes construction sites.

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

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

Therefore, any construction project should be compliant with the National Planning Policy Framework and construction noise should be compliant with the aims of the NPSE. While consideration of compliance with the NPSE may not be addressed directly in a Section 61 application, any noise threshold levels adopted should be consistent with guidance in the NPSE.

Planning Practice Guidance Noise[vii] is clear that it is up to the local planning authority to define their own values should they choose to do so, for example by setting a SOAEL for construction noise. Therefore, local authorities may have published differing values or may declare a preference for alternative values to those presented below.

However, to assist the promoter, developer and/or contractor, the following guidance is taken from the Thames Tideway Tunnel environmental statement, which was scrutinised in detailed as part of the Development Consent Order process. The Thames Tideway Tunnel, inspector's report[8] states in Clause 12.197:

We note that the use of s61 and local authority approval process (discussed later) would ensure that Best Practicable Means (BPM) are applied at each site, which would also serve to minimise and mitigate effects below the SOAEL level.

Clause 12.337 of the inspector's report states that:

We agree with the Applicant's assumption that the second aim [of the NPSE] relates to mitigation and minimising adverse effects, and agree with its interpretation of this being when noise levels are between LOAEL and SOEAL (sic).

The Thames Tideway application defined LOAEL and SOAEL as described in the following paragraphs.

Example SOAELs and LOAELs for Residential properties – Thames Tideway Tunnel

SOAELs for daytime, evening and night-time periods from construction noise at **individual residential properties**, where, the construction noise is greater than the specified daytime, evening or night levels for 10 days in any 15 days, 40 days in any six months or the average monthly level are defined in the application as:

- Daytime 75 dB (L_{pAeq})[9], or above the existing ambient if this is higher.
- Evening 65 dB (L_{pAeq})[10], or above the existing ambient if this is higher.
- Night 55 dB (L_{pAeq})[11], or above the existing ambient if this is higher.

Where construction noise levels are greater than the level and temporal values defined above, there may be a requirement to provide off-site mitigation. Further information regarding such mitigation is discussed in Section 2.3.3.

8 Examining authority's Report of Findings and Conclusions and Recommendation to the Secretary of State for communities and Local Government and the Secretary of State for Environment, Food and Rural Affairs.

9 The daytime SOAEL of 75 dB L_{PAeq} is based upon experience from other construction projects such as High Speed 1 (formerly Channel Tunnel Rail Link), Crossrail and Thameslink.

10 For the evening the SOAEL is set 10 dB lower than the daytime level and 10dB above the night-time level.

11 For night-time, the World Health Organization's Night Noise Guidelines for Europe introduced an Interim Target of 55 dB L_{night} measured outdoors and could be interpreted as a SOAEL threshold.

LOAELs for daytime, evening and night-time periods from construction noise at **individual residential properties**, are defined as:

- Daytime 65 dB (L_{pAeq})[12], or above the existing ambient if this is higher.
- Evening 55 dB (L_{pAeq})[12], or above the existing ambient if this is higher.
- Night 45 dB (L_{pAeq})[12], or above the existing ambient if this is higher.

Example SOAELs and LOAELs for Non-residential properties – Thames Tideway Tunnel

Any buildings other than residential, including commercial buildings and, if appropriate, schools, hospitals and clinics, may need to be separately identified, and subject to individual assessment as considered necessary. In delivering values for LOAEL and SOAEL due regard should be given to their construction, use and location. It is not possible to establish generic standards for such buildings because of the individual differences in use, sensitivity, layout and structure. Relevant national standards and guidelines, existing internal noise levels and precedents may be used as guides for setting trigger levels for individual buildings.

An assessment will then be required to demonstrate compliance with the Noise Policy Aims. Where, however, the SOAEL values are likely to be exceeded then alternative approaches may be required to further reduce the noise exposure at local receptors. This could include, for example, changing the work programme to limit the length of time within any one day that a particular noisy operation can take place.

1.4 Roles and responsibilities

Section 61 applications should be made by the Contractor (or Employer) who intends to carry out works to the relevant local authority.

The role of the noise consultant is to provide technical support and input on noise and vibration issues. This may include preparation of Noise and Vibration Management Plans and Section 61 consent applications, undertaking noise predictions to establish construction noise levels at the identified receptors based on the works programme, providing advice to the construction team on BPM and mitigation options, and assisting to ensure compliance with the consent conditions. The noise consultant should be a suitably qualified and experienced person with specialist knowledge of construction noise and vibration management.

For the purposes of this document the Project Director[13] is the person who has ultimate responsibility to ensure that the project adequately controls and manages noise and vibration issues and the Construction Manager[13] has the day-to-day responsibility for ensuring that the construction activities are managed in accordance with the Section 61 consent, minimising the effects of noise and vibration on nearby sensitive receptors. This role is especially important where conditions on site may necessitate short-term reactive modifications to the precise construction techniques or BPM measures set out in a Section 61 consent. The Construction Manager is also responsible for ensuring staff and subcontractors are briefed on noise and vibration work requirements through daily activity briefings, subcontractor briefings and toolbox talks.

Typically, for each worksite an Environment Manager will be responsible for the overall management, co-ordination and dissemination of the noise and vibration requirements in terms of legal compliance, preparation of plans, reviewing noise monitoring data, investigating complaints and helping to develop training presentations and task briefings/toolbox talks for site staff.

It is typical for local authority resources to be stretched, and some officers may be unfamiliar with the S61 process and/or your project. It is therefore advisable to engage with the Environmental Health representative as early as possible in the process to understand their concerns and familiarise them with the proposals. While many authorities will encourage S61 applications, some may be cautious due to concerns that it will "tie their hands" if there are subsequent complaints, particularly as there is often no input from elected councillors on the process due to the S61 timescales. Early engagement can help to alleviate some of these concerns, as can a robust community engagement plan and complaints resolution process from the developer.

12 The daytime, evening and night-time LOAEL is based upon experience from other construction projects such as High Speed 1 (formerly Channel Tunnel Rail Link), Crossrail and Thameslink.

13 Titles may alter from project to project.

1.5 Other Considerations

The Control of Pollution Act 1974 and the relevant code of practice, BS 5228, both refer the assessment of construction noise on people or occupants of buildings. Specifically, CoPA 1974 states:

In acting under this section the local authority shall have regard to the need to protect any persons in the locality in which the premises in question are situated from the effects of noise.

Furthermore, BS5228 considers noise sensitive properties to be ... *any occupied premises outside a site used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in noise level.*

As defined above, a Section 61 consent should only consider 'persons in the locality' or 'noise sensitive properties'. However, given that one test for best practicable means includes having regard to local conditions and circumstances consideration of the following additional influencing factors may be directly or indirectly relevant when developing and demonstrating BPM within the Section 61 application:

- Animals
- Marine ecology
- Cultural heritage
- Air quality
- Lighting
- Visual intrusion
- Security

Details of information to consider are provided in the following sections.

1.5.1 Animals

The weight applied to the protection of animals when considering BPM, will depend on the importance associated with the species and the habitat where they reside. The importance can relate to conservation (and potentially linked to designated sites such as SSSI) or a livelihood (e.g. livestock). Different species are affected by noise in different ways. These can include interference with communication, masking predation, startle and fright, along with other physiological effects. Hearing acuity differs significantly between species and consequently no uniform frequency weighting has been established to best evaluate response. Whilst there is limited available literature, the guidance which is available suggests some general principles. For example, British Standard BS 5502: Part 32: 1990 Buildings and structures for agriculture, Part 32: Guide to Noise attenuation[viii], section 5 states:

Effect of noise on livestock

Sudden loud sounds such as that produced from thunder (120 dB(A)) are particularly stressful and frightening to animals. Studies have shown that sheep exposed to 75 dB(A) gained weight faster than those exposed to 100 dB(A). Nevertheless, sheep exposed to instrumental music had significantly lower heart beats than those' exposed to white noise (a static hiss) or miscellaneous sounds such as trains and fog horns. Noisy equipment should not be sited in areas where animals need to walk in file. Air equipment should be checked for leaks and fitted with mufflers. Gates should either be counterweighted so that they close gently after the animals or be fitted with rubber or timber padding to prevent the noise of metal hitting metal. In the absence of any quantitative level with regard to the effect of noise on animals it is recommended that the maximum duration of daily exposure should be 8 h per day at 90 dB(A).

Where guidance is provided most papers on this subject suggest that habituation can occur reasonably quickly, for example, *McLean and Tarnopolsky*[14] suggests that habitation occurs after 10 to 30 presentations.

14 McLean EK, Tarnopolsky A. Noise, discomfort and mental health. A review of the socio-medical implications of disturbance by noise. Psychological Medicine 1977; 7:19-62.

It is generally considered that at species specific recommended levels, most animals demonstrate some habituation to noise and, in most instances additional care should be given where animals do not have the freedom to move away from the sound should they wish. Therefore, where species specific guideline noise levels are likely to be exceeded, and/or where animals are constrained within a limited area, for example, stables, kennels or paddocks, further detailed consideration may be necessary. It is recommended that specialist advice is sought where a risk is identified that such receptors could be materially affected, which in turn could influence the determination of BPM.

1.5.2 Marine Ecology

When working in, or very close (within a few metres) to a body of water where important marine ecology[15] may be present, the nature of the construction works to be undertaken should consider the effect on the marine ecology. This may predicate certain processes and noise mitigation options, and also necessitate measures to protect specific marine species. For example, there may be a requirement to consider migratory periods of key species or control waterborne levels to enable marine species of interest to pass the area. Depending upon the nature of the works proposed, it may be appropriate to consult a specialist marine ecologist.

1.5.3 Cultural Heritage

Generally, a building (or other structure) of historic value should not, unless it is structurally unsound, be assumed to be more sensitive to noise or vibration than other buildings with the same use. Nevertheless, there may be genuine circumstances where additional precaution may be necessary and cultural specialists may impose lower thresholds for the risk of damage from vibration. Furthermore, additional time should be factored into the programme where a need for building mitigation is identified due to the potential additional planning consents required for certain historical or listed buildings, or there is a requirement to provide semi-permanent monitoring, where equipment will be physically fixed to the building.

1.5.4 Other Mitigation Considerations

In addition, the noise and vibration receptors discussed above, other factors could have an effect on BPM, including:

- Visual intrusion: The location of screening (whether hoarding, bunds or enclosures) included within a scheme may block views and reduce natural light to properties. This may limit the height of screening, though the effect of blocking light can be minimised with the use of clear sections of barriers. Other mitigation could be planting to soften the effect of barriers, murals or use of that space for information[16].
- Lighting: Restricted spaces due to hoarding may need to be lit resulting in light overspill on properties.
- Security: Restricted spaces from hoarding may create areas where undesirable activities could be undertaken, or where risks to personal security are increased.

15 For example, RAMSAR sites or fisheries.

16 For instance, project information boards, paintings from local school children and advertising for local shops that may be obscured by the hoarding or the site. Vision panels in hoarding can have the practical benefit of a better understanding from the local stakeholders as to why the works are resulting in the incident noise levels and the progress being made on the project.

2. Scope and Application Strategy

2.1 Approaches

There are two established approaches to obtaining prior consent under Section 61 of the CoPA 1974. The first approach, that is most commonly used, is to submit an application covering all concurrent works within the site for a fixed period within the overall programme, the second is to seek consent for specific activities (or groups of activities) for the entire duration of the programme.

An activity-based application is often preferred where there is a desire to arrange the construction programme for individual *subcontractors*. It can result in a clear delineation with each *Subcontractor* working within a specific Section 61 application. However, where there is a need, or a direction from the local authority, to determine the combined noise or vibration levels from a project, each application may need to include supplementary information about the others' activities. This can result in problems where the works in separate applications overlap in the programme, and in particular, when monitoring compliance for each separate consent. These situations can be further confounded where minor variations or consent dispensations are also to be considered alongside the main or primary consent.

Where there is not transparent and accessible information between multiple contractors this can lead to an underestimation of the total noise effect, both in terms of magnitude and length of effect. This can lead to uncertainty, for example, as to eligibility for noise insulation or temporary re-housing. Given the difficulty of obtaining relevant information, it is key for one of the senior construction managers within the project team to be made responsible for the collation of data, assessment process and the preparation of the S61 application to cover all works. This is likely to be the senior manager for the contractor acting as principal contractor for the site.

A procedure for collation of information should be agreed with involved parties as soon as practical during the development of the construction programme and could include the following:

- Delineation of responsibilities and individuals assigned, including Local Authority contacts;
- Planning the quantity, scope and duration of each Section 61 application to meet the needs of the overall construction programme;
- Milestone timeframes, back calculated from the final issue of the S61 taking account of review times for local authorities, drafting times, assessment periods and data collection. It may also be necessary to make provision for any realistic prospect of entering into appeal proceedings;
- Details of construction information required;
- Screening of noisy works and identifying those that could be screened out of further consideration;
- Approach to applying mitigation (e.g. cost effectiveness and ranking noise contributors);
- Schedules or templates for data collation and other information required for the Section 61 documentation;
- Programming and planning the timing and frequency of engagement with the regulatory authorities; and
- Development of associated processes for variations and dispensations,

The assessment of multiple construction activities could be complex with a high degree of uncertainty prior to the start of works. There will be a balance between the level of detail available at the time of the development of the application and the level of flexibility required as the programme progresses. The aim will be to shape the application to be fit for purpose with precautionary assumptions whilst not overly constraining the contractor when the inevitable changes to works arise. The consequence of not achieving this principal objective from the outset can lead to the need to continuously review and re-issue consent documentation in an attempt to modify the consent to match frequent short-notice changes, inundating the Local Authority and complicating the process for all parties.

It is important that construction noise assessments take into account cumulative noise arising from combinations of potential concurrent activities. The hierarchy of combinations can be divided according to the following levels of detail within the programme:

- Activities across the programme.
- Tasks within each activity; and
- Combinations of plant and equipment used in each task.

Seeking consent for separate activities or even separate tasks may be unavoidable. However, multiple layers of co-existing applications may conceal potential cumulative effects at points in the programme unless they are overlaid appropriately.

A further level of cumulative impact is possible; that involving two unrelated projects occurring at the same time in close proximity to each other. It is unlikely that this level of cumulative effect would be practical to assess by different project teams working together. It may therefore be considered appropriate for the local authority to identify where such cumulative effects may occur and set out margins within the noise level related conditions to allow for the potential for cumulative effects.

In determining the appropriate approach for a given construction project, the extent of the works for each application should be considered, with the general aim of avoiding large applications but also avoiding too many individually smaller applications.

The required duration for fixed-period consents should be considered carefully. Seeking consents for future activities where the details are yet to be developed can lead to an appreciable amount of unnecessary work for the *Contractor* and the local authority in agreeing and managing subsequent amendments. Larger applications also increase the risk of starting later than planned if the content is considered controversial and requires considerable consultation with the local authorities before a formal submission is made. Some local authorities may have a clear preference for consents on large projects which are subject to a time limit (e.g. six months. This allows the local authority to review performance on a regular basis and ensures an ongoing involvement is maintained with the senior management of the *Contractor*.

The approach of using many individually smaller applications is also inefficient as it involves a considerable amount of increased administration for both the applicant and the local authority.

Some large projects can have single worksites which either abridge, or could give rise to noise in, more than one local authority area. Very large projects will extend across multiple local authority areas. In both cases it is advisable to seek to agree a consistent approach across the whole project, and it is good practice for projects and local authorities to engage to agree a project-wide application strategy as early as possible.

2.1.1 Amendments to Consents

There is no specific provision in CoPA to vary or amend a consent once issued. However, the practice of amending a Section 61 consent through either: a dispensation; a variation; or an over-run process is commonly utilised by major infrastructure projects, and usually accepted by the relevant local authorities.

The dispensation, variation and over-run/emergency procedures described below are often written into project or local authority CoCPs, or Section 61 consent conditions as a way of formalising these supplementary Section 61 procedures.

Where a local authority chooses not to determine a dispensation or variation, then given that they are not described in CoPA, they cannot be subject to the appeals process in CoPA. In this situation the only option for the contractor may be to submit a new Section 61 application.

Dispensation

Typically, a dispensation procedure is used where a change to works is required, that was not foreseen at the time of submitting the original Section 61 consent application, where the change may materially alter the predicted noise levels or the assessed effects at noise-sensitive receptors, e.g. major changes to works methodologies, a need for extended working hours and/or material changes to the programme.

Whilst the specific durations should be agreed with the relevant local authority, it is considered good practice for a dispensation application to be made at least fourteen days before the works to which the change relates are due to commence. Some relaxation of these duration may be appropriate where works of a critical or urgent nature need to be rescheduled, however, this too would need to be agreed with the relevant local authority. The dispensation application should include:

a) Reference to the Section 61 application to which the dispensation is to apply

b) Date by which dispensation required

c) Duration of work which is subject to the dispensation – including dates

d) Location of work

e) Clear reasons for the dispensation request, cross referred to the original Section 61 application, as appropriate

f) Nature of the work to be undertaken (if appropriate, include a site plan.)

g) Plant involved

h) Measures to be taken to minimise noise [17] effects (BPM measures)

i) Revised noise predictions

j) Name and contact details for the person controlling the works onsite for the *Contractor*

Additional comments such as the following may be appropriate:

k) Steps to be taken to avoid repetition of the event that required the dispensation; and

l) Any required notification to the public.

The local authority will be requested to make a decision on the dispensation as soon as possible or within agreed timescales between the parties. The local authority may attach conditions to the dispensation. Standardised templates for Section 61 dispensation applications are available and widely used on major projects.

Variations

Typically a variation procedure is used where a change to works is required that was not foreseen at the time of submitting the original Section 61 application but which does not materially alter the predicted noise levels or the assessed effects at noise-sensitive receptors, e.g. delay to the programme, changes in the types of quantities of plant that does not lead to a material change in predicted noise levels; or the inclusion of a new minor activity.

Whilst the specific durations should be agreed with the relevant local authority, it is good practice for an application for a variation be made to the local authority as early as practicable, ideally at least seven days [18] before the commencement of the works subject to the variation.

It would not normally be anticipated that extensive supporting information would be required for variation applications, and the application document should be proportionate to the minor nature of the change. The extent of supporting information would need to be agreed with the relevant local authority.

The variation decision should be made by the local authority as soon as possible. Typically, it is unlikely a variation would require a review of the consent conditions; however, the local authority may choose to amend or add additional conditions within the provisions of CoPA 1974. Standardised templates for Section 61 variation applications are available and widely used on major projects.

Over-run/Emergencies

Over-runs/emergencies may occur on occasion particularly where, for health and safety reasons or due to engineering requirements, a specific work item needs to be completed before the worksite can be left in a safe state, or there is a risk of an engineering or structural failure if the works are not completed.

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17 Noise includes vibration as defined in CoPA 1974.

18 In some instances, with local authority agreement this period can be reduced. A practicable minimum of at least two working days is recommended.

An over-run/emergency notification should be communicated to the local authority as soon as any need for an over-run is identified, requesting that the local authority acknowledge receipt and return a signed application document or other acknowledgement to the *Contractor*. The notification system for over-runs is not considered to be an approval process.

The local authority may follow up notifications of over-runs/emergencies by requesting further investigations or justification. If no valid justification for the over-run and consequent notification can be demonstrated, the local authority may wish to consider enforcement action.

2.1.2 Draft Applications

It is considered good practice to present a draft application before the formal submission of the Section 61 application: to enable early consultation with the Local Authority; to engender a collaborative approach; and to solicit constructive feedback on the application. Whilst there is no provision for draft applications within CoPA, it is a widely applied process.

The benefits of the draft application process are that it gives the *Contractor* and the local authority an early opportunity to engage, explain and discuss any concerns or queries over the application. This can include initial dialogue regarding justification that a process proposed in the application is demonstrating that BPM are being adopted to minimise noise and vibration.

Early discussions should take place, whether a draft is provided or not, between the *Contractor* and the local authority(s) to ensure that all parties are familiar with the issues associated with the planned construction works to be covered by the application. It is recommended that a draft application be submitted to the local authority at least one month before the intended formal submission date. The draft can then serve as a basis for more detailed discussions between the parties with respect to the works and any necessary alterations to the information provided in the application can be identified with sufficient time to implement changes.

If the draft application process is not followed, it increases the risk that local authority may choose to apply undesirable consent conditions to address what it may consider to be observed deficiencies in the formal application. This can unnecessarily increase the burden of risk on the *Contractor*, potentially requiring unplanned management measures and which could otherwise have been avoided by the amendment of the application at drafting stage.

2.2 General Guidance (other guidance on the S61 process)

Currently, there is limited guidance for good practice on making Section 61 consent applications. The primary resource being the code of practice identified in Section 71 of CoPA 1974. Section 71 "Codes of practice for minimising noise" of the CoPA identifies that:

> *(1) For the purpose of giving guidance on appropriate methods (including the use of specified types of plant or machinery) for minimising noise, the Secretary of State may –*
>
> *a. prepare and approve and issue such codes of practice as in his opinion are suitable for the purpose; and*
>
> *b. Approve such codes of practice issued or proposed to be issued otherwise than by the Secretary of State as in the opinion of the Secretary of State are suitable for the purpose.*

Currently, British Standard 5228 "Code of practice for noise and vibration control on construction and open sites" – Part 1: Noise and Part 2: Vibration, 2009 + A1 2014, is identified as the approved code of practice. Section A.3.3.3 of the Part 1 of the standard provides guidance on "Consent under Section 61 of the Control of Pollution Act 1974".

Further general guidance on making Section 61 consent applications is contained within publications issued by national bodies such as CIRIA [19] and Network Rail [20] and local groups such as LANAF [21] as well as area specific guidance from the local authority where the works are being undertaken, or project specific guidance from construction schemes such as Crossrail, East London Line extension, Thames Tideway Tunnel and High Speed 2.

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19 Construction industry research and information association - Environmental good practice on site guide.

20 Network Rail - Construction noise mitigation through the Section 61 consent process ref.: NR/GN/ENV/00022

21 London Authorities Noise Action Forum - Noise and Vibration Control for Demolition and Construction sites.

2.3 Project Specific Constraints

During the planning stages of a development prior to the *Developer* commencing any construction works, the project promoters may have voluntarily prepared, or agreed to incorporate, construction noise and vibration related commitments. Whilst the provisions of the Control of Pollution Act 1974 are unequivocal, these ancillary commitments may be intended to operate in parallel to, or in addition to, those provisions. However, the commitments cannot introduce aspects which would adversely influence or prejudice the CoPA provisions. As such the commitments tend to be only general in nature, for example forming a basic framework of the promoters' current view on Best Practicable Means.

The commitments can appear in various publications according to the scale and severity of any likely effects and produced by the promoter which may include:

- Project Specific Code of Construction Practice;
- Noise and vibration management plans;
- Formalised policies;
- Information papers; and/or
- Specific guidance on the management and preparation of Section 61 consent application documentation.

Further constraints might be imposed on the promoter by the planning authority and/or decision maker through the planning process, via the following:

- Local authority guidance – Local authority CoCP or Development Plans, etc.;
- Planning conditions;
- Development Consent Orders; and/or,
- Acts of Parliament.

Irrespective of whether the commitments have been imposed through the planning system or as self-imposed initiatives, the various commitments must be brought together and provided as a single collection of contract requirements on any incoming *Contractor*.

The *Developer* and its *Contractor* will then be required to carefully design the construction methodology to aim to achieve all commitments, subject to the over-riding requirements of demonstrating Best Practicable Means required by COPA. Conflicts between the project-specific constraints and the requirements of CoPA can occur, and these may require specific resolution with the parties involved. Preparation of the construction methodology should normally include the input from the *Developer's* acoustic consultants, or advisers, as well as construction engineers and planners. A carefully considered compromise may need to be developed and explained to the planning and regulatory authorities, both of which may have competing priorities.

An example of such a conflict arose on one of the Thames Tideway worksites. The CoCP Part B for the site included provision for a noise barrier to be installed outside of the site boundary to mitigate construction noise. The CoCP Part B indicated that planning consent would need to be obtained from the local planning authority for this barrier. During the process of developing a S61 consent the contractor's acoustic consultant recommended that the potential noise reduction from this barrier would be required to achieve the project's noise constraints. However, the contractor indicated that there was insufficient time to obtain planning consent. As a result, the acoustic consultant worked with the contractor to develop alternative mitigation proposals. The alternative barriers were within the site boundary and therefore did not require a planning application to the local planning authority.

2.3.1 Code of Construction Practice

A project specific Code of Construction Practice (CoCP) sets out control and management measures that will be employed to control the environmental effects during the construction phase of a project. It will usually include aspects related to all environmental disciplines in one document, as well as information on traffic management, stakeholder and community engagement, complaint procedures and project timescales.

From a *Developer's* perspective these are usually only in place for large infrastructure projects. However, it should be recognised that many regulatory authorities have now recognised the value of publishing their own

codes of practice to provide local guidance on the authorities' requirements (see Local Planning Constraints below). *Developers* should be cognisant of such local codes in the preparation of their consent documentation and be aware, that failure to comply with a local authority code does not in itself imply that the requirements of CoPA have not been achieved, unless Best Practicable Means are not being employed. It should be noted that some authorities may not advocate the Section 61 process, in preference to controlling the works according to their local requirements.

Project specific CoCPs for large projects would typically address the following noise and vibration dependent information:

- Section 61 approach/guidance;
- Core working hours;
- Non-core working hours;
- Activities taking place during start-up and close down hours;
- Activities where extended hours or 24/7 working may be justified;
- Hierarchy of mitigation (see below);
- Generic mitigation measures (both engineering methods and management methods);
- Noise and Vibration thresholds for risk management purposes;
- Off-site mitigation policies;
- Monitoring initiatives;
- Local Authority and stakeholder engagement;
- Complaint management;
- Dispensation, variation and over-run procedures; and
- Template documents for the agreed Section 61 processes.

CoCPs will sometimes refer to site specific noise/vibration sensitive receptors. This can be the case where a project adopts a project wide CoCP (typically termed CoCP Part A) with individual Construction Environmental Management Plan (CEMP) (see section 2.3.2) documents applying to specific worksites.

It is good practice for a project specific CoCP to include a hierarchy of mitigation in order to demonstrate that BPM will be adopted at all times. For example, the *Contractor* will consider mitigation in the following order:

- Control at source – e.g. the selection of quiet and low vibration equipment, review of construction programme and methodology to consider quieter methods, and use of less intrusive alarms, such as broadband vehicle reversing warnings;
- Control on-site – e.g. location of equipment on site, control of working hours, the provision of acoustic enclosures, and screening, including local screening of equipment, perimeter hoarding or the use of temporary stockpiles to limit the hours of spoil movements; and
- Control off-site – e.g. where despite the implementation of BPM, the noise exposure is predicted to exceed the agreed criteria, the *Contractor* may offer: noise insulation; or ultimately temporary re-housing (for further details see Section 2.3.3).

All of the above are relevant for the preparation of a Section 61 consent application to the local authority. Some of the pre-construction documentation which may constrain the developer in its works are discussed further in the following subsections.

2.3.2 Noise and Vibration Management Plans

A CEMP will usually include or refer to, a plan for controlling construction noise and vibration specific to the works location or specific activities. The title of the plan can vary by project, local authority or *Developer*. Common titles include: Noise and Vibration Management Plan (NVMP), Local Environmental Management Plan or CoCP Part B.

A NVMP will typically be prepared following the planning process but before construction commences. A NVMP will provide detail on sensitive receptors, foreseeable site specific mitigation measures, such as working hours, noise barrier/hoarding heights and locations, limitations on the use of specific types of construction techniques (e.g. percussive piling), as well as describing generic mitigation measures on the selection, operation and use of construction plant. The NVMP would normally set the scene for the eventual detailed contents of any Section 61 application, or where the Section 61 process is not being pursued, it could be the *Contractor's* final proposal for controlling noise and vibration from the works.

2.3.3 Off-site Mitigation

Noise Insulation and Temporary Re-Housing

Where, despite the application of all reasonably practicable on-site mitigation measures, the resulting residual noise and/or vibration could still lead to forecast adverse effects, then as a last resort off-site mitigation measures including noise insulation or temporary re-housing may be required to mitigate those effects.

A Noise Insulation and Temporary Re-Housing Policy for a large project will typically specify noise thresholds and temporal criteria that have to be achieved in order for a property to qualify for enhanced glazing measures or for alternative accommodation during periods of particularly noisy work.

Typically, large railway and highway projects introduce their policies under the powers available under the relevant Noise Insulation Regulations. As explained in BS 5228-1:2009 + A1 2014, The Noise Insulation Regulations 1975 'allow a highway authority to provide insulation for dwellings and other buildings used for residential purposes by means of secondary glazing and special ventilation when highway works are expected to cause serious noise effects for a substantial period of time'. The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1995 give similar discretionary powers to those of highway authorities to railway authorities to provide sound insulation for dwellings in relation to noise from the construction of new or altered railway lines. The Land Compensation Act 1973 also allow reasonable expenses for temporary alternative accommodation when construction work would make living in a property impracticable. As such, any non-statutory obligations invoked under this legislation may not be controllable under CoPA, due in part to CoPA's clear direction that powers are only available to control noise emitted from the premises, or noise at any specified point on those premises.

This further implies that any determination or review of Best Practicable Means under the provisions of CoPA cannot take into account the intention or otherwise to offer off-site mitigation in the form of noise insulation or temporary re-housing invoked under separate legislation. This is supported by the commentary provided in E.4 of BS 5228: Part 1, Annex E which confirms that BPM is defined prior to any consideration of off-site mitigation: *"If the contractor has applied best practicable means to the provision of mitigation, i.e. all reasonable measures have been taken to reduce the noise levels, but levels are still such that widespread community disturbance or interference with activities or sleep is likely to occur, there are two further provisions"* (i.e. noise insulation and temporary re-housing).

This legislative arrangement effectively ensures that appropriate attention is paid to the design and execution of control measures on the premises and avoids situations where the offering of off-site mitigation could lead to less considered control measures being planned for and adopted within the worksites. It is commonplace for this distinction to be observed in Section 61 consent applications on major infrastructure projects where reference to any eligibility for off-site mitigation is included for information only, as opposed to being included for the purposes of obtaining consent from the Local Authority.

However, it should also be noted that the environmental impact assessments and subsequent planning approvals for some projects may require the benefits provided by off-site mitigation to be taken into account when identifying the residual construction noise effects on persons in the vicinity of the construction works.

It is good practice for the off-site mitigation to be implemented before the works commence which result in the qualification. The provision of off-site mitigation is not a particularly rapid process, typically the installation of noise insulation can take more than six months, and longer where listed building consent is required.

Whilst it may be an objective to require that the mitigation is installed before the commencement of the relevant works, this is dependent upon cooperation from the occupant of the property where the mitigation is being applied. It is recommended that where there are considerable risks that the mitigation might not be implemented before the noisy works commence, a definition of what constitutes the reasonable steps to be followed to install the mitigation be agreed early, and in writing, with the local authority.

Nevertheless, the existence of such a scheme is likely to influence the *Contractor's* eagerness to explore all other on-site mitigation avenues to minimise the need for noise insulation and temporary re-housing. Whilst not a matter of approval under CoPA, it may be appropriate to identify properties qualifying for noise insulation or temporary re-housing within a S61 application for information purposes and to ensure that decision makers are provided with the full details of both on-site and off-site measures.

Commitments of this kind tend to be aimed at residential dwellings or other premises used for residential purposes and may make reference to other non-residential "special cases" or building types where the relevant Noise Insulation and Temporary Re-Housing policy applies.

Trigger Action Plans

Trigger Action Plans [22] (TAPs) have been used extensively across recent major infrastructure projects in the UK to document specific or special control requirements agreed between the *Developer* and the owner/occupier of non-residential premises. The recipient usually has a commercial or operational interest in the premises and the control measures are likely to be bespoke to the usage and sensitivities of the premises. As such the TAP document tends to form part of a private agreement, unlike other publicly and more generically applicable published policies. Some recent projects have taken a different approach and adopted TAPs to cover all premises, including dwellings, expected prior to construction to potentially qualify for noise insulation or other off-site noise or vibration mitigation measures.

A TAP may set out specific off-site mitigation and other control measures that will be implemented at the identified property and may also include noise or vibration trigger levels. These trigger levels will also therefore influence the *Contractors* proposed construction methodology and hence the contents of any Section 61 consent application. A TAP may also set-out details of noise and vibration monitoring proposals and critically the procedures and actions associated with any reported trigger exceedances. Such actions, which may include the cessation of works, can impact on the *Contractor's* works both in terms of methodology and programme, and may present challenging constraints with regards to the development of Section 61 applications.

2.3.4 Development Specific Planning Constraints

Depending on how a development has gained consent, there may be additional environmental obligations relating to construction noise that need to be considered when preparing a Section 61 application. Nationally Strategic Infrastructure Projects (NSIP) gain consent under Development Consent Orders (DCO) and the mechanism or processes to ensure that construction is complaint with the specific planning constraints can be different depending upon the project.

Such projects may include requirements that the effects of construction are 'not environmentally worse than' (NEWT) the effects set out in the Environmental Statement for the project. DCOs and Acts of Parliament (e.g. The Crossrail Act) have included requirements that Section 61 applications must be sought for all construction works forming part of a project. Large projects may also have agreed to legal undertakings with particular property owners relating to construction noise or vibration. These would be recorded in a project register of Undertakings and Assurances (U&As).

For a development granted planning approval by a local planning authority, planning conditions may have been set that limit hours of construction, or to set other controls on noise or vibration levels during construction. In such cases it is likely that the Section 61 application would need to make reference to the conditions.

2.3.5 Local Planning Constraints

Local Plans, Local Development Plans or Unitary Development Plans generally include some general guidance indicating that new development should minimise the effects of noise during construction. Supplementary Planning Guidance (SPG) documents on noise and vibration have been issued by a number of local planning authorities and these are more likely to contain specific guidance on the control of construction noise or vibration. Alternatively, this may be included within a Local Authority CoCP. If the construction is taking place within such a local authority area, the relevant SPG or CoCP will need to be taken into consideration.

22 It should be noted that the term 'Trigger Action Plan' may have a specific project definition and requirements, which may be in addition to the information presented herein.

2.3.6 Project Programming Constraints

The preparation of a Section 61 consent application is contingent on the availability of relevant information and data. This includes; baseline noise and/or vibration data; reliable and reasonable construction programme information; and a schedule of construction plant and activities. A project needs to be programmed so that the necessary information has been obtained or developed in time to enable preparation of the Section 61 application to be commenced when required to meet project deadlines for the start of construction work.

There may be programme constraints relating to project financial issues, when a site is acquired or can be accessed, and interactions or limitations imposed by construction works taking place on neighbouring sites.

Works on, above or adjoining a railway will require 'possessions' to be obtained. These are periods when the railway is not operating, generally overnight; or longer possessions over weekends or bank holidays may be negotiated. Seasonal programme constraints may apply, for example necessitating that earthworks are carried out during summer to maximise daylight working hours. Conversely, completing works in winter in constrained urban location may be preferable as residents would be less likely to be using their balconies or gardens, or have windows open. Other seasonal constraints often apply in relation to the protection of ecological resources such as breeding birds or fish or marine mammals. The timing of marine works may also be dictated by tides.

2.3.7 Project Information Papers

Larger projects often publish a number of Information Papers. These are publicly accessible documents setting out project obligations and commitments on a topic. An information paper on construction noise could set out details of the thresholds or criteria used to determine significant noise and vibration effects. Where appropriate, a project's noise insulation and temporary re-housing policy could also be detailed in an information paper.

2.3.8 Project Specific Guidance on Section 61 Application Preparation and Management

Some large projects or infrastructure providers have put in place project specific guidance on preparation and management of the Section 61 process, especially where a consultation process with local authorities has taken place, and where there is a need for a consistent approach across several regulatory authority boundaries. Such guidance may include the content and format of application documents, timescales for the Section 61 process, and the approach to consultation with the local authority, including arrangements for submitting draft applications. Management and monitoring during the construction works may also be covered, including monitoring of noise and vibration and implementation of Best Practicable Means, and procedures and template documentation applying to dispensations and variations.

2.3.9 Contract Specifications

On a large infrastructure project all project specific guidance and requirements outlined in the preceding paragraphs should be referred to in the contract requirements imposed on the *Contractor* carrying out the construction works. These requirements along with other project constraints will inevitably influence the scope and content of the Section 61 application.

2.4 Timescales

The only timescales fixed in CoPA are those associated with the determination period for the consent (28 days), and the timescale for lodging an appeal if the consent is not determined, or the consent issued contains unacceptable conditions (21 days from due determination date or date of issue of consent).

An important part of defining the approach and strategy for a project specific Section 61 process is appreciating, and planning for, the realistic timescales associated with: sourcing the relevant input information; carrying out noise predictions; preparing the other required information and application documentation; and submitting the application documentation at appropriate intervals to ensure that the required consent is in place in advance of the works commencing.

In tandem with the progress on developing Section 61 applications, there may be other related activities which require planning and programming in parallel. These include planning and mobilising for: semi-permanent noise and vibration monitoring equipment installations; and implementing off-site mitigation in the form of either noise insulation or temporary-re-housing measures.

Figure 1 presents indicative but typical timescales for the determinable stages in the process. These include where appropriate, for the prospect that: off-site mitigation is to be implemented in parallel to the CoPA consenting process; and that any noise or vibration monitoring equipment might need to be attached to listed buildings and hence potentially triggering the need to gain listed building consent. Both of these possibilities can influence the overall timescales considerably. The following provides a summary of the timescales shown in detail in Figure 1.

- Information collation, preparing calculations and draft documentation: 6 to 10 weeks
- Review of draft documentation and submission of final documentation: 4 to 6 weeks
- Determination period: 4 weeks
- Monitoring equipment (non-listed buildings): 8 to 12 weeks
- Monitoring equipment (listed buildings): 14 to 16 weeks
- Off-site mitigation (non-listed buildings): 20 weeks
- Off-site mitigation (listed buildings): 28 weeks
- Appeal lodge period: 3 weeks
- Appeal process to conclusion: 21+ weeks

The above indicates that typically a period of between 10 to 16 weeks should be allowed for from the start of the process to the formal submission. The range reflects certain variables including any requirement for baseline monitoring and the early identification of potential off-site mitigation.

Baseline monitoring may or may not be required, depending upon the project's approach and the regulatory authority's preferences. A period of 2 weeks is provided for in the indicative timescales to allow for some level of baseline monitoring. The timescales could vary due to; weather conditions; atypical ambient sound conditions (including public and/or school holidays); land access permissions and other factors. These need to be taken into account when planning the Section 61 process.

The indicative timescales required to implement off-site mitigation (20 to 28 weeks) are longer than those required to develop the applications (10 to 16 weeks). Therefore, in some circumstances, reliance on the findings of a Section 61 assessment to determine whether off-site mitigation is required will not leave sufficient time for the off-site mitigation to be implemented before the noisy works commence.

To avoid this situation, off-site mitigation proposals may need to be finalised, and the implementation commenced, before the Section 61 noise calculations are completed. Where there is the risk of these circumstances arising, earlier and more cautious scoping calculations may need to be undertaken as a separate exercise in advance of those specifically for Section 61 purposes.

Alternatively, the preparation of the Section 61 applications can be brought forward in the programme as a contingency measure. However, there is a commensurate risk that the assumptions will change in the subsequent weeks as the methodology is refined towards the start of works. The risk of needing to complete off-site mitigation within available timescales is a critical programming risk for a project and is a key consideration when developing the Section 61 strategy.

It should be noted that these indicative timescales will vary according to the scope, complexity and nature of the works for which consent is being sought, as well as the relationships between the contractor representatives, the regulatory authority and any other third party required to co-operate with the contractor. In particular, arranging access for baseline monitoring and installing noise insulation at properties can be subject to considerable delays if the residents or building occupants are not sufficiently co-operative.

In situations where the contractor intends to pursue an appeal against the consent conditions issued (or where the application has not been determined) by the regulatory authority, considerable additional timescales should be planned for. Once an appeal has been lodged, the Magistrate's Court (or the Secretary of State in cases where the legislation has been modified for major infrastructure projects) will set a hearing date. After the hearing, there will be a period of time before a decision is published. Typically, this could total at least 3 months from the lodging of the appeal, to receiving a decision. These timescales however can be highly variable and longer periods could apply in more complex circumstances or where the courts are busy. Furthermore, a potential outcome of the appeal process may be that the contractor is required to re-submit its application (modified or changed as a result of the hearing findings), leading to another 28-day determination period before consent is expected to be received.

Figure 1: Indicative timescales for the determinable stages in the S61 consent application process

Stage	Activities	Typical Timescale (Stretch)	Example roles and responsibilities							Week																																
			CM	NS	CR	EM	CTM	LA	Others	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1. Preparatory	Identify working practices, specification of plant, identify receptors and carry out base-line surveys	6 - 10 Weeks (6 - 15)	x	x		x																																				
	Other project constraints			x		x																																				
	Noise calculations, advance warning of triggering of Noise Insulation criteria			x																																						
	Mitigation and BPM design - revise noise calculations and consider mitigation options		x	x		x																																				
	Advance consultation with LA - application strategy + local conditions, etc.		x	x	x	x		x																																		
	Identify locations for Listed building consents *					x																																				
	Prepare and submit Draft S61 Application		x			x																																				
2. Draft Application	Await response from LA	4 - 6 Weeks						x																																			
	Consultation and review of comments		x	x		x																																				
	Identify NI and TRH locations if applicable			x		x																																				
	Prepare Final S61 Application			x																																						
3a. Final Application - no offsite mitigation - no listed building consent	Submit Application and await response from LA	4 Weeks	x																							Start on site*																	
	Request draft S61 conditions					x																																				
3b. Final Application - no offsite mitigation - listed building consent	Prepare and submit Listed Building Consent applications	14 - 16 Weeks					x																																			
	Listed building determination period							x																										Start on site*									
	Submit Application and await response from LA																																									
	Request draft S61 conditions					x																																				

Figure 1: Indicative timescales for the determinable stages in the S61 consent application process (Continued)

Stage	Activities	Typical Timescale (Stretch)	CM	NS	CR	EM	CTM	LA	Others	Week
3c. Final Application - offsite mitigation - no listed building consent	NI/TR installation process	18 - 20 Weeks	x	x	x	x	x	x		
	Submit Application and await response from LA		x							Start on site*
	Request draft S61 conditions					x				
3d. Final Application - offsite mitigation - listed building consent	Commence Noise Insulation and Temporary Re-Housing procedures	26 - 28 Weeks	x	x	x	x	x	x		
	Prepare and submit Listed Building Consent applications						x			
	Submit LBC Application and await response from LA							x		Start on site*
	Submit S61 application and await response from LA		x							
	Request draft S61 conditions					x				
4. Appeal application	Lodge the appeal	25 - 40 Weeks	x							Start of appeals processs
	Hearing date								x	3 months or greater
	Appeal to he heard		x	x	x	x	x	x	x	
	Where applicable, revise and resubmit the application		x	x		x				
	Determination period								x	

Weeks: 1–34

* or appeals process

CM	Construction Manager
NS	Noise Specialist
CR	Community Relations advisor
EM	Environment Manager
CTM	Consents Manager

3. Preparation of the Application

3.1 Information to be Presented

It is good practice for a Section 61 application to include the following:

1. Address or location of proposed works
2. Name and address of main contractor
3. Particulars of the works to be carried out
4. Working hours
5. Methods to be used in each stage of the development
6. Number, type and size of equipment and machinery stating Sound Power Levels.
7. Proposed steps to minimise noise and vibration
8. Predicted noise and vibration levels
9. Noise and vibration monitoring
10. Approximate duration of works
11. Community liaison
12. Other information – e.g. contact names and contact details, telephone numbers and e-mail addresses. This section may also make reference, for information only, to off-site noise mitigation measures that the project has implemented.
13. List of Appendices – A list of all attached plans and documents

Item 1 should describe the address of the worksite(s) where the proposed works are planned to take place. For large projects this may be one or more of several worksites where works are planned if the intention is to seek consent for all works within a particular local authority boundary.

The following sub-sections provide guidance on each of the above.

3.2 Name and Address of Main Contractor

Section 61 applications should be made by the person responsible for the works, or on behalf of the organisation responsible for the works. This will usually be the main construction or demolition contractor.

The Section 61 consent process must be 'owned' by the construction team within the contractor organisation as the resulting consents are a legal agreement between the applicant and the regulatory body for the methods of work and mitigation measures, including constraints on hours of working and potentially other significant and costly commitments. Hence the processes for developing Section 61 consent applications and ensuring compliance with the consent must be understood and fall within the responsibilities of senior level management within the contractor organisation.

It is an offence to "knowingly permit" a contravention of a Section 61 consent. Therefore, where a contractor is working on behalf of another organisation, the lead organisation should be involved in: reviewing and authorising the Section 61 application; acceptance of any consent conditions; and ensure that all reasonable steps have been taken to ensure that all *Contractors* and *Sub-Contractors* are fully aware of, and compliant with, the consent conditions.

Where a Joint Venture (JV) is in place for the construction works, representatives from each of the parties that form the JV should sign the application.

In advance of formally submitting the first Section 61 application, the contractor should confirm to the local authority the named signatories with authority to submit Section 61 applications (and dispensations and variations) on behalf of the contractor. The local authority will normally request this evidence before accepting a formal consent application. Usually a letter from the company secretary will be sufficient. Any changes to authorised signatories should be notified to the local authority as soon as possible.

The address to be provided in the applicant's details section of the Section 61 application should be the registered address of the applicant's company, not the site address.

3.3 Particulars of the Works to be Carried Out

Section 60 of the CoPA provides a description of the works for which the local authority's powers can be applied:

"*(1) This section applies to works of the following description, that is to say—*

(a) the erection, construction, alteration, repair or maintenance of buildings, structures or roads;

(b) breaking up, opening or boring under any road or adjacent land in connection with the construction, inspection, maintenance or removal of works;

(c) demolition or dredging work; and

(d) (whether or not also comprised in paragraph (a), (b) or (c) above) any work of engineering construction."

In the strictest sense, therefore, any works that do not fall within the above description, cannot be controlled under CoPA, and therefore prior consent cannot be sought for them.

The *Particulars of works to be carried out* box in the application template is used to outline the scope of the application in a simple and concise summary form, concentrating on the main elements of the construction works that are proposed.

A Section 61 application will normally cover a number of activities within a prescribed period. The activities are usually defined from the construction programme and interpretation of the associated construction method statements. It is often possible to group similar construction processes that are repeated regularly or take place throughout as one activity. Other activities may be defined by the working hours requirements, e.g. those outside of core working hours, including deliveries due to access constraints. The particulars of works to be carried out are typically drafted by the construction manager or the environment manager.

An example series of generic construction activities is provided below:

- Mobilisation
- Site establishment and set-up
- Site investigations
- Demolition
- Site preparation
- Ground stabilisation
- Utilities diversions
- Dewatering
- Excavations
- Cofferdams
- Earthworks
- Piling
- Diaphragm walling
- Structures
- Tunnelling and support works
- Superstructure
- Fit-out
- Finishing works
- De-mobilisation

It is good practice to ensure that the programme and activities proposed in the Section 61 application are realistic, and that sufficient flexibility is built into those assumptions to ensure there is some capacity for change. One of the key considerations is the overall amount of plant used on site. Shared equipment across activities or tasks should not be double counted to avoid the over estimation of noise and vibration levels. It is good practice to engage in a series of iterative workshops with the relevant parties defined in Section 1.4 once the preliminary noise and vibration predictions are available to ensure that the plant schedule, defined activities and indicative programme are realistic.

3.4 Working Hours [23]

Item 4, "Working Hours", should provide a clear statement of the working hours to be adopted. These should usually be in line with periods normally permitted by the local planning authority unless a clear justification can be made for working during other periods, such as evenings and night-time periods. If they are to be used, then start-up and shut-down hours should be included with this information.

3.5 Methods to be Used in Each Stage of the Development

Section 61 of CoPA requires that:

"(1) An application under this section shall contain particulars of–

(a) the works, and the method by which they are to be carried out; and

(b) the steps proposed to be taken to minimise noise resulting from the works."

The method statement section should present key information on the methods of work and at every opportunity should describe any steps taken during the development of the construction method which inherently lead to the minimisation of noise and vibration. The method statement should also explain the existence of other potentially significant constraints that would prevent further steps to minimising noise or vibration from being practicable.

In doing so, it is useful to describe other methods that are available and reasons why they are not practicable and have not been adopted to provide sufficient information to the regulatory authority and reduce the risk of challenge or delays in obtaining consent. This may need to include not only construction techniques and available mitigation measures but also describe any working hours requirements that cannot be altered due to engineering practicability or other constraints.

The method statement should be directly traceable to, and consistent with, the plant schedule and activity schedule so that the regulatory authority is able to fully understand the proposals from the outset and has sufficient information to confirm the noise predictions. The method statement may need to describe each of the named activities and the quantum of plant assumed in each, along with some indication of the locations of the activities and processes within the site by reference to drawings in the application.

It should be noted that method statements prepared for construction planning purposes by the construction engineers in general does not include the tailored information required for a Section 61 consent application, or a specific narrative on the necessary justification that BPM has been adopted to minimise noise and vibration. However, such documents are often used as the starting point for the method statement to be included in the application, but caution should be exercised when using generic method statements.

3.6 Number, Type and Make of Plant and Equipment

3.6.1 Derivation of Plant Schedule

The plant schedule covering each key activity should be prepared in conjunction with reference to the method statement prepared by the contractor's construction planning team. The plant schedule for each activity should include: type and model of plant (including relevant specifications); the number of plant (including both static and moving heavy vehicles within the worksite that are noise generating); a reference to the noise source term for the plant item; and the percentage on-time for the plant item for the time period of interest.

23 In July 2020 the UK Government issued "Guidance: modification of planning conditions relating to construction working hours" (https://www.gov.uk/government/publications/construction-working-hours-draft-guidance/draft-guidance-construction-site-hours-deemed-consent), which provides local powers to grant extended working hours in response the loss of construction productivity during the Covid-19 pandemic. Currently the guidance is due to expire in April 2021. The guidance includes recommendation regarding the control of noise and vibration, which were contributed by members of the steering group for this document, in conjunction with the Institute of Acoustics and Chartered Institute of Environmental Health.

3.6.2 Construction Activity or Equipment Sound levels

Noise levels for the proposed plant can be obtained from different sources, as follows in order of preference:

- Measured noise and vibration levels for the specific plant item or activity as part of preparing the application. Whilst this would be the ideal, it is rare that this is practicable or desirable in the majority of cases;
- Manufacturer's information from technical data sheets;
- Sound level data available in BS 5228-1; and
- Other authoritative guidance or reliable data from other sources.

BS 5228-1 provides tables of sound level data for site equipment and site activities. Annex C presents "current" data, principally in terms of Activity $L_{Aeq,T}$ levels. Annex D gives "historic" data with most tables providing both Sound Power Levels and Activity $L_{Aeq,T}$ levels. There are some minor features of this data that the user should note. In Annex C the sound levels for many mobile items of plant such as dozers and lorries are given in terms of the drive-by maximum sound pressure level. For some of the historic data, for certain activities an Activity $L_{Aeq,T}$ level is given covering two or three items of plant. Some caution should be exercised when using such data. However, the sound power levels for the individual items are usually also given, allowing each item to be evaluated separately if required.

The data given in BS 5228-1 is likely to be applicable to the majority of activities taking place on a construction site. However, it is not possible for these lists to be completely exhaustive. For a particular activity or item of equipment, especially if it is likely to dominate the predicted noise from a site, it may be appropriate to obtain more specific data. Ideally, noise measurements would be obtained for the plant or activity in question. The measurements should be carried out by personnel suitably qualified or experienced in noise measurements and should be obtained at a number of locations or distances with respect to the noise source. This would enable a reasonable estimate of the Activity $L_{Aeq,T}$ level or Sound Power Level to be calculated from the measured data. Sound level data provided by the manufacturer may also provide more specific data that than given in BS 5228-1 and may include directivity patterns should these be needed for the noise predictions. However, the acoustic consultant seeking to use manufacturer's data should critically examine the data to form a judgment as to whether the data is more representative than that listed in BS 5228-1.

Many items of construction plant are required to display a "CE" plate stating the Sound Power Level generated by the equipment, as required by a series of EC directives. These rated Sound Power levels are likely to be the data listed in the manufacturer's specifications for the equipment. This data should also be viewed with caution as the testing regime specified by the relevant EC directive is unlikely to replicate typical use of the plant during construction activities.

For some types of plant or activity, there may be a relatively large range in sound level for apparently similar plant items. Alternatively, the size or power of the specified item of plant may not match any of the BS 5228-1 data. In these cases, using appropriate professional judgment, it may be reasonable to calculate an average Activity $L_{Aeq,T}$ level or Sound Power Level from a number of similar plant items. As discussed above, should the plant item represent a dominant or critical activity, it is likely to be advisable to obtain more reliable measured data. However, averaged data may be suitable for initial predictions, as advocated by BS 5228-1. If reliable data cannot be obtained it may be acceptable to state within the S61 that predictions of noise from specific activities will be verified by noise measurements at the commencement of the relevant phase of works on site.

The plant schedule should be based on the construction programme and method statement and will specify the items of plant, numbers of plant and percentage on-times for the various phases of work. Ideally, the plant schedule will provide the Activity $L_{Aeq,T}$ level or Sound Power Level for each item of plant by reference to the relevant BS 5228-1 table, manufacturer's data or specific measured data.

It is strongly recommended that the contractor's construction planning team, engineers or environment manager prepares the plant schedule that will form the basis of the noise calculations. The acoustic consultant will need to critically review the plant schedule. It is often the case that the acoustic consultant will need to complete or supplement the plant sound level data initially provided. Where this is not possible for the contractor's representative to prepare the plant schedule, the schedule generated by the acoustic consultant should always be verified by the contractor's team before commencing the assessment.

3.6.3 Percentage On-times

BS 5228: Part 1 effectively defines two percentage on-times. The first type of percentage on-time is that used when using the 'Plant Sound Power Method' to determine the $L_{Aeq,T}$ value at a receptor. The definition of this percentage on-time is the percentage of the time period under consideration that the plant is operating at maximum noise level. A further definition is given for this percentage on-time data given with reference to plant sound power data in Annex C and D of the Standard, as follows:

'The on-time recorded in the tables is the percentage of time that the equipment was working at full power during the measurement period'

The second percentage on-time is applied at the next stage of the noise predictions. When the $L_{Aeq,T}$ from either the Sound Power Level or an activity $L_{Aeq,T}$ at 10 m for each activity or item of plant has been determined this must be corrected for *'the percentage of the assessment period for which the activity takes place'* in order to calculate the $L_{Aeq,T}$ over the assessment period for that activity.

Therefore, if using the 'Plant Sound Power Method' there are two sets of percentage on-time data are required and if using the 'Activity $L_{Aeq,T}$ Method' only one set of percentage on-time data is required.

In practice, when construction plant and programme information is provided for the S61 noise predictions, a clear distinction between the two types of sound level data and percentage on-time is not made. Sound Power Levels are commonly used to determine proxy Activity $L_{Aeq,T}$ levels (with a correction of -28 dB) and Activity $L_{Aeq,T}$ levels may also be used to determine Sound Power Levels. The 'Plant Sound Power' percentage on-time is often not applied when data has been provided by the construction planning team or the Activity $L_{Aeq,T}$ values are provided for an activity that is not directly similar in terms of on-times to the activity that was the source of the Activity $L_{Aeq,T}$ level. It may therefore be necessary for the acoustic consultant to work closely with the team providing the construction information to understand how the data was compiled before appropriate adjustments are made, based on a full understanding of the definitions discussed above.

For a discussion on the uncertainty associated with each method please refer to the uncertainty section.

3.6.4 Example Plant and Activity Schedule

An example of a pro-forma that can be used to obtain the necessary information from contractor for an activity is shown in the table below.

Activity Description				
Date(s)/Programme				
Working Hours				
Plant Schedule	Plant Name, Model and Specification	% on-time	Number of	Noise Source Term, Reference (BS 5228)

An alternative format for collation of information on projects where there is a requirement to predict noise levels over each pre-determined time period over a working week is presented in the table below. In this example, it is necessary to ensure that any difference in the relevant percentage on-times for each time period is captured.

Act ID	Activity	Plant Item	No.	Plant % on-times											
				Monday to Friday					Saturday					Sunday and Public Holidays	
				Daytime			Eve	Night-time	Daytime			Eve	Night-time		
				07:00 08:00	08:00 18:00	18:00 19:00	Worst hr (19:00 22:00)	Worst hr (22:00 07:00)	07:00 08:00	08:00 13:00	13:00 14:00	Worst hr (14:00 22:00)	Worst hr (22:00 07:00)	Worst hr (07:00 21:00)	Worst hr (21:00 07:00)
1.0	Pile Casing Installation	160t Crawler Crane	1	-	100%	100%	-	-	-	100%	-	-	-	-	-
		80t Crawler Crane	1	-	25%	25%	25%	-	-	25%	-	-	-	-	-
		PVE 52M Piling hammer	1	-	50%	100%	100%	-	-	50%	-	-	-	-	-
		Volvo 800 Power Pack	1	-	10%	100%	100%	-	-	10%	-	-	-	-	-
		600 amp Arcgen welding set	1	-	20%	50%	50%	-	-	20%	-	-	-	-	-
		Lorry delivery	1	-	10%	30%	-	-	-	10%	-	-	-	-	-
		9" Grinder	1	-	20%	20%	20%	-	-	20%	-	-	-	-	-
		Lighting Generator	2	-	20%	100%	100%	-	-	-	-	-	-	-	-

3.7 Proposed Steps to Minimise Noise and Vibration

Mitigation of construction noise and vibration is implemented through Best Practicable Means (BPM) as defined by the Control of Pollution Act 1974. This will serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BPM will vary depending on the nature of the works. The objective when considering and determining BPM is to strike a balance between ensuring the protection of the persons in the locality from the effects of noise and vibration and enabling the works to proceed as planned without being subject to disproportionate constraints.

Typical BPM measures which comprise of both physical and management measures might include:

- restrictions on working hours;
- scheduling of noisy works to the least sensitive working hours;
- adopting quiet working methods, using plant with lower noise emission levels;
- adopting working methods that minimise vibration generation particularly with regard to demolition activities and piling;
- use of plant conforming with the relevant EU directives relating to noise and vibration;
- ensuring that all plant is properly maintained, (mechanisms properly lubricated, faulty silencers replaced, worn bearings replaced, cutting tools sharpened etc.);
- closing acoustic covers to engines when in use or idling;
- use of electrically powered equipment in preference to internal combustion powered equipment;
- hydraulic equipment in preference to pneumatic equipment;
- wheeled plant in preference to tracked plant;
- locating plant as far away from noise and vibration sensitive receptors as practicable;
- installation of site hoardings or perimeter noise barriers;
- use of temporary acoustic enclosures or screens around specific noisy static plant;

- use of large fully enclosed acoustic buildings to surround activities and/or worksites;
- avoiding the unnecessary revving of engines and switch off equipment when not in use;
- starting-up plant and vehicles sequentially rather than at the same time;
- keeping internal haul routes well maintained to minimise impulsive noise and vibration from vehicles running over discontinuities in the running surfaces;
- fitting rubber linings to chutes, hoppers and dumper vehicles to reduce impact noise from material transfer;
- minimising drop heights of materials;
- setting of noise and vibration limits at boundary or at other locations together with associated monitoring during the works;
- carrying out regular inspections of mitigation measures (or BPM audits) to ensure compliance with noise and vibration commitments;
- providing regular briefings for all site-based personnel so that noise and vibration issues (including the requirement to employ BPM at all locations at all times) are understood and that generic and site-specific mitigation measures are explained and adhered to;
- ensuring that unloading is carried out within the worksite rather than on adjacent roads or laybys;
- phasing of materials deliveries to be controlled on a 'just in time' basis to minimise noise and congestion on roads around the site; and
- setting out the stakeholder engagement initiatives to be undertaken, including the provision of information to local residents about noisy works and/or works planned to take place outside of core working hours.

Some examples of physical control measures are shown in the following photographs.

Figure 2: Purpose built site hoarding or perimeter noise barrier

Figure 3: Localised temporary acoustic screening

Figure 4: Temporary acoustic enclosure around static plant

Figure 5: Use of hydraulic concrete shears instead of percussive breaking methods

Figure 6: Rubber lined payload areas on dumper trucks

Figure 7: Use of Continuous Flight Auger piling produces less noise than other percussively driven methods

3.8 Predicted Noise and Vibration Levels

3.8.1 Assessment Locations

A section 61 application should include noise predictions at a sufficient number of locations to represent the range of noise levels expected at affected noise-sensitive premises. As indicated previously, BS 5228-1 provides a description of typical noise-sensitive premises (NSPs).

Establishing knowledge of the NSPs should be carried out early in the process of developing the S61 so that specific local sensitivities can be considered. This would initially be carried out by inspection of available mapping, aerial photography, previous noise and vibration assessments (including those submitted at planning stages), and other GIS resources.

Following a desktop appraisal, it is often appropriate to carry out a site visit. Typically, NSPs other than residential dwellings may include the following:

- Schools, hospitals, offices, places of worship, community facilities, libraries, theatres, studios, courts, sensitive commercial premises;
- Gardens and balconies of residential dwellings; and
- Other amenity space such as green space, shared community spaces or other spaces that might provide sheltered areas from construction noise.

For the majority of non-residential NSPs it is important to obtain information on the operational hours.

When establishing the NSPs it is advised to consult with the Environmental Health department of the local planning authority to ensure that any *'local conditions and circumstances'* are understood from the outset.

The prediction methods given in Annex F of BS 5228-1 indicate that an allowance for reflections should be made if the reception point is 1 m from a building façade. The general convention is to evaluate construction noise levels at the façade of a building. The reception point used should be 1 m from the building on the most exposed façade. A correction to account for reflections from the façade of + 3 dB is then applied to the free-field predicted noise levels.

It should be noted that when considering eligibility for potential noise insulation or temporary re-housing, unless advised otherwise, it is necessary to evaluate noise levels 1m from the façade as advised in Table E.2 of Annex E of BS 5228-1 where example threshold noise levels are presented.

As indicated above, in some circumstances it will be appropriate to predict free-field noise levels for open spaces or garden locations and the reception position should be taken at least 3.5 m from any building to ensure free-field conditions.

In addition to predicting at specific, or groups of, NSPs it may also be necessary to predict noise levels for worksite boundary locations to be used as control points for compliance noise monitoring purposes. Thus, if a semi-permanent continuous noise monitor is to be installed at the construction site boundary, compliance with the predicted noise levels at this location will provide confidence that the predicted noise levels at the other NSPs are also being achieved.

For high rise buildings multiple vertically, and horizontally, separated positions may need to be included to obtain predicted noise levels on different floors and on different facades of NSPs. When considering potential eligibility for noise insulation it is worth noting that eligibility only applies to facades with windows to habitable rooms. However, it may also be appropriate to take account of windows opening on to non-habitable rooms (kitchens, bathrooms, hallways etc.) if these connect to habitable spaces.

BS 5288 states that *"In practice, sources of noise such as construction site equipment do not radiate sound uniformly in all directions. Equations (F.3) and (F.4) can be adapted to allow for this directivity effect and for reflections within the site."* Noise predictions should consider the receiver location relative to the source locations and apply corrections to account for directivity as well as angle of view.

3.8.2 Predicted Noise Levels

Presentation and format of information

The predicted noise levels at sensitive receptors are normally presented in tabular form as an appendix to the S61 Application. The methodology and assumptions used for the calculations should also be described and consideration should be given to including sufficient information for the local authority or a delegated independent adviser to validate the calculations.

One method for providing this information is to tabulate the input data used in the noise predictions which may include: source noise levels corrected for on-time during the perio of interest; distances from plant locations to receptors; screening corrections applied for barriers, intervening topography or buildings; soft/ hard ground assumptions; and reflections due to the presence of building facades. Plans should be included to show working areas, receptor locations (used to represent NSPs) and the location of any physical mitigation measures such as temporary localised screening, enclosure or perimeter noise barriers. Where noise predictions have been performed using a proprietary noise model, it is generally not possible to present all the information necessary for the local authority to verify the predictions. In such cases it is advisable to ensure that the plans provided in the S61 application clearly show the locations of all relevant features that have been included in the noise model. Phasing diagrams are a useful addition where the application covers a number of different construction phases.

The noise indicators should be agreed with the local authority or must be consistent with any pre-determined, and jointly agreed, project specific guidance and normally this would be $L_{Aeq,T}$ over the prescribed period, or the worst hour LAeq,1hr. For some projects or some local authorities, L_{AFmax} may also be required, particularly for impulsive or intermittent works during night-time periods. For larger projects, predictions may be required for a number of different periods during week days and weekends separately and the required $L_{Aeq,T}$ averaging period may also be defined. An example is presented below:

Day	Time Period	Relevant Indicator (Period or Worst Hour)
Monday to Friday	7am-8am	$L_{Aeq,1hr}$
	8am-6pm	$L_{Aeq,10hr}$
	6pm-7pm	$L_{Aeq,1hr}$
	7pm-10pm	$L_{Aeq,1hr}$
Saturday	7am-8am	$L_{Aeq,1hr}$
	8am-1pm	$L_{Aeq,5hr}$
	1pm-2pm	$L_{Aeq,1hr}$
	2pm-10pm	$L_{Aeq,1hr}$
Sunday	7am-10pm	$L_{Aeq,1hr}$
All Days	10pm-7am	$L_{Aeq,1hr}$

The noise data should be presented in a set of tables showing the relevant date/time period and the predicted noise levels and ambient noise levels for each receptor location. An example of this format is shown below.

Rec ID	Receptor	Receptor Height* (m)	Ambient Noise Level (dB)	Highest Construction Noise Level (Monthly Average Noise Level) dB $L_{Aeq,T}$					
				March 2016	April 2016	May 2016	June 2016	July 2016	August 2016
AF1	Borough House	20	58	70 (65)	69 (63)	65 (62)	64 (61)	60 (57)	60 (57)
AF2	12-24 High Street	7.5	58	73 (67)	67 (65)	64 (61)	60 (57)	60 (56)	59 (55)
AF3	1-13 Smith Road	4.5	57	70 (65)	66 (61)	60 (57)	60 (56)	59 (55)	59 (55)
AF4	77 West Street	4.5	62	55 (47)	46 (<45)	<45 (<45)	<45 (<45)	<45 (<45)	<45 (<45)
AF5	West Tower	28	61	72 (69)	71 (67)	61 (61)	61 (61)	60 (59)	59 (59)

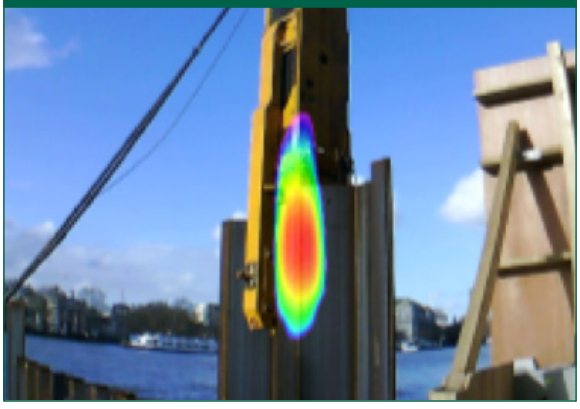
* Receptor height is the highest floor, but the predicted noise levels shown are the highest levels calculated for over any floor on that facade

Depending on the nature of the construction works and the locality where they are taking place, it may be appropriate to present more than one set of construction noise prediction tables for each required time period. One set of tables might be provided for 'construction noise only' and the other set might provide the summation of noise representing 'construction noise plus ambient noise' for each receptor. Where the existing ambient noise levels contribute to the total noise expected at receptors the 'construction plus ambient' tables might provide more representative threshold values at locations designated for continuous noise monitoring. Because of the likely variability in ambient noise levels from day to day and from hour to hour at some locations, care should be taken to ensure that such elevated threshold noise levels are not unrepresentative and overly favourable to the contractor. This is particularly the case where the worst hour is the primary time period of interest, and where it might not be appropriate to assume the worst case highest ambient noise level for that hour in the period.

Noise source locations

The positions to be assumed for the noise sources in both the vertical and horizontal planes can be based upon: the dimensional mid-point of the plant item or activity, the noisiest part of the plant item or activity or another position that is suitably representative of the total noise emissions over the period of interest for the assessment. Particular care will need to be taken where there is need to specify the lengths, orientations and heights of physical noise mitigation measures, such as noise barriers and enclosures. Some plant items may have multiple sources that need to be modelled individually, especially where screening proposals may mitigate noise for a selection, and not all, of the sources.

Figure 8: Acoustic camera image showing dominant noise source location for sheet piling



In accordance with the calculation methodology presented in BS 5228-1 it may be necessary to model mobile plant (including delivery vehicles) either working over defined areas or operating along internal haul routes as line sources. The location of such line sources should be based on the logistics plan and the layout of routes within the worksite.

When modelling the source locations on the worksite, it may be necessary to consider either the closest location to the NSPs or a spatially averaged position for the assessment period of interest, depending upon the objective of the assessment. If the purpose is to predict worst case noise levels, then the closest locations should be adopted, while the spatially averaged location might provide a better representation of 'average' noise levels over a certain phase of works. The approach adopted should be influenced by the proximity of closest noise sensitive receptors to the construction site, and any other project specific requirements. It should be noted that if the receptors are relatively distant from the construction site then there will be little difference in the noise predictions whether the closest locations or the spatially averaged locations are used.

Selection of the most suitable position might also be influenced by whether predicted average month or worst day noise levels are the required outputs. The available noise data from some plant and equipment may also indicate the orientation of the plant item may be an important factor in its noise emissions to NSPs, and indeed it may be possible that the plant orientation can be deployed as an effective mitigation measure.

3.8.3 Implications of Prediction Accuracy

BS 5228 does not explicitly require consideration or quantification of uncertainties associated with the prediction of demolition or construction noise and vibration. However, any decision maker may want to understand how robust the assumptions adopted in the prediction exercise are, how accurate the published predicted values are likely to be and what risk there is that predictions could be exceeded. It is common for conditions to be attached to a S61 consent which requires some evidence of compliance with the predicted values through monitoring. For sensitive sites, it is therefore necessary to ensure that a sufficient level of precaution is applied to the prediction process to minimise, or control to an acceptable level, the likelihood of measured levels exceeding those that have been predicted.

Uncertainty can be introduced at various stages in the prediction process for both noise and vibration generated by construction activities. The most sensitive parts of the prediction process can be investigated through sensitivity testing. This involves altering assumptions in the process to look at the lower and upper range of reasonably foreseeable parameters for assumptions, and even a more cautious worst possible case series of assumptions. Sensitivity testing will enable a more complete understanding of the range of possible outcomes.

Whilst there are clear benefits in presenting predictions towards the upper end of what might be expected in any S61 application, in the knowledge that consent conditions may bind the contractor to within, or to not excessively exceed, those predictions, there are also associated dis-benefits if the balance is in the favour of the contractor and against the interests of the persons likely to be affected and the regulatory authority.

Predicted levels which have been intentionally elevated to create a wider noise level boundary limit for the contractor to operate in an unfettered fashion, could attract greater interest from the local authorities leading to more onerous consent conditions, and potentially implying the need for unnecessary mitigation in the form of both on-site and, should a relevant policy be enacted for the site, off-site measures in the form of noise insulation and/or temporary re-housing [24].

Conversely, predictions which are underestimated, and which could assist in gaining an easier and unchallenged consent passage by the regulatory authorities, could lead to almost immediate adverse response by affected parties and local authorities. In such circumstances, rapid and adversarial intervention by the local authorities could be expected, as well as reactive and difficult community relations activities. If noise level related conditions are in place, excessive measured exceedances of the predictions could lead to cessation of works and/or modification of the construction methods and the re-visiting of mitigation to enable works to re-commence. An approach of presenting underestimated noise levels could also modify the stakeholders' attitude, trust and expectations from that point onwards which could result in further disruption to the contractor's progress of the works for the remainder of the construction programme. Best Practicable Means would most likely be scrutinised to a greater degree than would be the case with more cautious predictions and potentially on a more regular, or even continuous, basis by the local authorities.

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24 As discussed in Section 2.3.1, whilst not formally part of the consent application, may be identified for information in the Section 61 application.

The acoustic consultant in conjunction with the construction team will need to find a reasonable balance on how much uncertainty and/or tolerance to apply to the predictions, considering the sensitivity of the construction works, the risk of exceedances occurring and the legal and community relations implications of any routine and/or excessive exceedances.

Accuracy of BS 5228-1 Predicted Noise Levels

BS 5228-1 does provide guidance on how to maximise accuracy of noise predictions.

Para F2.1 advises that 'reasonably accurate predictions can be made by approaching the problem in a logical way and by analysing all activities involved.'

BS 5228-1 also strongly suggests a preference to use measured $L_{Aeq,T}$ values of 'a similar item of plant, operating in the same mode and at the same power over a representative time period including a sufficient number of operating cycles'. It advises that the measurements may be taken at any appropriate distances but are generally taken at 10 m; measurements at other distances generally need to be corrected back to 10 m for reference purposes.

BS 5228-1 states that 'the method given [... above ...] is likely to provide the most accurate prediction.', going on to say that the plant sound power method (see F.2.3.2) can be used in the absence of sufficient data for the activity $L_{Aeq,T}$ method (see F.2.2) but it is necessary to know the on-time of the plant in order that 'comparable accuracy of site noise prediction can be obtained'. Importance is placed on how representative the % on-time is.

On the subject of barrier attenuation, BS 5228-1 says that 'calculations may be made in octave bands instead of "A" weighting to provide a more accurate barrier attenuation value; if the octave band sound levels (see Tables C.1 to C.11) and the positions of the sources, receiver and barrier are known'.

Potential Areas of Uncertainty

The following provides a checklist of areas in the prediction process that could contribute to the compound uncertainty and which should be considered by sensitivity testing when assessing the robustness of assumptions applied.

- Construction Methodology:
  - have all of the correct methods of construction been identified and understood?
  - have the correct activities and plant types been identified?
  - are the various sources of noise and vibration (not just machinery noise) for each activity understood?
  - have the correct, and suitably cautious, quantities of plant been identified?
  - does the indicative programme show potential for multiple activities contributing to combined noise levels at any receptor?
- Location of activities:
  - Are all of the possible locations of the activities understood and accounted for? (including static, linear and mobile activities)
  - Is there a need to understand an absolute worst-case location for noise (e.g. worst hour, worst day etc), and/or a spatial average of the activity locations to provide an indication of noise over a longer defined period of time?
  - If off-site noise mitigation policies apply, is there an overriding requirement to understand the temporal variation over each day to enable an accurate assessment of eligibility?
- Accuracy of % on-time:
  - Are the % on-times realistically representative of the expected noise generation by the plant item or activity? Whilst a doubling of % on-time can lead to a modest difference of 3 dB, the % on-time must reflect the expected usage over the period of interest for any calculation. This means that the values can vary according to those time periods. For example, it may be appropriate to assume that over a 10-hour day, certain plant may be used for 30% of the time, but there may be occasions where the % on-time for a worst hour in that day could be 80%.
  - Is there a need to apply cautious % on-times if the engineers have identified potential risks of delays to the planned timescales of certain plant operations or activities?

- Location of noise sources:
  - What level of detail is required for defining noise source locations? Depending upon the accuracy required, it may be necessary to accurately define the locations and orientations of specific and individual plant noise sources in the horizontal and vertical planes. This may be the case where the effects of barrier attenuation and/or soft ground attenuation need to be understood in detail;
- Source data:
  - Have measurements of similar plant or activities been used wherever practicable and in particular for dominant plant items?
  - What are the risks of underestimating the noise predictions by relying solely on published or manufacturer's data? In such cases it may be appropriate to recommend supplementary source measurements either prior to development of Section 61 application or as an audit activity at the start of the relevant works as a precautionary measure;
  - Has any averaging of the published BS 5228 source data been undertaken (as advocated in the BS), in the absence of a known or directly applicable individual plant item?
  - Have the risks of relying on any averaging of source data been reviewed and understood?
- Dominance of plant:
  - Are there specific items of plant or equipment that are the dominant influence on the predicted noise levels for the works under investigation? When considering the noise generated by an activity or grouping of plant it may be prudent to understand the relevant dominance of each plant item. It will be more important to apply effective controls to the dominant plant items rather than to those that may alter the predicted levels and outcomes to a lesser degree;
- Design of mitigation measures:
  - Are performance specifications required to ensure that mitigation measures achieve the desired control? Where noise mitigation assumptions (barriers, enclosures, silencers and other forms of noise attenuation) applied in the predictions presume a stipulated or minimum standard of performance, then the practitioner should ensure that such a performance is realistically achievable, and that appropriate input is provided to the design of such measures. This may include the minimum dimensions, orientation, sound insulation, sound absorption and/or insertion loss properties. The performance specifications and/or required properties should err on the side of caution.
- Calculations at receptors
  - Do the calculations require a façade correction to be applied to free-field calculated values?
  - If the pre-existing ambient noise levels need to be combined with the predicted construction noise levels, are both normalised for free-field or façade?
  - Are calculations being conducted beyond the stated distance range of applicability of BS 5228? If so, what provisions are being included to account for use beyond that stated range?
  - Is there a justification for considering other noise metrics and/or making provision for distinguishable audible characteristics in the calculations and assessment?

Managing uncertainty in construction noise and vibration predictions requires close discussions between the acoustics practitioner (who will hold an understanding of the output implications of changes in input assumptions), and the construction team (who will hold an understanding of the true variability of the input assumptions).

3.8.4 Prediction of Vibration

A S61 application should address vibration whenever construction activities may result in:

- the potential for people to be concerned about the effects of vibration;
- perceptible levels of vibration within nearby buildings; or,
- potential cosmetic or structural damage to buildings, other structures, sensitive equipment or assets from vibration.

Where it is necessary to address vibration in the S61 predictions, it does not necessarily require a detailed assessment. The following hierarchy of approached can be considered as part of a risk-based approach.

Qualitative approach – Explaining that plant has been selected to minimise vibration and the activities resulting in perceptible vibration will only occur for a limited time. The effects will be mitigated by informing residents or other building occupants of dates and times when the activities will occur. This may be considered to be Best Practicable Means where potential effects are limited and for short durations.

Risk assessment approach – This approach may require limited calculations or predictions of expected levels of vibration to be carried out. For example, the predictions may be needed to demonstrate that vibration would be below levels likely to result in building damage or levels of vibration that may be just perceptible.

Vibration assessment approach – This may be required for example where construction activity is taking place underground such that vibration or groundborne noise may be the only perceptible effects in a given location. Also, detailed predictions may be needed for construction sites where activities causing relatively high levels of vibration may be required for protracted periods, or sites close to sensitive uses, such as laboratories or recording studios. In addition, predictions to an engineering level of detail may be required where very high levels of vibration may be generated, and it is necessary to consider and mitigate any potential building damage.

Either a risk assessment approach or a more detailed approach may be used to derive safe distances or exclusion areas specifying effective stand-off distances for vibration generating activities. These may also be combined with duration limits where human response in terms of VDV is relevant.

Where there are potential vibration risks it may be appropriate to specify that vibration monitoring will be carried out for specific activities to confirm the risk assessment outcomes presented in the S61.

BS5228-2 Methodology

Annex E of BS 5228-2 includes empirical equations for the prediction of the resultant PPV from a number types of construction plant or activities. These prediction equations are taken from the TRL report 429. Prediction equations are limited to the following activities:

- Vibratory compaction
- Vibratory piling
- Percussive piling
- Dynamic compaction
- Vibrated stone columns, and
- Mechanised tunnelling

Where an acoustics practitioner has knowledge and experience of vibration and different construction techniques and plant items, it is possible to carry out approximate predictions for other plant or activity by taking one of the specified activities as a proxy.

Note that for several of the prediction equations, the results represent the probability of exceeding a certain resultant PPV, based on applying a scaling factor. Scaling factors are given based on the probability that the predicted resultant PPV will be exceeded by 50%, 33.3% and 5%. The appropriate application of these equations should be determined according to the level of acceptable certainty and risk for the particular receptor under investigation.

Predicting Vibration Dose Value (VDV)

BS 5228-2 makes a number of references to Vibration Dose Value (VDV) as this is "recommended in BS 6472 as the appropriate measure to evaluate human exposure to vibration in buildings in residential and other uses". (BS 5228-2 para 6.2).

Some projects have therefore specified construction vibration guideline limits in terms of VDV in relation to effects on people. The current version of BS 6472-1 does not include any guidance for calculating VDV from construction activities or any direct methodology for calculating VDV from vibration velocity or even a simple methodology for estimating VDV from acceleration. The 1992 version of BS 6472-1 did include methods for calculating the estimated VDV or eVDV based on continuous or intermittent acceleration values. It is possible to estimate the VDV using this methodology from PPV predictions if additional data or assumptions are made about the vibration frequency generated, the effective time the activity would operate for, amongst other factors. Refer to other specialist for more detailed assessment as required.

Specialists or project engineers may have obtained their own in-house empirical data, and these may also be available from published literature for certain activities. Sufficient data need to be available to determine approximate relationships between instantaneous PPV, period VDV and corresponding building response transfer functions. Again, considerable caution and appropriate professional judgment needs to be exercised in relation to ground types, equipment weight or power or energy of vibration sources.

Regarding human response to vibration, it is noted that this topic is discussed in section B.2 of Annex B of BS 5228-2. The text includes the following statement:

"Whilst the assessment of the response to vibration in BS 6472 is based on the VDV and weighted acceleration, for construction it is considered more appropriate to provide guidance in terms of the PPV, since this parameter is likely to be more routinely measured based upon the more usual concern over potential building damage. Furthermore, since many of the empirical vibration predictors yield a result in terms of PPV, it is necessary to understand what the consequences might be of any predicted levels in terms of human perception and disturbance."

A table, (Table B.1) is given in the Standard that relates different levels of PPV to the likely human effect. This enables any initial assessment of potential human disturbance effects presented in a S61 application to be based upon the PPV indicator.

Consideration should be given to transfer functions between the predicted free-field vibration in the ground and that transferred into a building. Relevant advice on transfer function should be sought from authoritative sources. A summary of suitable guidance is given in the ANC publication, Measurement & Assessment of Groundborne Noise & Vibration [25], section 8.2.5.

For the evaluation of potentially damaging vibration in buildings in terms of PPV the receptor location should be taken as the base of the building on the side of the building facing the source of the vibration. For evaluating human response to vibration in terms of VDV, the assessment location should be at the typical point of entry to the human body. Positioning of the vibration source locations for predictions should consider the purpose of the assessment, namely whether the primary purpose is to calculate the instantaneous worst-case vibration in terms of PPV or a more longer term exposure as described by the VDV.

Structure-borne/Ground-borne Noise

Some circumstances arise where vibration generated from within the construction worksite can cause consequential structure-borne or ground-borne noise to be generated in adjoining or nearby building spaces. If these spaces are occupied, then unexpected and atypical adverse human response effects can arise from a combination of the resultant noise level and its character. Where these works fall within the scope of CoPA, and are determined to arise from the 'premises', then the relevant obligations under the legislation, including the application of Best Practicable Means, apply. Typical situations where structure-borne or ground-borne noise effects can arise include:

- Sub-surface works (inc. tunnel construction and/or blasting) – where the contribution of airborne noise is either non-existent or highly attenuated, and vibration transmission from the activity through the overlying ground is sufficiently high in magnitude to excite the internal surfaces of the receiving building and cause the re-radiation of sound;
- Internal works within adjoining buildings – where adjoining buildings are mechanically coupled either with shared structural elements including party walls, works involving activities that cause vibration in one building can be transmitted into the structure of the second building and similarly excite the internal surfaces of the receiving building; and
- Surface external works close to neighbouring buildings – where buildings are close to external works which generate vibration and the façade of the building attenuates airborne noise to high degree, then the resulting structure-borne/ground-borne noise and vibration may become dominant effects within those buildings.

For the above, it is often the case that a combination of both structure-borne/ground-borne vibration and noise can co-exist in varying relevant contributions, and hence both effects would need to be assessed accordingly.

Assessment and mitigation of structure-borne/ground-borne noise and vibration are highly complex fields and specialist involvement is advised. Further guidance including prediction and assessment methods is given in the ANC publication, Measurement & Assessment of Groundborne Noise & Vibration [25].

25 Measurement & Assessment of Groundborne Noise & Vibration, Association of Noise Consultants, Third Edition, 2020 (The Red Book).

3.8.5 BS 5228-1 Limitations and clarifications

Character of Construction Noise

The character of the construction noise, be it tonal, intermittent, or impulsive, may affect the degree of disturbance caused to people in the locality. This is recognised in BS 5228-1 which promulgates the inclusion of additional metrics in assessments and the recommendation to measure maximum noise levels where such features are expected.

As there is no direct provision in BS 5228-1 to apply modifications or adjustments to predicted noise levels for such characteristics, it can only be presumed that the assessment criteria and thresholds for off-site mitigation presented in BS 5228-1 inherently take account of the specific variability and character of all types of construction noise to have been successfully applied on numerous projects since the original versions of the standards were published. Nevertheless, it may still be a requirement of BPM for particular works to eliminate or mitigate such characteristics where such features are expected to affect the degree of disturbance.

Angle of view

The BS5228 methodology assumes point sources for all fixed plant and equipment. The practitioner will need to ensure a suitable amount of individual point sources is an area of activity is being modelled. This is particularly important where only part of a working area is screened by purpose-built barriers or intervening topography or buildings.

Distance Limitations

BS 5228 includes the following note of caution regarding predictions over longer distances.

At distances over 300 m noise predictions have to be treated with caution, especially where a soft ground correction factor has been applied, because of the increasing importance of meteorological effects.

Where predictions are made to locations over 300 m from the works, it may be appropriate, subject to agreement from the relevant local authority, to either use a hard ground correction irrespective of the actual ground conditions or, to use a prediction methodology which does consider meteorological effects such as ISO 9613:Part 2 "Acoustics – Attenuation of sound during propagation outdoors" [ix], or the method presented in CONCAWE report "The propagation of noise from petroleum and petrochemical complexes to neighbouring communities" no. 4/81.

Propagation Over Water

The BS 5228-1 methodology confirms that the calculation procedures are applicable for sound travelling over areas of water (wide rivers, harbours, lakes, etc.), and that the distance adjustment for hard ground should be applied when considered propagation over water.

Prediction of Maximum Construction Noise Levels, L_{Amax}

The relevant local authority may request that maximum construction sound levels are provided, particularly where works include night-time impulsive activities or are in close proximity to NSPs. The methodology presented in BS 5228-1 does not provide a method for the prediction of maximum construction noise levels, and it should be noted that BS5228 states that:

There are no general empirical relationships between L_{Amax} and $L_{Aeq,T}$.

Furthermore, other than for moving vehicles, BS 5228-1 does not provide source information in maximum noise level terms to enable calculation.

Where the local authorities request is agreed, it is recommended that the maximum noise levels predictions are provided for impulsive activities only and that the prediction method to be used is agreed with the local authority before submission of the S61 application, ideally through trial measurements undertaken at less sensitive times. Where practicable and agreeable to the local authority, it is recommended that measurements are undertaken to determine the source sound levels. These source levels can then be adjusted for screening, distance and other relevant factors in any further noise predictions that are required.

Reflections

The BS5228 methodology requires that... "The activity $L_{Aeq,T}$ needs to be corrected for source-receiver distance, **reflections** and screening or soft ground attenuation". Specific guidance on the façade reflections is provided:

Where the point of interest is 1 m from the façade of a building, make an allowance for reflection by adding 3 dB to the calculated (free field) levels.

The following informative is provided:

In practice, sources of noise such as construction site equipment do not radiate sound uniformly in all directions. Equations (F.3) and (F.4) can be adapted to allow for this directivity effect and for reflections within the site. However, for the purposes of calculations in this standard the effect is ignored.

It is considered prudent that where it is likely that reflections from existing buildings, site buildings, hoarding or another structures, may potentially affect the predicted sound levels, that predicted construction noise levels (particularly those considering large screening values) are treated with caution. Such situations may include:

- Partially enclosed working areas;
- Plant enclosures;
- Receptors which do not have direct line of sight to the site but may be affected by reflections from neighbouring buildings/structures (see Figure 9);
- Sites either fully or partially surrounded by buildings or other structures higher than the site hoarding; and
- Any other semi-reverberant spaces, including those introduced by opposite reflections on the site hoardings themselves.

In these situations, it may be appropriate to consider the use of a virtual source location to calculate the effective barrier attenuation. For example, using the methodology in ISO 9613: Part 2. To minimise this effect of reflective barriers or surfaces on the assumed barrier attenuation, it may be appropriate to provide absorptive linings to control the semi reverberant sound levels.

Figure 9: Example where the receptor does not have direct line of sight machinery but may be affected by reflections other structures

3.9 Noise and Vibration Monitoring

A Section 61 consent application should include details of the noise and/or vibration monitoring to be undertaken to demonstrate compliance with the consent conditions. The appropriate level of noise and/or vibration monitoring will depend upon the scope and nature of the works to be consented, and the type and use of neighbouring sensitive receptors.

Further details on the monitoring and strategy are contained in Sections 5.2 and 5.3.

3.10 Approximate Duration of Works

A Section 61 consent application should include sufficient programme information to identity, for the basis of any predictions, the likely sequencing of activities and those activities which are likely to be undertaken concurrently. It is important that the programme information be consistent with the method statement, noise and/or vibration predictions, and the site plans presented in the application. However, given the variable nature of construction, the specific details of the programme should not be a matter for consent as it is often likely to change.

3.11 Community Liaison

A Section 61 consent application should as an informative to the application, include details of the community liaison to be undertaken by the client or Contractor connected to the works. It has been shown numerous times that keeping the community informed about the works is a very beneficial mitigation measure.

Community liaison can take a number of forms. Details should be provided of how residents and other stakeholder will be notified in advance of the nature and duration of the proposed works. This should include specific reference to any activities that may result in more noticeable periods of noise and vibration. Contact details for further information should also be included and any telephone hotline number and an email address.

3.12 Other Information

3.12.1 Off-site Mitigation

The Control of Pollution Act section 60 and 61 processes emphasise the reduction of noise at source (through use of quieter plant/quieter working methods) and other controls that can be implemented on site (such as barriers and enclosures and siting of noisy equipment).

However, if the contractor has applied BPM to the provision of mitigation, i.e. all reasonable measures have been taken onsite to reduce the noise levels, but levels are still such that widespread community disturbance of interference with activities or sleep is likely to occur, it will be necessary to consider off site mitigation. Off-site mitigation could include Noise Insulation (NI) such as secondary glazing and additional ventilation, or temporary or permanent rehousing (TRH).

Off-site mitigation such as NI or TRH should always be viewed as a last resort and does not lessen the onus on the contractor to demonstrate that BPM has been employed. It should be remembered that the provision of off-site mitigation will require time for surveys and implementation works and that this can have programme implications. The onus is on the contractor to offer the off-site mitigation (or reasonable costs thereof), but the occupant of the affected building is not obliged to accept the offer.

Annex E of BS5228 provides example criteria for NI and TRH which contain a qualifying noise level and a qualifying duration of *"a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months"*.

The qualifying noise level is the higher of either the values shown in Table E.2 of the standard (reproduced in table x.1 below) or 5 dB above the pre-construction ambient sound level, whichever is the higher for noise insulation; and 10 dB above the noise insulation level or 10 dB above the pre-construction ambient sound level, whichever is the higher, for temporary rehousing.

It should be noted that this Annex represents good practice but is an informative. Local Authorities should be consulted to agree criteria for sound insulation in advance of the section 61 preparation. It is not uncommon for major projects to introduce their own policies and thresholds which can vary from those presented in BS5228 Annex E.

Table x.1 NI and TRH Recommendations from BS5228:2009+A2014

Time	Relevant time period	Averaging time T	Noise Insulation trigger Level dB $L_{Aeq,T}$	Temporary Rehousing Trigger Level dB $L_{Aeq,T}$
Monday to Friday	07.00-08.00	1h	70	80
	08.00-18.00	10h	75	85
	18.00-19.00	1h	70	80
	19.00-22.00	3h	65	75
	22.00-07.00	1h	55	65
Saturday	07.00-08.00	1h	70	80
	08.00-13.00	5h	75	85
	13.00-14.00	1h	70	80
	14.00-22.00	3h	65	75
	22.00-07.00	1h	55	65
Sunday and Public Holidays	07.00-21.00	1h	65	75
	21.00-07.00	1h	55	65

In addition to the above off-site mitigation thresholds, some large projects have also offered alternative arrangements such as temporary respite, for example during planned daytime piling works.

3.12.2 Alternatives to Noise Insulation

In some cases, for example where existing glazing is of a good acoustic standard, but windows need to be kept open for ventilation purposes, it may be appropriate to offer acoustically attenuated ventilation only, to allow windows to be closed during noisy works.

3.12.3 External Areas

NI can be effective for reducing internal noise levels but is ineffective for protection of external living areas such as gardens and balconies.

3.12.4 Balcony Screens and Locally Placed (off-site) Noise Barriers

Balcony screens have been used on some major projects as a means of reducing noise from construction activities affecting external areas. These either take the form of clear screens to extend the height of the balustrade or full height screens with louvred glass or sliding windows to provide ventilation. Such screens may need planning permission. An example from the Thames Tideway Project is shown in Figure 1.

Figure 10: Balcony mitigation (before and after)

Off-site noise barriers can only be included in the Section 61 application if it can be proved that they can be delivered. In some cases, these will need planning permission.

Figure 11: Construction hoarding incorporating a transparent upper section

There are programme implications arising from reliance on mitigation that would require a separate consenting process such as a planning consent. A contractor led noise insulation scheme can have the benefit of incentivising the contractor to innovate to reduce noise emissions and avoid.

3.12.5 Presentation

The typical section 61 application template form used by many projects and local authorities does not in all cases incorporate a need to report off-site mitigation proposals. This is because NI/TRH is normally enacted under the provisions of alternative legislation, and in practice falls outside of the provisions of CoPA 1974. Therefore, whilst not a matter for consent in any Section 61 application, for some projects, where an off-site mitigation policy applies, it may be appropriate to refer to NI or TRH but for information only.

3.12.6 Application Informatives

In addition to the statutory or recommended information to be included within a Section 61 consent application, in some instances, it is recommended that other relevant documentation is appended to the Section 61 consent application as an informative, not requiring consent. This may apply where other constraints have implication on the noise or vibration generated on a site, or relevant information can be provided to the local authority which may assist in the consenting process. Such examples include:

- Procedures for considering complaints from local stakeholders [26];
- Other stakeholder management processes;
- Examples of letters provided to local stakeholders informing them of the works [27];
- Details of off-site mitigation schemes or private agreements with local stakeholders; and
- The combined noise or vibration levels resulting from other contractors working in the local area. This may be from contractors working on the same project or on unrelated developments.

3.13 Good Practice Example

A good practice example of elements of a Section 61 consent application is presented in Appendix: Example 3.

26 An example complaints procedure is included within the LANAF document, *London Good Practice Guide - Noise & Vibration Control for Demolition and Construction*

27 An example from the Thames Tideway Project is presented for information in Appendix - Example 8.

4. Consent

4.1 General

This section considers the content of the Section 61 prior consent which may be granted to the Contractor by the local authority. A consent can be granted:

If the local authority considers that the application contains sufficient information for the purpose and that, if the works are carried out in accordance with the application, it would not serve a notice under the preceding section in respect of those works, the local authority shall give its consent to the application.

- Section 61(4) of the CoPA 1974

The content of the Section 61 prior consent can include the following:

In acting under this section a local authority shall have regard to the considerations set out in subsection (4) of the preceding section and shall have power to–

(a) Attach any conditions to a consent; and

(b) limit or qualify a consent to allow for any change in circumstances; and

(c) limit the duration of a consent,

and any person who knowingly carries out the works, or permits the works to be carried out, in contravention of any conditions attached to a consent under this section shall be guilty of an offence against this Part of this Act.

- Section 61(5) of the CoPA 1974

If the local authority is in agreement [28], similar to the recommended process of exchanging a draft consent application before formal submission, it is recommended that a draft consent (including conditions) is requested from the local authority before the end of the statutory consent period. The conditions should then be reviewed by the Contractor and other interested parties to make sure that they are reasonable and proportionate.

It is recommended that consent conditions comply with the following (based upon the 6 tests defined in the National Planning Policy Framework (para 206 [29])):

1. necessary;
2. relevant to planning and to the development to be permitted [30] ;
3. enforceable;
4. precise; and
5. reasonable in all other respects

For example, a condition which requires that noise be limited to be inaudible, or not perceptible at a receptor, is subjective as audibility and perceptibility vary from person to person and are a matter of judgement. Therefore, such wording is neither sufficiently precise, nor enforceable.

Another area where caution is required, is where the consent is linked to a planning application. In the same way that the planning application must be relevant to planning and a condition must not relate to specific control outside of the planning legislation (in this case Control of Pollution Act 1974), the S61 consent should not be linked to a planning legislation. This also applies to any consent linked to off-site mitigation enacted under alternative legislation.

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28 It is recommended that the issuing of draft conditions is discussed with the local authority as early as practicable, at latest before the formal submission.

29 Further information on the tests/key questions: **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/579424/Tests-and-key-questions.pdf**

30 May not be relevant to a Section 61 consent application.

It is also recommended that any consent provides for the substitution of plant or addition of new plant subject to no material change in either the effective sound power level or the overall noise levels at receptors. An example relating to the effective sound power level is presented below:

> 5. The plant and equipment specified in Section 6 and Appendix II of the application shall be used to carry out the works in accordance with the Method to be Used detailed in Section 4 and Appendix I of the application. The applicant may substitute an alternative item or use additional items of plant or equipment and will use the best practicable means to ensure that the effective sound power level is equivalent, similar or lower than that stated in the application.

- Example from Crossrail model consent conditions document

Such a condition is recommended because it provides benefits to both Contractor and Local Authority; the Contractor is able to make minor revisions to equipment used on site without the need to provide a variation or dispensation and the local authority does not need to spend unnecessary time reviewing and agreeing variations or dispensations which do not alter the effect on persons in the locality.

The conditions may also confirm items within the application, for example frequency of monitoring and types of reporting, and confirm the use of variations, dispensations and over-runs that may be used in relation to the consent.

It is recommended that where, the draft consent includes conditions which do not comply with one or more of the six consent condition requirements, that the conditions are discussed with the local authority before the formal conditions are issued, particularly given the difficult process of appealing consent condition.

The consent should also set out details of the available process (which may be modified in the case of major infrastructure projects), for appealing a consent or appealing the non-determination of an application.

4.2 Noise and Vibration limits

Generally, it is not recommended that noise or vibration limits are included within the consent conditions. This is because the central mechanism for controlling construction noise and vibration under CoPA 1974 relies on the demonstration that BPM is being employed at all times to minimise noise and vibration. In situation where limits are applied, then it provides the circumstances for the contractor to plan its works to generate noise levels up to those limits and not necessarily plan to conduct its works in accordance with BPM. As such, the imposition of limits introduces legal uncertainty and can be considered to be incompatible with BPM. Furthermore, planning works to meet limits does not allow for flexibility in working which may be advantageous to nearby occupants of NSPs. For example, generating high noise levels but for only short periods of time with some periods of respite might be considered to be BPM and may reduce overall disturbance to neighbouring occupants. These periods of respite might not be available if noise limits are being made available to the contractor.

In certain situations, there can be advantages to noise or vibration limits. For example, where there are large distances between the worksite and the nearest noise sensitive receptors, or for smaller more variable projects where modelling is not practicable and flexibility in the construction programme means that works can be easily stopped or amended in order comply with the limits. Finally, the adoption of limits can result in a simpler management/contractual process and can remove the requirement for any off-site mitigation policy.

4.3 Consent Informatives

The local authority may add an informative to the consent condition, examples include:

- The local authority protocol for the appeals process [31];
- The use of variations, dispensations and over-runs forms;
- The preferred format of monitoring information; or
- Other standard local authority procedures.

31 The statutory information is presented in; The Control of Noise (Appeals) Regulations 1975, as amended by The Control of Noise (Appeals) (Amendment) (England) Regulations 2016

5. Compliance

5.1 Introduction

Once the application is made and the consent granted this might seem to be end of the Section 61 process. However, there is a requirement within CoPA 1974 that ... *In any proceedings for an offence under section 60(8) of this Act it shall be a defence to prove that the alleged contravention amounted to the carrying out of the works in accordance with a consent given under this section*. Therefore, there is a requirement to prove that the works are being undertaken in accordance with a Section 61 consent. The most obvious way of proving compliance is through monitoring, which may include either physical noise or vibration measurements or observational on-site monitoring but usually a mixture of the two.

5.2 Monitoring Strategy

It is imperative that the aims or goals of any monitoring regime are defined before monitoring is undertaken, and that these are described in the Section 61 application for the avoidance of doubt. Measuring construction noise or vibration for no specific objective can be an unnecessary burden. It is recommended that the goals consider: the consent requirements, any need for non-core working hours; the variability of activities across the site; and the relative benefits of physical measurement and observational on-site monitoring. It is recommended that any monitoring regime, including reporting method and frequency, should be agreed with the local authority prior to being implemented to avoid unnecessary costs.

Typically, monitoring is undertaken for the following reasons:

- investigating complaints;
- measuring source noise levels from on-site activities during trials, or early phases of the works, to verify the inputs included in the Section application;
- comparing measured construction noise or vibration levels against those predicted in the Section 61 application;
- checking that BPM measures are in place and identifying opportunities for other control measures;
- identifying whether measured levels require the offering of off-site mitigation in accordance with project policies;
- ensuring compliance with noise and vibration limits where these have been imposed; and
- other project commitments.

Typically, the above is achieved through a combination of continuous unattended semi-permanent monitoring stations, and the deployment of specialists to undertake short-term attended sample measurements and on-site BPM audits.

Any personnel undertaking noise and vibration monitoring shall be able to demonstrate their competency for the task, either through membership of a professional organisation, or practical experience.

5.3 Noise and Vibration Monitoring

Guidance on measuring noise and vibration from construction works is included within the following documents:

- BS5228 Part 1 [ii] Annex G "Noise Monitoring";
- Crossrail legacy document [32];
- CIRIA Environmental good practice on site;
- London Good Practice Guide – Noise and vibration Control for Demolition and Construction, LANAF [21]
- ANC publication, Measurement & Assessment of Groundborne Noise & Vibration [25]

32 https://learninglegacy.crossrail.co.uk/documents/section-61-consents-lessons-learned/

In addition to this guidance included within these documents, consideration should be given to the following when planning and implementing monitoring strategies for construction noise and vibration.

5.3.1 Baseline Monitoring

For receptors where there are appreciable existing levels of ambient noise or vibration it is recommended that baseline noise and/or vibration measurements are undertaken prior to the commencement of the works. These measurements can be used during the construction phase to disaggregate noise from the worksite from the prevailing ambient noise (see Example 2).

Often it is not practicable to undertake extensive measurement prior to the commencement of construction works. In which case, it is recommended that any historical measurements be reviewed, which may be planning documents (including Environmental Impact Assessments), local authority measurements, DEFRA documentation and DEFRA noise mapping. These data can be augmented with measurements undertaken at weekends, or other periods when the worksite is not operational.

5.3.2 Monitoring Locations

Wherever practicable monitoring should be undertaken at the locations defined within the Section 61 application, including those that may have been included on the site boundary specifically for monitoring purposes. Where this is not practicable, monitoring should be undertaken at a nearby representative location, or at a proxy location where the measurements can be simply corrected to determine the level at the receptor identified in the application. If the site orientation enables it, such locations can be within the site boundary making the process of gaining access to undertake monitoring much simpler.

5.3.3 Equipment

When selecting noise monitoring equipment, in lieu of specific contract or project requirements, the following requirements from BS5228-1 Annex G should be considered:

The instrumentation should conform to the requirements for integrating averaging sound level meters, preferably of type 1 as specified in BS 7580-1:1997, but at least of type 2 as specified in BS 7580-2:1997, with verification of conformity being undertaken by periodic testing in accordance with these standards.

The differences in accuracy between a Type 1 and Type 2 sound level meter is dependent upon a number of factors; but primarily directional response and frequency response. If it assumed that the sound level meter is orientated towards the construction worksite, then the primary differences are frequency dependent. The frequency weighting and acceptance limits in one-third octave band nominal frequency bands as presented in BS EN 61672 are presented in Table 3.

The frequency content of construction noise is primarily between 63Hz and 1kHz, where there is little difference between a Type 1 and Type 2 sound level meter, and given the cost differential between these items of equipment, typically a factor of 10, it could be preferential to install Type 2 equipment. However, where discrepancies or conflicts occur then given the higher accuracy of the Type 1 sound level meter usually results in this data been seen as the more reliable. One approach could be to install multiple Type 2 sound level meters around the site and support the measurements with attended measurements using Type 1 equipment.

It should be noted that some projects stipulate requirement for either type or class of instrument as part of the contractual obligations with its contractors. This may also include differences in the periodic verification requirements and, when or if any verification is to be conducted in conformance with UKAS protocols.

5.3.4 Calibration

Guidance regarding calibration and selection of construction noise monitoring equipment is contained in BS5228-1 Annex G "Noise monitoring" which can be summarised as follows:

- The instrumentation should conform to the requirements for integrating averaging sound level meters
  - preferably of type 1 as specified in BS 7580-1:1997 (Or BS EN 61672-1:2013) [33]; or
  - of type 2 as specified in BS 7580-2:1997 (or BS EN 61672-1:2013) [33]
- Verification of conformity should be undertaken by periodic testing in accordance with the standards referenced above.

33 Alternative instrumentation, if used, should provide equivalent performance in respect of frequency and time weightings and tolerances.

- Manufacturers' instructions that accompany measuring instruments should be followed strictly.
- Every precaution should be taken before use to ensure that the instruments are accurately calibrated and, in the case of battery-operated instruments, that the batteries have not run down.
- In addition to the periodic testing recommended in the first paragraph, a sound calibrator or pistonphone, preferably one conforming to BS EN 60942:2003, class 1, should be used to check the correct operation of the meter; typically before and after each measurement session.

5.3.5 Construction Only versus Total Noise

Any predicted construction noise levels required to be included within a Section 61 consent application can either be expressed as construction only levels, or as the 'total noise level' where the prevailing ambient noise level is added to the construction noise level.

It can be considered advantageous to present the total noise level in the application as it may make it clearer as to the level to be monitored and hence easier to demonstrate compliance. However, in situations where the construction works alter the prevailing ambient noise level, for example, full or partial closure of a road, or removal of a building providing screening. This may result in unnecessarily high levels being consented. Furthermore, where there is a marked fluctuation in baseline noise level over the working period, the measurement periods may need to be increased to cover the whole period to allow for the variation, which potentially removes the option of using short-term measurements to demonstrate compliance.

Where the construction works are liable to alter the ambient noise level, irrespective of the noise directly associated with the works, and/or the ambient noise level is unstable, then it is recommended that the construction noise only levels are presented, and a method for disaggregating the ambient noise levels from the construction noise levels is presented in the monitoring section 3.9.

5.4 Observational On-site Monitoring

As described in section 3.3.1 and presented below:

"*(3) An application under this section shall contain particulars of–*

(a) the works, and the method by which they are to be carried out; and

(b) the steps proposed to be taken to minimise noise resulting from the works."

Observational on-site monitoring to verify that that the method, and the plant associated with that method, and the steps to minimise noise are being utilised on site in accordance with the consent should be undertaken and records kept for future reference. An example checklist is presented in Example 6.

5.5 Monitoring Records

The monitoring records should be readily available for the local authority to review upon request, with copies (or access to copies) available from the site office. The format that this takes should be agreed with the local authority as part of the pre-Section 61 consent application discussions and is likely to be different depending upon the nature of the works, local authority experience [34], and any specific project requirements. Typically, it may be necessary to report data collected from continuous semi-permanent monitoring systems separately to data collected from periodic short-term attended and targeted monitoring surveys.

Historically, information has been provided in weekly or monthly basis in a spreadsheet or document form. However, often on large projects web-based records or a live system are employed, which once setup can often result in appreciable time savings. Such a system enables text or email alerts to be sent to the acoustic consultant, contractor's environmental manager and other team members as appropriate. One note of caution for a 'live' system is that influence from other non-construction sources may result in a false alert which may unduly concern local authority representatives or residents, if a timely explanation is not provided.

It is recommended that these records are periodically audited to ensure that they are completed correctly and that they would be fit for purpose to fulfil their primary roles which is provide a defence against an alleged contravention of the consent.

34 and often IT capability.

5.6 Training

It is vital that all relevant personnel within the contractor's team are made aware of their responsibilities to ensure compliance with the consent conditions and the implications should they undertake works in a manner which breaches that consent. The level of training should be dependent upon the role being undertaken and the relative involvement in the physical construction process, compared to the design process and the management of the site.

For example, managers should understand their legal position should a breach of consent occur, the fines and potential delay costs that would be incurred and their personal responsibilities. Whereas site operative involvement may be limited to ensure that they work in a manner compliant with a method statement, and within the agreed working hours.

Appendix: Examples

Example 1: Construction noise and vibration mitigation measures

In addition to the information contained with BS5228:2009+A1:2014 as the approved Code of Practice by the Secretary of State under Section 71 of CoPA. There are good examples of mitigation measures identified in the following on-line resources:

Guidance documents

- London Good Practice Guide – Noise and vibration Control for Demolition and Construction, LANAF **https://www.cieh.org/media/1251/london-good-practice-guide-noise-vibration-control-for-demolition-and-construction.pdf**

Project learning legacy sites

- Crossrail learning legacy **https://learninglegacy.crossrail.co.uk/documents/section-61-consents-lessons-learned/**
- Thameslink learning legacy **https://www.thameslinkprogramme.co.uk/learning-legacy/sustainability/noise-and-vibration/**

Project specific code of construction practice

- Hinckley Point C, Code of Construction Practice **https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010001/EN010001-005452-120806_EN010001_%20Code%20of%20Construction%20Practice%20(CoCP).pdf**
- Thames Tideway Tunnel, Code of Construction Practice **https://www.tideway.london/contact-us/document-library/code-of-construction-practice-part-a-and-b/**

Local authority code of construction practice

- City of London, Code of Practice for Deconstruction and Construction Sites **http://democracy.cityoflondon.gov.uk/documents/s75334/Code%20of%20Practice%208th%20Edition%20Committee%20Draft.pdf**
- London Borough of Richmond Upon Thames, Code of Construction Practice **https://www.richmond.gov.uk/media/19415/code_of_practice.pdf**

Example 2: Disaggregation of monitoring

In situations where multiple construction sites are being operated in close proximity, or where the existing noise climate varies materially over the operating hours of the site, there may be a requirement to disaggregate the construction noise of one site from a neighbouring site, or the existing noise levels. The following method is based on the premise that information regarding the neighbouring construction site and the existing noise climate is available.

Step 1

The predicted construction noise levels at locations affected by multiple sites, in conjunction with the existing ambient noise levels, should be reviewed to identify likely contributions at the sensitive locations.

Step 2

Attended measurements should be taken at a position close to the sensitive location and where practicable, at a proxy location which is screened from the 'other' sites, or whilst an equidistant from the activity may be further from the other works than the relevant sensitive location.

Broadband measurements are likely to be sufficient if there is an obvious disparity between different worksites. However, 1/3 octave band levels would assist in identification of contributions where the construction noise at the receptor location in a complex mix of contributions of similar noise levels. The duration of measurements will depend on how clear contributions are and the complexity of the sound source.

Measurements at the receptor will assist in confirming the levels of exceedance and allow the site operative to listen for obvious directionality or character of the various noise sources.

Step 3

Attended measurements can then be taken close as practical to the worksite(s), dependant on access arrangements and health and safety requirements. Care should be taken to measure all contributory noise sources, noting that the highest contribution at the receptor may not be the highest noise level at the worksite(s) dependant on any intervening screening.

Step 4

Measurements at source can be used to predict noise source levels at the receptor (or at the intermediate measurement location), using the calculation methodology within BS5228-1:2009+A1:2014. By comparing measurement data and predictions at the receptor and the proxy location if used) it will be possible to identify contributions, which summed should match the receptor ambient noise level.

Example 3: Example elements from a Section 61 application

Project X
Control of Pollution Act 1974
Application form for Section 61 Consent
[Site name]

To the[1]

I/WE HEREBY MAKE APPLICATION for prior consent in respect of works to be carried out on the [construction] site(s) specified below, under Section 61 of the Control of Pollution Act 1974.

***Indicates fields that should be completed as a minimum – refer to the Code of Construction Practice Part A.**

***Signed[2]**		***Date**	
***Name of applicant[2]**	(USE CAPITAL LETTERS)		
***Address of applicant (including postcode)[2]**	(USE CAPITAL LETTERS)		
***Tel no**		***Email**	
Tick which box applies	Working hours are as set out in the Code of Construction Practice Part B for this site ☐ OR Working hours are different to those set out in the Code of Construction Practice Part B for this site ☐		

1. Address or location of proposed works *	
2. Name and address of main contractor (See Note 3) *	
3. Particulars of works to be carried out	Highway Modifications Associated works will comprise the following principle activities: 1. Establishment of one-way system Site hoarding installation General site clearance and hardstanding/platform construction Associated works will comprise the following principle activities: 1. General site clearance 2. Hardstanding/ platform construction Archaeology investigation Associated works will comprise the following principle activities: 1. Excavation Cabin delivery and installation – office & welfare Associated works will comprise the following principle activities: 1. Construction of office foundations 2. Cabin delivery 3. Cabin fit-out Substation construction [Etc…]
4. Methods to be used in each stage of development	An overview method statement is attached as Appendix A. Site plans are attached as Appendix C.
5. Hours of work	This Section 61 consent application seeks permission for the following working hours: **Standard Working Hours** - 08:00 to 18:00 (Monday to Friday).

	Extended Working Hours - 18:00 to 22:00 (Monday to Friday) for installation of cofferdam tie rods, culvert prep works and bulk infill of cofferdam cells (tidal restriction). - 05:00 to 08:00 and 18:00 to 22:00 (Monday to Friday) for marine plant movements or relocations (tidal restriction). **Mobilisation and Demobilisation Hours** Plus up to one hour before and after for mobilisation and demobilisation - 07:00 to 08:00 and 18:00 to 19:00 (Monday to Friday) - 07:00 to 08:00 and 13:00 to 14:00 (Saturday) - 22:00 to 22:30 (Extended working hours activities) (Monday to Friday) Mobilisation and demobilisation will comprise the following activities: • Arrival and departure of the workforce at the site and movement to and from places of work (if parked, engines shall be turned off and staff shall be considerate towards neighbours with no loud music or raised voices; • Site inspections and safety checks: • Site meetings (briefings and inspections or site walkovers); • Site clean-up (site housekeeping that does not require the use of plant); • And low-key maintenance and safety checking of plant and machinery (providing this does not require or cause hammering, banging etc.). **Maintenance periods** - 08:00 to 17:00 Saturdays - 10:00 to 16:00 Sundays Maintenance activities will comprise general mechanical maintenance to construction machinery and plant such as

		cranes, excavators, compressors, grouting equipment and dewatering pumps.
6.	Number, type and make of plant and machinery (including heavy vehicles) stating sound power levels	A schedule of plant is included in Appendix D.
{7.	Proposed steps to minimise noise and vibration	See Appendix B.
8.	Predicted noise levels	Predicted noise levels are shown in Appendix F.
9.	Predicted vibration levels	The construction methods and plant have been selected to minimise vibration as far as practicable. The activities that have the potential to result in the highest vibration are [INSERT ACTIVITIES]. Considering the worst case where these activities occur at the closest possible proximity to [IDENTIFIED RECEPTORS], vibration may reach levels that could give rise to complaints. Vibration when these activities take place further from these properties and vibration from other activities may be perceptible but below levels typically likely to cause complaint. Levels of vibration from all activities are expected to below the thresholds indicating potential building damage.
10.	Approximate duration of works and programme	Works will be undertaken from [date] to [date]**.** An indicative programme of works is given in Appendix E.
11.	Noise and vibration monitoring locations and method	Continuous noise monitoring will be undertaken at locations agreed in the Noise and Vibration Management plan. Monthly reports will be prepared and submitted to the Local Authority. Attended monitoring will be as indicated in Appendix B. Where measured noise levels exceed predictions by more than 3 dB due to construction noise, this will be highlighted and

	investigated. The results of the investigation will be provided to the Local Authority upon request.
12. Site plan (attached, yes/no)	Yes – see Appendix C.
13. Other information	
14. List of plans and documents attached	Appendix A – Method Statement Appendix B – Mitigation Measures Appendix C – Site Plans Appendix D – Plant Schedule Appendix E - Indicative Programme of Works Appendix F – Noise Predictions

Appendix A: Outline Method Statement

Highway Modifications

A one-way system needs to be established from John Street onto Frederick Place around Pauls Way and back out onto John Street. This will mean that a small excavator will need to remove the grass and soil at the end of George Place to create an opening, while a mini tracked excavator and vibratory roller will be used to create new hardstanding. It is likely that the spoil will be loaded into a dumper that will discharge into a temporary muck bin before removal from site. Small modifications to kerbs and footpaths may require the use of hand breakers, and a concrete saw in addition to small concrete pours. Where breakers and concrete saws are to be carried out close to noise sensitive properties, portable acoustic barriers will be used to minimise noise disturbance.

Site hoarding installation

The site hoarding will be installed all around the site. It will be made of timber panels fixed to steel posts which will be mounted in concrete foundations. The foundations will be built using light duty timber shutters and the concrete will be poured directly from the trucks. The panels and concrete blocks will be moved around using an excavator. A MEWP will be used to access the top of the hoarding.

[The outline method statement would provide a similar level of detail for the other stages of the works identified under item 3 of the Section 61 application.]

Appendix B: Mitigation Measures

General Measures

Best Practicable Means (BPM) as defined in Section 72 of the CoCP Part A shall be employed at all times to reduce noise and vibration to a minimum and will be consistent with the recommendations of BS 5228-1+A1:2014.

THE CONTRACTOR will employ BPM and ensure the timing, duration and phasing of construction activities are programmed to minimise the effects of noise and vibration on sensitive receptors where practicable and reasonable. In addition to the BPM measures noted in Appendix A the following mitigation will be employed as far as reasonably practicable:

- THE CONTRACTOR and their subcontractors will ensure that the following BPM guidelines will be applied and followed as well as the BPM listed in the CoCP Part A (Sections 6.4.2 to 6.4.12) and any possible noisy activities will be planned to take place during normal working hours. The site-specific noise and vibration control measures in CoCP Part B Section 6 will also be complied with, where applicable and in-place.
- Choice of methodology/technique for noisy operations will be considered in order to eliminate or reduce noise. Where reasonably practicable, fixed items of construction plant should be electrically powered in preference to diesel or petrol driven;
- Each item of plant will comply with the European Commission Directive 2000/14/EC (The EU Directive on Noise Emission by Outdoor Equipment). United Kingdom Statutory Instrument (SI) 2001/1701;
- Whenever possible fabrication will be undertaken off site;
- Noisy plant will be kept as far away as possible from sensitive areas (and may need localised acoustic and visual screening);
- As far as reasonably practicable the noise from reversing alarms will be controlled or limited. This will be undertaken through following a hierarchy of techniques:
  a. The site layout will be designed to minimise reversing;
  b. Banksmen will be utilised to avoid so far as reasonably practicable the use of reversing alarms; and
  c. Reversing alarms will incorporate where reasonably practicable features such as broadband signals to reduce the level of noise.

- All plant, equipment and noise control measures applied to plant and equipment will be maintained in good working order and operated such that noise emissions are minimised as far as reasonably practicable. Every effort will be made to plant, equipment or items fitted with noise control equipment found to be defective, not be operated until repaired;
- Where demolition and other breaking out activities are necessary consideration will be given to use of alternatives to percussive or impact breaking equipment/methods. Wherever it is practical to do so, pulverisers (munchers) will be used to carry out the bulk of demolitions, achieving a much quieter method of undertaking the activity;
- The movement of delivery materials outside of normal working hours will be kept to a minimum and handled in a manner that minimises noise;
- Shutting down equipment when not in use;
- Handling materials in a manner which minimises noise;
- Fixed items of plant including pumps; generators; compressors; concrete batching plant and wastewater plant will be situated within suitable noise enclosures if plant does not already have sufficient built-in noise attenuation.

Site Specific Measures

The site-specific noise and vibration control measures in CoCP Part B will also be complied with, where applicable and in-place. Site specific measures will include the following:

- All static plant shall be screened or enclosed.
- Noise barriers will be used when practicable and will not have any openings that face noise sensitive receptors.
- All portable noise barriers will be inspected before works begin.
- Electrically powered plant will be utilised where practicable.

The following actions will be implemented in relation to vibration for the specific activities identified in section 9 of this application:

- Inform residents in advance of works likely to create high levels of vibration.
- Carry out attended vibration measurements at the start of these activities.

In all cases prior warning and explanation of activities likely to generate perceptible vibration will be provided to residents with the aim of minimising complaints.

Appendix C: Site Plans

Figure C1: Plan showing receptor locations

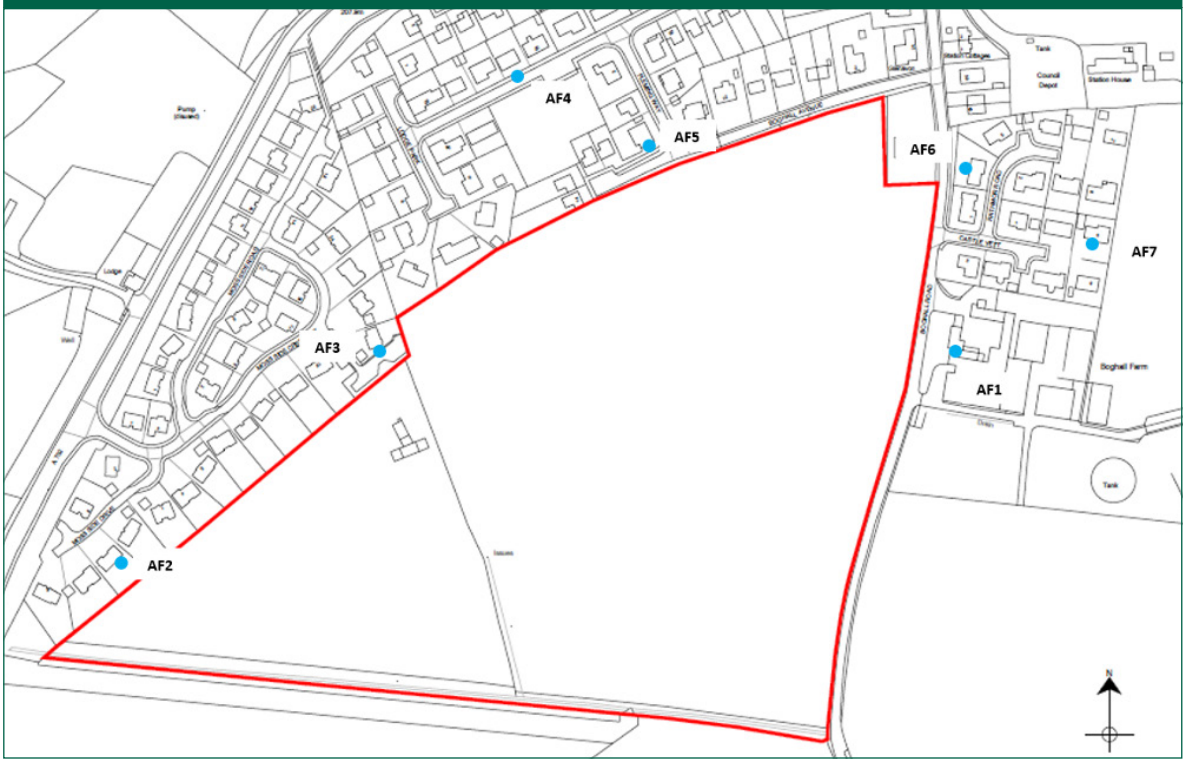
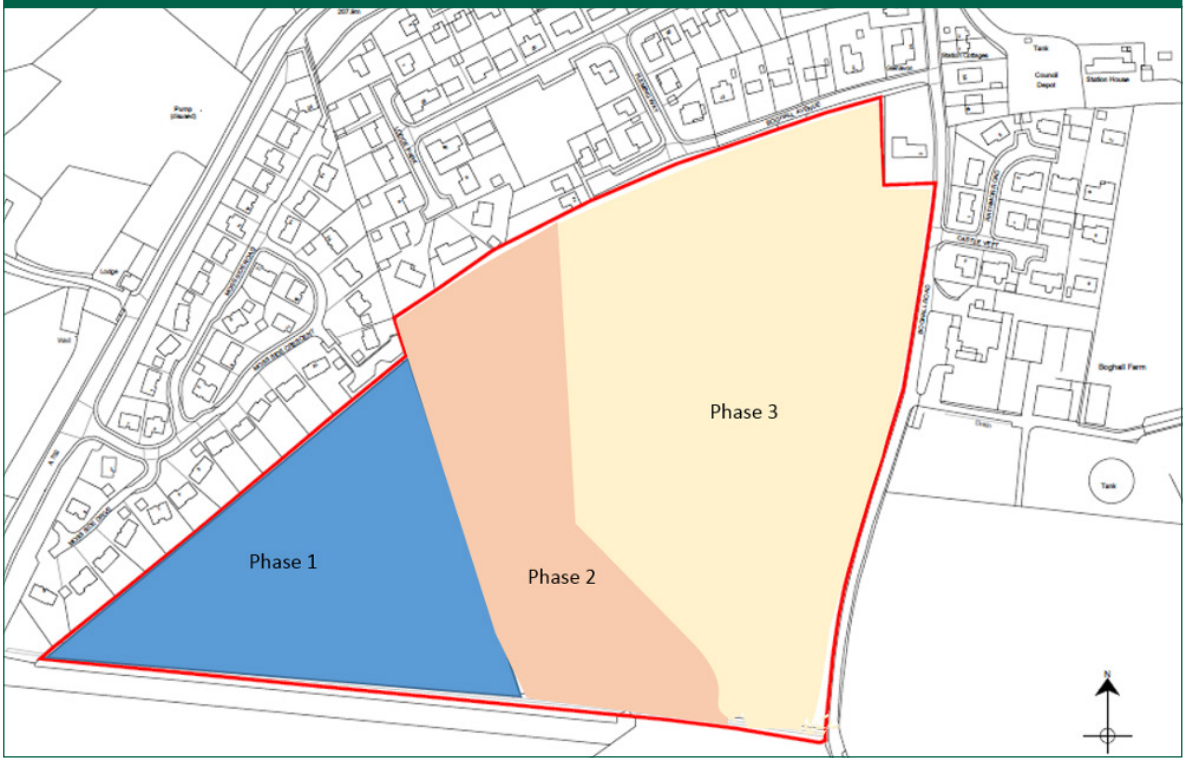


Figure C2: Indicative phasing plan



Appendix D: Plant Schedule

The table below details the plant and equipment to be used during this phase of works, grouped into construction activities. All % on-times are estimates and may vary throughout the works, however the overall assessment is considered representative. Individual items of plant may be substituted with other plant considered to be equivalent. All plant source heights are assumed to be 2 m above local ground level unless otherwise stated.

Phase	Plant Description	Plant Reference	Plant L_{Aeq} at 10 m (dB)	No. of plant	Programme Dates		Monday to Friday			Saturday			Sunday	
					Start	Finish	08.00 - 18.00	19.00 - 22.00	22.00 - 07.00	08.00 - 13.00	14.00 - 22.00	22.00 - 07.00	07.00 - 22.00	22.00 - 07.00
Highway Modifications	Dumper	BS 5228-1:2009 Table C.4:7	78	1	Early June	Mid July	40%	-	-	40%	-	-	-	-
Highway Modifications	Misc Hand Tools	Measured	70	1	Early June	Mid July	40%	-	-	40%	-	-	-	-
Highway Modifications	Vibratory roller	BS 5228-1:2009 Table C.5:27	67	1	Early June	Mid July	20%	-	-	20%	-	-	-	-
Highway Modifications	Handheld Pneumatic Breaker	Manufacturer's data	68	1	Early June	Mid July	10%	-	-	10%	-	-	-	-
Highway Modifications	Road Saw	BS 5228-1:2009 Table C.5:36	87	1	Early June	Mid July	5%	-	-	5%	-	-	-	-
Highway Modifications	20t Excavator	BS 5228-1:2009 Table C.2:3	78	1	Early June	Mid July	50%	-	-	50%	-	-	-	-
Highway Modifications	Asphalt finisher	BS 5228-1:2009 Table C.5:31	77	1	Early June	Mid July	20%	-	-	20%	-	-	-	-
Highway Modifications	Mini excavator with hydraulic breaker	BS 5228-1:2009 Table C.5:2	83	1	Early June	Mid July	10%	-	-	10%	-	-	-	-
Install hoarding	Delivery Lorry	BS 5228-1:2009 Table C.2:34	80	1	Mid June	Mid July	20%	-	-	20%	-	-	-	-
Install hoarding	Vibrating Poker	BS 5228-1:2009 Table C.4:34	69	1	Mid June	Mid July	10%	-	-	10%	-	-	-	-
Install hoarding	Concrete Lorry with Boom Arm	BS 5228-1:2009 Table C.4:29	80	1	Mid June	Mid July	10%	-	-	10%	-	-	-	-
Install hoarding	Mobile Elevated Working Platform	BS 5228-1:2009 Table C.4:59	78	1	Mid June	Mid July	60%	-	-	60%	-	-	-	-
Install hoarding	Telescopic handler	BS 5228-1:2009 Table C.2:35	71	1	Mid June	Mid July	20%	-	-	20%	-	-	-	-
Office/ welfare foundations and cabin installation	Concrete mixer truck	BS 5228-1:2009 Table C.4:20	80	1	Early Aug	Mid Oct	5%	-	-	5%	-	-	-	-
Office/ welfare foundations and cabin installation	Poker vibrator	BS 5228-1:2009 Table C.4:34	69	1	Early Aug	Mid Oct	5%	-	-	5%	-	-	-	-
Office/ welfare foundations and cabin installation	100t mobile crane	BS 5228-1:2009 Table C.4:41	71	1	Early Aug	Mid Oct	40%	-	-	40%	-	-	-	-
Office/ welfare foundations and cabin installation	30t excavator	BS 5228-1:2009 Table C.2:16	75	1	Early Aug	Mid Oct	50%	-	-	50%	-	-	-	-
Office/ welfare foundations and cabin installation	Delivery Lorry	BS 5228-1:2009 Table C.2:34	80	1	Early Aug	Mid Oct	20%	-	-	20%	-	-	-	-
Office/ welfare foundations and cabin installation	Mobile Elevated Working Platform	BS 5228-1:2009 Table C.4:59	78	2	Early Aug	Mid Oct	40%	-	-	40%	-	-	-	-
Office/ welfare foundations and cabin installation	Misc Hand tools	Measured	70	1	Early Aug	Mid Oct	40%	-	-	40%	-	-	-	-

Phase	Plant Description	Plant Reference	Plant L_{Aeq} at 10 m (dB)	No. of plant	Programme Dates		Monday to Friday			Saturday			Sunday	
					Start	Finish	08.00 - 18.00	19.00 - 22.00	22.00 - 07.00	08.00 - 13.00	14.00 - 22.00	22.00 - 07.00	07.00 - 22.00	22.00 - 07.00
Foundations	30t excavator	BS 5228-1:2009 Table C.2:16	75	2	Early July	Mid Sept	50%	-	-	50%	-	-	-	-
Foundations	Excavator breaker attachment	BS 5228-1:2009 Table C.1:9	90	1	Early July	Mid Sept	5%	-	-	5%	-	-	-	-
Foundations	Dumper	BS 5228-1:2009 Table C.4:7	78	1	Early July	Mid Sept	30%	-	-	30%	-	-	-	-
Foundations	Vibratory roller	BS 5228-1:2009 Table C.5:27	67	1	Early July	Mid Sept	40%	-	-	40%	-	-	-	-
Foundations	Misc Hand tools	Measured	70	1	Early July	Mid Sept	10%	-	-	10%	-	-	-	-
Foundations	Handheld circular saw	BS 5228-1:2009 Table C.5:36	87	1	Early July	Mid Sept	5%	-	-	5%	-	-	-	-
Foundations	Rigid lorry for deliveries	BS 5228-1:2009 Table C.2:34	80	2	Early July	Mid Sept	20%	-	-	20%	-	-	-	-
Foundations	Concrete Lorry with boom arm	BS 5228-1:2009 Table C.4:29	80	1	Early July	Mid Sept	20%	-	-	20%	-	-	-	-
Foundations	Asphalt finisher	BS 5228-1:2009 Table C.5:31	77	1	Early July	Mid Sept	60%	-	-	60%	-	-	-	-
Substation Foundation slabs	Delivery Lorry	BS 5228-1:2009 Table C.2:34	80	1	Early July	Mid July	20%	-	-	20%	-	-	-	-
Substation Foundation slabs	Vibrating Poker	BS 5228-1:2009 Table C.4:34	69	1	Early July	Mid July	10%	-	-	10%	-	-	-	-
Substation Foundation slabs	Concrete Lorry with Boom Arm	BS 5228-1:2009 Table C.4:29	80	1	Early July	Mid July	10%	-	-	10%	-	-	-	-

Appendix E: Indicative Programme of Works

Table E.1: Overview programme of works

	Jun-17		Jul-17		Aug-17		Sep-17		Oct-17		Nov-17	
Highway Works												
Hoarding Installation												
Substation Construction												
Site Clearance + Working Platform Construction												
Office & Welfare Installation												

Appendix F: Noise Predictions

Calculations use the methodology within BS 5228-1+A1:2014 Code of Practice for noise and vibration control on construction and open sites – Part 1 Noise. The location of noise receptors is indicated in the plan shown in Appendix C. Construction phases correspond to those detailed in Appendix E. All ground is assumed to be hard ground. A +3dB façade correction has been added to the calculated free-field noise levels. Predicted receptor (façade) noise levels in the following tables are shown month by month. The first number is the highest noise level predicted for that month and the number in the brackets is the average predicted construction noise level during that month. Noise levels have been calculated by breaking each construction phase down into construction activities taking into account each activity duration.

Table F.1: Predicted Monthly Noise Levels - Standard Working Hours (08:00 – 18:00 hrs, Mon to Fri)

Rec ID	Receptor	Receptor Height (m)	Ambient Noise Level (dB)	Highest Construction Noise Level (Monthly Average Noise Level) dB LAeq,T					
				June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017
AF1	Location1	6.7	58	67 (66)	70 (64)	68 (68)	69 (67)	67 (67)	66 (66)
AF2	Location 2	4.1	58	70 (69)	72 (67)	72 (72)	71 (71)	69 (69)	69 (69)
AF3	Location 3	4.1	57	70 (69)	72 (67)	72 (72)	71 (71)	69 (69)	69 (69)
AF4	Location 4	4.1	62	63 (62)	65 (60)	64 (64)	64 (63)	63 (63)	63 (63)
AF5	Location 5	1.5	61	62 (61)	65 (60)	64 (64)	64 (63)	63 (63)	62 (62)
AF6	Location 6	4.1	62	65 (64)	69 (63)	69 (69)	68 (67)	68 (68)	67 (67)
AF7	Location 7	4.1	61	62 (61)	65 (60)	64 (64)	64 (63)	63 (63)	62 (62)

1. Receptor height is the highest floor but the predicted noise levels shown are the highest levels calculated for that facade
2. Noise levels shown include a +3dB façade correction

Table F.2: Predicted Monthly Noise Levels - Extended Working Hours (19:00 – 22:00 hrs, Mon to Fri)

Rec ID	Receptor	Receptor Height (m)	Ambient Noise Level (dB)	Highest Construction Noise Level dB LAeq,1h (Worst case 1-hour level)					
				June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017
AF1	Location1	6.7	57	61	62	61	61	59	59
AF2	Location 2	4.1	57	61	63	63	63	57	57
AF3	Location 3	4.1	55	61	63	63	63	57	57
AF4	Location 4	4.1	61	54	56	56	56	54	54
AF5	Location 5	1.5	59	55	56	55	55	54	54
AF6	Location 6	4.1	61	57	59	59	59	58	58
AF7	Location 7	4.1	59	55	56	55	55	54	54

1. Receptor height is the highest floor but the predicted noise levels shown are the highest levels calculated for that facade
2. Noise levels shown include a +3dB façade correction

Tables F.3 to F.4 show the predicted construction plus ambient noise level month by month. The highest level and average level for each month are presented in Table F.3 in the same format as in Table F.1.

Table F.3: Predicted Construction plus Ambient Noise Levels - Standard Working Hours (08:00 – 18:00 hrs, Mon to Fri)

Rec ID	Receptor	Receptor Height (m)	Ambient Noise Level (dB)	Highest Construction Noise Level (Monthly Average Noise Level) dB LAeq,T					
				June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017
AF1	Location1	6.7	58	68 (67)	70 (65)	69 (69)	70 (68)	68 (68)	67 (67)
AF2	Location 2	4.1	58	70 (70)	72 (68)	72 (72)	71 (71)	70 (70)	70 (70)
AF3	Location 3	4.1	57	70 (70)	72 (68)	72 (72)	71 (71)	70 (70)	70 (70)
AF4	Location 4	4.1	62	65 (64)	66 (63)	65 (65)	65 (65)	65 (65)	65 (65)
AF5	Location 5	1.5	61	64 (64)	66 (63)	65 (65)	65 (65)	65 (65)	64 (64)
AF6	Location 6	4.1	62	65 (64)	66 (63)	65 (65)	65 (65)	65 (65)	65 (65)
AF7	Location 7	4.1	61	64 (64)	66 (63)	65 (65)	65 (65)	65 (65)	64 (64)

1. Receptor height is the highest floor but the predicted noise levels shown are the highest levels calculated for that facade
2. Noise levels shown include a +3dB façade correction

Table F.4: Predicted Construction plus Ambient Noise Levels - Extended Working Hours (19:00 – 22:00 hrs, Mon to Fri)

Rec ID	Receptor	Receptor Height (m)	Ambient Noise Level (dB)	Highest Construction Noise Level dB LAeq,1h (Worst case 1-hour level)					
				June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017
AF1	Location1	6.7	57	63	64	63	63	62	62
AF2	Location 2	4.1	57	63	64	64	64	61	61
AF3	Location 3	4.1	55	63	64	64	64	61	61
AF4	Location 4	4.1	61	60	61	61	61	60	60
AF5	Location 5	1.5	59	60	61	60	60	60	60
AF6	Location 6	4.1	61	61	63	61	61	61	61
AF7	Location 7	4.1	59	60	61	60	60	60	60

1. Receptor height is the highest floor but the predicted noise levels shown are the highest levels calculated for that facade
2. Noise levels shown include a +3dB façade correction

Example 4: Example Dispensation

Control of Pollution Act 1974
SECTION 61 DISPENSATION*1 APPLICATION FORM
(Use Supplementary sheets, as necessary)

Application to: (Insert name of Local Authority).
Site:
Section 61 to which dispensation relates: ……..(Local Authority Reference)……(Contractor Reference)

..Date by which Dispensation Required:
Duration of Work *(Duration of work which is subject to the dispensation - including dates.)*
Location of Work
Reasons for Dispensation Request *(Cross refer to original S61 application, as appropriate.)*

.Nature of Work to be undertaken *(If appropriate, include a site plan.)* Note: 1. Dispensations include significant variations to existing Section 61 consents.
Plant Involved:
Measures to be Taken to Minimise noise effects (BPM Measures):
Revised Noise Predictions:
Person in charge: (*Include Name, job title, address, telephone no.)*
Additional Comments: (*Include steps taken to avoid repetition of event if appropriate*.)
Signed: Name:

Position: Copies: *(Project Manager)*

Note 1 Dispensations include significant variations to existing Section 61 consents.

Example 5: Example variation

Contractor Section 61 Reference:	
Local Authority Section 61 Consent Reference:	
Date:	
Over-run Reference:	

Brief description of the variation (including reason(s))

	For [Contractor]	Approved by [Local Authority]
Name:		
Signature:		
Date:		

Distribution:

Approved, Subject to the Following Conditions

Notes
Use this form to confirm your application for a minor variation to the works that featured in your application for a Section 61 consent, for which a consent has been issued by the [Local Authority].

Do not use this form for matters that were not included in your application for a Section 61 consent and are not covered in the consent that has been granted.

Example 6: BPM audit

In order to demonstrate compliance with the Proposed Steps to Minimise Noise and Vibration presented in Section 61 consent application, Contractor will complete a site BPM checklist at least once a week as part of their process of demonstrating compliance with the consent mitigation measures. Where mitigation measures are not being complied with, then corrective action shall be taken to amend the working practices so that they are compliant with those consented.

Generic		Comment / Example
All vehicles and plant will be switched off when not in use.		
All plant being used is included within the Section 61 consent application		
All plant being used is included within the Section 61 consent application		
Plant is being operated in a manner which minimises noise and vibration (i.e. engine covers closed, air-lines not leaking, joints suitably lubricated)		
Plant is maintained in a good condition		
Good house-keeping on site		
Site operatives suitably informed of the consent requirements, their responsibilities to minimise noise and vibration, and the approved working hours.		
Design and use of site hoardings and screens, where necessary, to provide acoustic screening at the earliest opportunity. Where practicable, doors and gates will not be located opposite occupied noise-sensitive buildings.		

Specific		Comment / Example
Marine hoarding being deployed on the jack up to reduce noise to shore side receptors and as mitigation when works are carried out adjacent to HMS Wellington.		
The use of mufflers on pneumatic tools.		
Rubber protection matting within the jack up working area to eliminate metal on metal impact noise		
Rubber sheath on jack up CR2 mast (cable percussive marine mast) to reduce cable noise		
Marine power pack not used on full throttle and idled/ switched of whenever possible between drilling tasks		

Compliance with Section 61: YES/NO

If NO, ACTIONS REQUIRED

Signed (Surveyor): ..... PRINT NAME): ..... Date: .....

Example 7: Monitoring reports

[PROJECT TITLE AND LOCATION] ATTENDED NOISE MONITORING PRO-FORMA										
Consultant: [name / credentials]						**Sound Level Meter Type:** [make/model]				
Date: [dd/mm/yy]						**SLM Serial Number:** [number]				
Worksite: [name]						**Date of Next Accredited Calibration:** [dd/mm/yy]				
Monitoring Location: [ref ID / address]						**Freq. Weighting:** [A/C/Lin]				
Survey Type: [Compliance/Source Term/Other]						**Time Constant:** [fast/slow/imp]				
Weather	**Wind Speed**	**Rel. Humidity**	**Temp.**	**Cloud**	**Conditions**	**Dyn. Range:** [x - y dB]		**Cal Start:** [xx] dB	**Cal End:** [xx] dB	
	[x.x] m/s	[xx] %	[xx] ˚C	[xx] %	[Descrip.]	**Calibrator Type:** [make/model]				
						Cal Serial Number: [number]				
Time [hrs]	**Mic. Ht.**	**Construction Activity / Equipment**	**Meas. Dist. (m)**	**Meas. Duration (min)**	**Façade/ Free-field**	**dB $L_{Amax,F}$**	**dB $L_{Aeq,T}$**	**dB $L_{A90,T}$**	**Compliance / BPM / Other Comments**	
[hh:mm]	[x.x] m	[description]	[xx]	[xx]	[Fac/FF]	[xx.x]	[xx.x]	[xx.x]	[general composition of ambient noise, notable events, range of Lp]	
[hh:mm]						[xx.x]	[xx.x]	[xx.x]	[as above]	
[hh:mm]						[xx.x]	[xx.x]	[xx.x]	[as above]	
Signed (Consultant)					**Print Name:** [name]					**Date:** [dd/mm/yy]

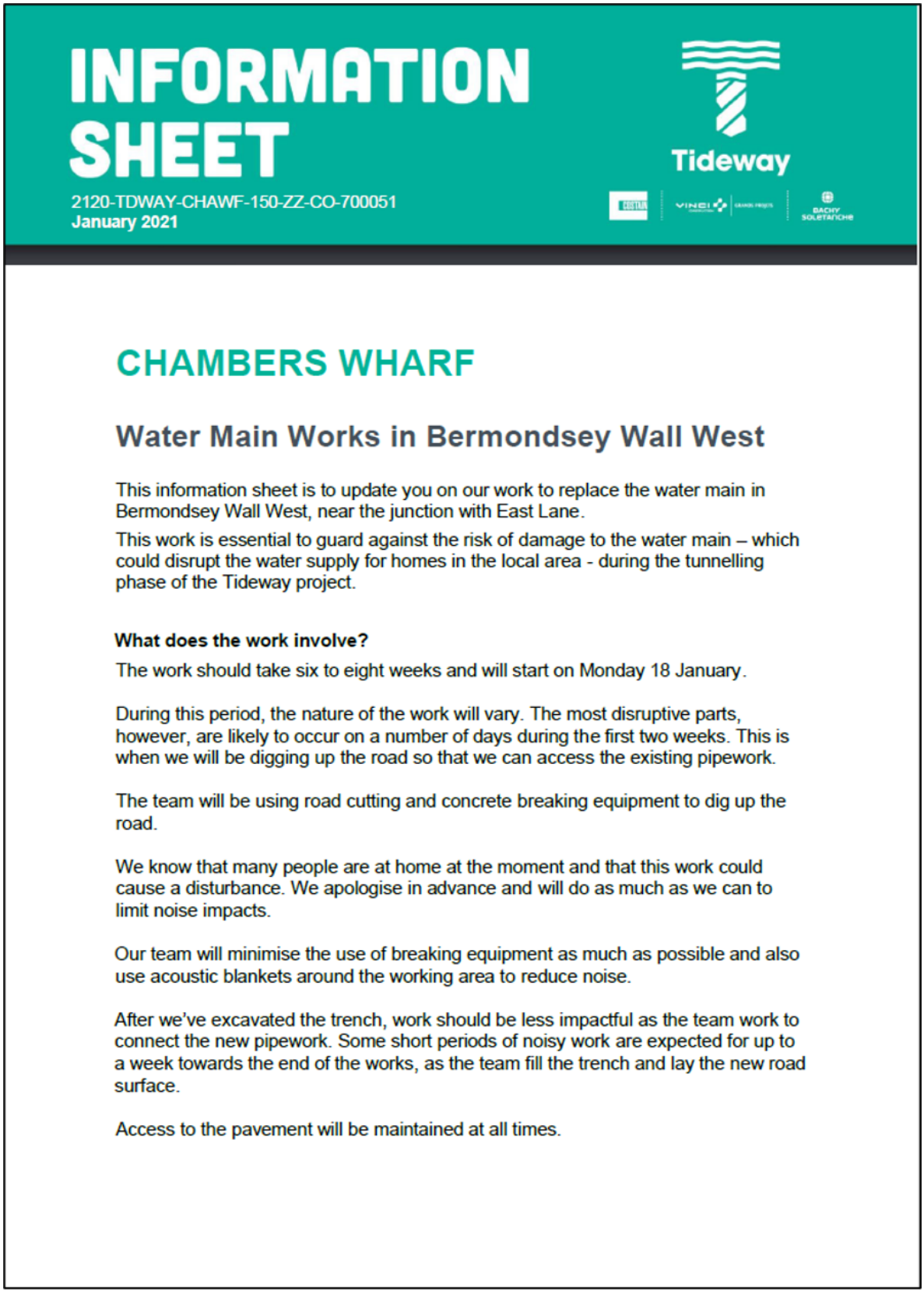
[PROJECT TITLE AND LOCATION] SOURCE TERM MEASUREMENT PRO-FORMA

Meas. Ref.	Monitoring Location	Date of Meas.	Source-Receiver Separation Distance (m)	Start Time	Dur.	Measured Noise Levels, dB re. 2 x 10-5 Pa.			Dominant Noise Generating Equipment	Estimated SWL dB(A)	Comments
						LAmax,F	LAeq,T	LA90,T			
[ID]	[Code]	[dd/mm/yy]	[xx.x]	[hh:mm]	[mm:ss]	[xx.x]	[xx.x]	[xx.x]	[plant/ equip]	[xx]	[description of observation during sample]

[PROJECT TITLE AND LOCATION] SOURCE TERM MEASUREMENT PRO-FORMA							
Works Activity	Observed Plant	Estimated Lw dB(A)	Section 61 LWA dB	Comparison of plant observed vs. Section 61 entries	Comparison of Lw values vs. Section 61 entries	Comment on observed activity	Recommendations / Actions
[activity name]	[plant/equip]	[xxx-yyy]	[xxx]	[statement]	[statement]	[statement]	[statement]

Example 8: Informatives - Local resident information/project updates to be provided

An example from the Thames Tideway Tunnel Project.



INFORMATION SHEET

2120-TDWAY-CHAWF-150-ZZ-CO-700051
January 2021

Tideway

CHAMBERS WHARF

Water Main Works in Bermondsey Wall West

This information sheet is to update you on our work to replace the water main in Bermondsey Wall West, near the junction with East Lane.

This work is essential to guard against the risk of damage to the water main – which could disrupt the water supply for homes in the local area - during the tunnelling phase of the Tideway project.

What does the work involve?

The work should take six to eight weeks and will start on Monday 18 January.

During this period, the nature of the work will vary. The most disruptive parts, however, are likely to occur on a number of days during the first two weeks. This is when we will be digging up the road so that we can access the existing pipework.

The team will be using road cutting and concrete breaking equipment to dig up the road.

We know that many people are at home at the moment and that this work could cause a disturbance. We apologise in advance and will do as much as we can to limit noise impacts.

Our team will minimise the use of breaking equipment as much as possible and also use acoustic blankets around the working area to reduce noise.

After we've excavated the trench, work should be less impactful as the team work to connect the new pipework. Some short periods of noisy work are expected for up to a week towards the end of the works, as the team fill the trench and lay the new road surface.

Access to the pavement will be maintained at all times.

How can I get more information?

If you would like to receive more information on the work programme as it progresses please let us know by emailing helpdesk@tideway.london

You can also call us 24 hours a day, seven days a week, on 08000 30 80 80 if you have questions about the work.

If you have particular concerns about the impact of the work, we may be able to offer you support and advice. Please contact us and ask to speak to your local Mitigation and Compensation Lead, who will be able to advise you about support through the Independent Compensation Panel.

Tideway is happy to provide information in other languages and formats such as braille or large print.

Please contact us: 08000 30 80 80 or helpdesk@tideway.london

KEY INFO

WORKING HOURS

Monday to Friday: 08:00 – 18:00

Saturday: 08:00 – 13:00

WHAT TO EXPECT

Intermittent noisy work to upgrade the watermain in Bermondsey Wall West, near the junction with East Lane

WHAT WE WILL DO TO REDUCE IMPACTS

Use 'acoustic blankets' around machinery to limit noise

Keep lighting to the minimum required for safe working

Brief all our staff to keep noise to a minimum and be considerate at all times

Provide updates to residents who would find this useful

24 HOUR HELPDESK 08000 30 80 80

helpdesk@tideway.london | Freepost TIDEWAY

www.tideway.london

@TidewayLondon

Example 9: Source heights for different plant

Table A.1 Examples source heights for construction plant

Equipment	Main Noise Source	Secondary sources	Normal height (m) range depending on size* [35]
Articulated dump truck	Engine	Dumping material, hydraulics	2 to 4
Breaker mounted on backhoe	Point of impact of breaking	Engine when not breaking (used for height), hydraulics	1 to 2
Bulldozer	Engine	Bucket use, hydraulics	2 to 5
Concrete mixer truck	Engine	Drum mixing and discharging	2 to 4
Diesel generator	Engine		0.5 to 2
Gas cutter	Cutting noise (relative to where worker stands)		0.5 to 2
Generator for welding	Engine		0.5 to 2
Handheld cordless nail gun	Nail impact sound (relative to where worker stands)		0 to 2
Hand-held welder	Welding noise (relative to where worker stands)		0 to 2
Hydraulic hammer rig	Impact point	Engine	0 to 20 [36]
Large rotary boring piling rig	Drilling point, main drive	Engine	2 to 5
Lifting platform (idling)	Engine		0.5 to 1
Lorry	Engine	Tyre noise	1 to 2
Mobile telescopic crane	Engine	Hydraulics, winch	2 to 4
Power pack	Engine		0.5 to 2
Road sweeper	Engine	Sweeping sound	0.5 to 1.5
Tracked Excavator	Engine	Bucket use, hydraulics	1.5 to 5
Truck mounted concrete pump	Engine	Pump	1.5 to 3
Vibratory piling rig	Impact sound	Engine	0 to 20 [36]
Vibratory roller	Engine	Vibratory rolling sound	1 to 2
Vibratory tamper	Impact sound	Engine	0.5 to 1.5

35 Based on typical UK construction plant

36 Dependent on height of works, or pile

Example 10: Microphone mounting for monitoring/lamp-post monitoring setup

It is becoming more common to install the noise monitors on the lamppost or other street furniture in London. The lampposts are either owned by Transport for London (TfL) or the London Boroughs. The TfL ones are currently managed by a joint venture company comprising of Colas, VolkerHighways and AECOM (CVU), and the local boroughs are typically managed by the Street Lighting Department of Asset Management Services. Installation consent/permit is required before the installation, and any installation should appropriately consider the health and safety requirements including the CDM Regulations [37]. When contacting the relevant department for permission to use the lamppost, the following information is usually required:

- Date required for the installation;
- Purpose of the monitoring;
- The lamp-post reference number and street location
- Power consumption of the equipment to be installed;
- Weight of the equipment,
- Demonstration that the required Health and Safety processes have been adhered to; and
- Number of sockets, socket type and height.

Once all the paperwork is in place and payment made for the installation, CVU or the local borough will send the electrician to install the sockets ready for use. The process normally takes 2-4 weeks but could be much longer if traffic management is required. Figure 12 show some example installations.

Figure 12: Example of sound level meter installations on lamp-posts

37 The Construction (Design and Management) Regulations 2015 - **www.hse.gov.uk/construction/cdm/2015/index.htm**

Example 11: Complaint investigation procedure

(This example has been taken from *LANAF London Good Practice Guide - Noise & Vibration Control for Demolition and Construction*)

All staff on site will be required to understand the chain-of-command when a complaint is made and any complaint received in relation to noise and vibration will be investigated by the appropriate worksite personnel.

Records of any complaints about noise and/or vibration received by and relating to the site should be recorded and retained, and details of any complaints or incidents should be sent to the local authority in a pre-agreed timeframe by telephone and/or email.

Details of the complaint should include [38]:

- Name of complainant
- Address of affected property
- Contact phone number
- Date and time of complaint
- Method of notification (i.e. complaint line, email, letter)
- Type of complaint (i.e. noise or vibration)
- Details of complaint
- Summary of any previous or related complaints

All complaints should be investigated which may include a requirement to undertake additional noise and/or vibration monitoring. Where appropriate, additional mitigation measures should be implemented or work practices modified to reduce noise and vibration levels where it is reasonably practicable to do so.

The results of the investigation, including details of any additional mitigation measures implemented, work practices that have been modified and how complainants have been kept informed should be recorded and sent to the local authority.

Preliminary and final reports should be submitted in a standardised format as agreed by the local authority and include:

- Person responsible, position title
- Details of investigation including any relevant monitoring data
- Action taken i.e. mitigation or modifications to work practices implemented
- Details of response provided to complainant, including a copy of any correspondence sent, if applicable.
- Action taken to prevent a recurrence of the complaint
- Details of any further action required

Regular summary reports of all complaints will be provided to the local authority within a specified pre-agreed timeframe.

Where, a complaint is as a result of works are being undertaken using methods or mitigation measures which do not comply with an extant Section 61 consent application, the specific activity will be halted until the method or mitigation measures defined in the Section 61 consent application are installed, or the method or mitigation measures are agreed through the dispensation or variation process.

38 This information shall be provided in accordance with the Data Protection Act 1998

References

No.	Reference
i	Control of Pollution Act 1974 - HM Government, The Stationery Office
ii	British Standard BS 5228 – Part 1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Noise*
iii	British Standard BS 5228 – Part 2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Vibration*
iv	Environmental Protection Act 1990 - HM Government, The Stationery Office
v	National Planning Policy Framework 2019 - Ministry of Housing, Communities and Local Government
vi	Noise Policy Statement for England, 2010 – Department for Environment Food and Rural Affairs
vii	Planning Practice Guidance Noise [39] 2019 - Department for Communities and Local Government
viii	British Standard BS 5502: Part 32: 1990 *Buildings and structures for agriculture, Part 32: Guide to Noise attenuation*
ix	International Organization for Standardization ISO 9613, 1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation*

39 Department for Communities and Local Government (DCLG) (2019), Planning Practice Guidance – Noise. Available online at: **https://www.gov.uk/guidance/noise--2**

CONSTRUCTION NOISE

A good practice guide to the preparation, submission and management of Section 61 consents

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