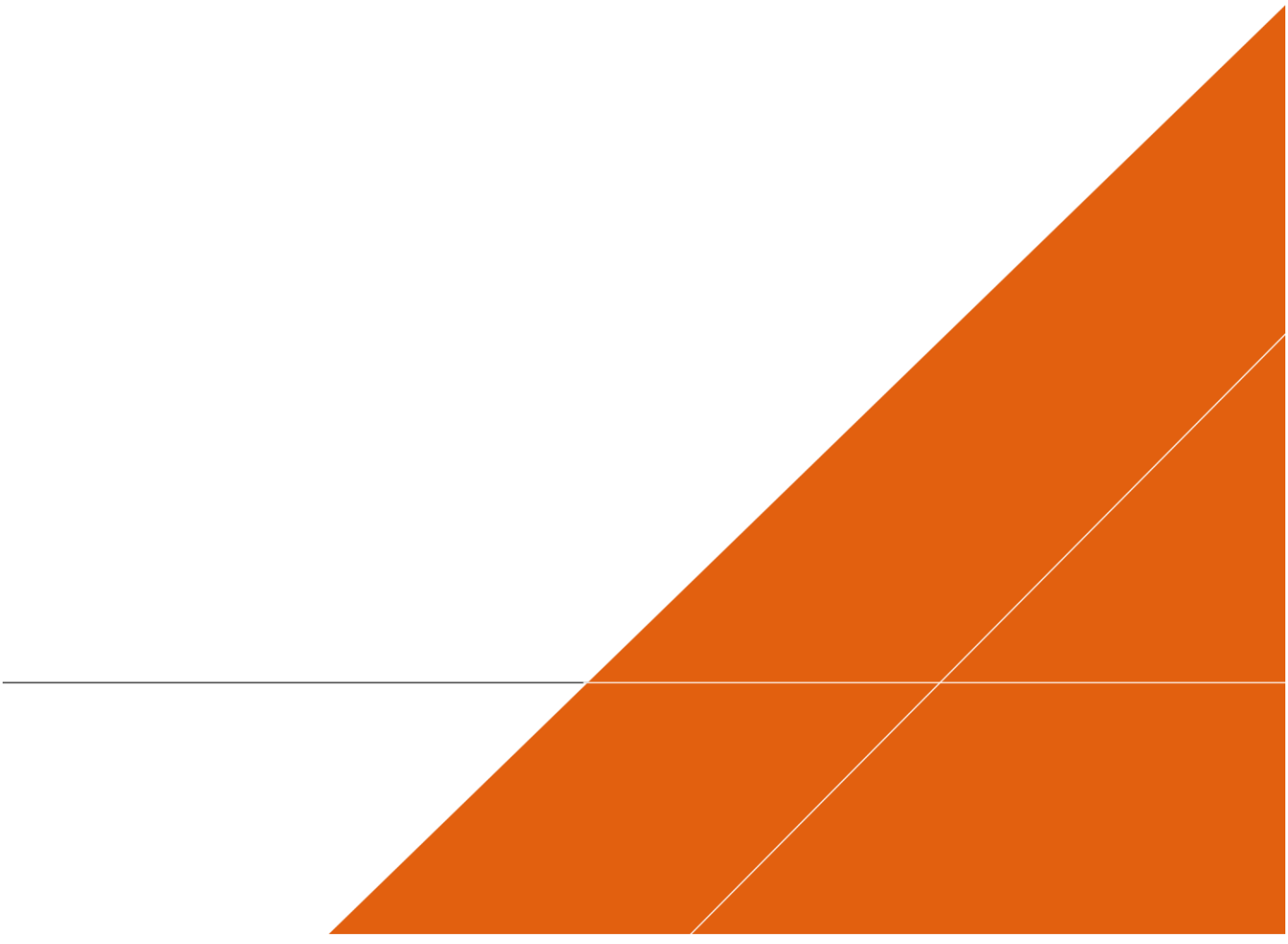
ARCADIS Design & Consultancy for natural and built assets

BE FIRST REGENERATION LTD

BULL LANE GARAGES, DAGENHAM, RM10 7EH

Noise and Vibration Desk Study (10046791-AUK-XX-XX-RP-AE-0063-01)

MARCH 2021



Bull Lane Garages, Dagenham, RM10 7EH

(10046791-AUK-XX-XX-RP-AE-0063-01)

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This report dated 29 March 2021 has been prepared for Be First Regeneration Ltd (the “Client”) in accordance with the terms and conditions of appointment dated 28 January 2021 (the “Appointment”) between the Client and Arcadis (UK) Limited (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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1 INTRODUCTION

1.1 Terms of Reference

Arcadis (UK) Limited (Arcadis) has been commissioned by Be First Regeneration Ltd (henceforth referred to as the 'client') to undertake the desk-based consideration of noise and vibration for a parcel of land currently occupied by garage blocks just off Rainham Road North (A1112), Dagenham, RM10 7EH (henceforth referred to as the 'site').

Through this programme, the client is aiming to divest/develop a number of small sites within the London Borough of Barking and Dagenham (LBBD) to enable positive regeneration primarily for residential development. The objective of this desktop review is to identify potential development constraints due to noise and vibration on the site.

The objectives of this review are to:

- Review any existing noise and vibration information regarding the site and its surrounding area; and
- Identify potential development constraints due to noise and vibration conditions expected on site.

It is noted that notwithstanding the outcome of this qualitative consideration of noise and vibration impacts, this would need to be substantiated through a full and detailed quantitative consideration of noise and vibration impacts should the site progress to planning.

1.2 Technical Standards

As part of this desk study report, various sources of information have been referenced as detailed below: The following documents have been considered.

- National Planning Policy Framework, Department for Communities and Local Government (2019) (Ref 1),
- The Noise Policy Statement for England (NPSE) (Ref 2),
- Technical Guidance to the Implementation of the NPPF (PPG Noise) (Department for Communities and Local Government, 2014 as updated 2019) (Ref 3),
- Barking and Dagenham Local Plan. Borough Wide Development Polices DPD, adopted March 2011 (Ref 4),
- BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (Ref 5),
- BS8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (Ref 6),
- ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development (ProPG Planning & Noise) (Institute of Acoustics, Association of Noise Consultants, and Chartered Institute of Environmental Health (2017) (Ref 7).

The following documents have been referenced, but relate to baseline surveys and the quantification of noise and vibration impacts, so would only be appropriate should the site be progressed for residential development and subject to a detailed assessment:

- BS 7445-2:1991, ISO 1996-2:1987 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use (Ref 8),
- BS ISO 4866:2010 Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures (Ref 9), and,

- BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting (Ref 10).

1.3 Limitations and Expectations

This report has been prepared for the client in accordance with the terms and conditions of appointment dated 18th February 2021.

Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document, including the electronic format shall remain the property of Arcadis.

This report has been compiled from a number of sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. Consequently, there is a potential for further information to become available, which may change this report's conclusion and for which Arcadis cannot be responsible.

1.4 Scope of Work

The brief requires a desk-based residential feasibility assessment of the setting and a consideration of likely requirements in general accordance with the ProPG, BS7445-2: 1991, BS6472-1:2008 & BS ISO 4866:2010. It should be noted that the BS7445-2 and BS ISO 4866 relate to carrying out physical noise and vibration surveys, respectively. BS6472 provides guidance on predicting human response to vibration in buildings.

In the absence of quantified noise and vibration levels, the above standards are noted and would be relevant during detailed assessment of the site, should the site be progressed for residential development.

The feasibility assessment has been carried with due consideration of the policy and guidance set out in Section 3 in accordance with the level of information available for the site.

2 SITE SETTING AND DESCRIPTION

The setting and locality of the site under consideration within the scope of this report is set out below.

Table 1: Details relating to the site location

Site Location / Address	Bull Lane Garages, Dagenham, RM10 7EH.
National Grid Reference	549774, 186411 (approx. site centre)
Description of Site	The site is roughly 0.05ha and is currently in use as a garage block area. The site is an irregular shape and is currently occupied by 14 garages along the western boundary of the site. There is an area of hardstanding in the front of the garages.
Surrounding Area	The site lies within a predominantly residential area, being surrounded immediately by houses on Sparrow Green and Rainham Road North. Approximately 135m to the north-west of the site lies an industrial and commercial area, including office premises and Frizlands Lane Recycling Centre. Rainham Road North (A1112) is located approximately 35m to the east of the site.

The site location is shown in Figure 1 below.

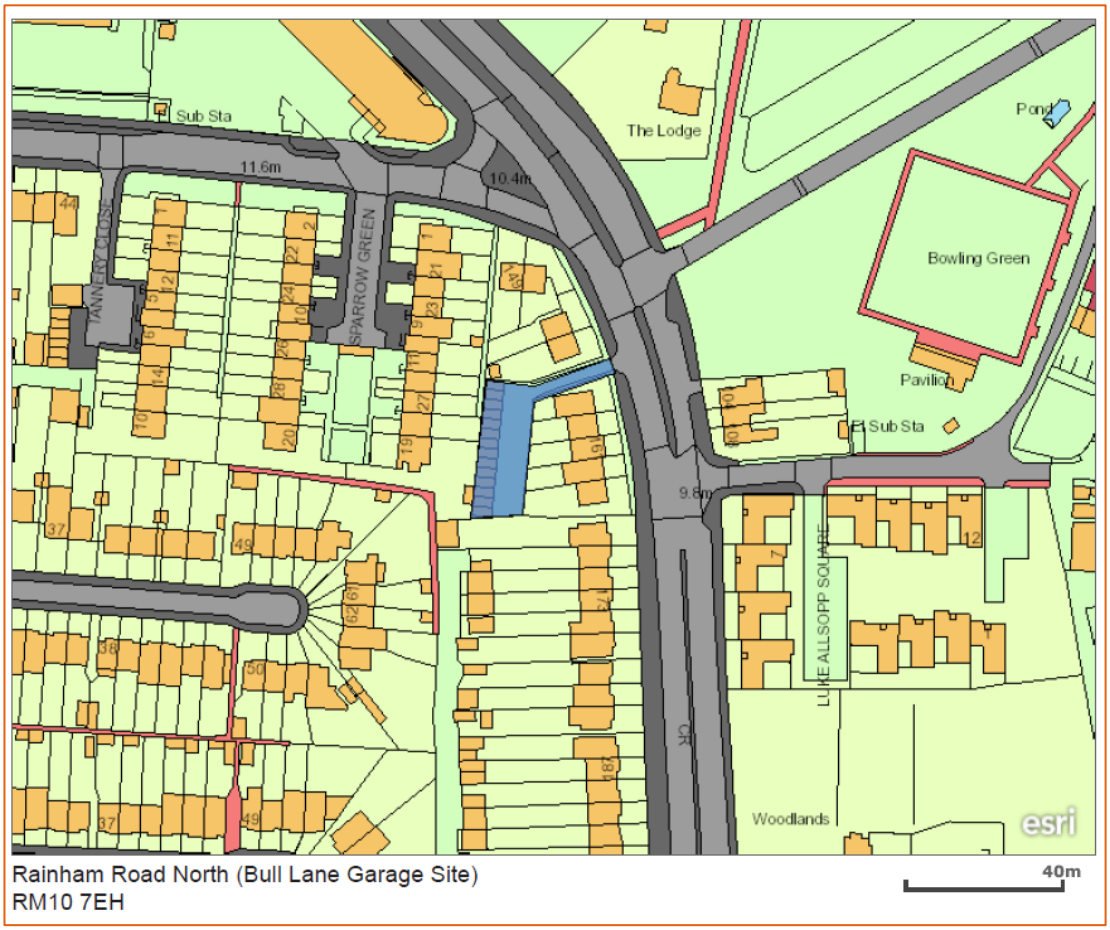


Figure 1: Site location plan

3 LEGISLATION AND POLICY

Within the following section of the report, details will be presented relating to the guidance documents and assessment methodologies appropriate for noise associated with the proposed development of the land for residential purposes.

3.1 National Policy & Guidance

3.1.1 National Planning Policy Framework (NPPF) and Planning Practice Guidance: Noise (PPG)

The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. Paragraph 170 of the NPPF states that "*planning policies and decisions should contribute to and enhance the natural and local environment by; e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or* ***noise*** *pollution or land instability*".

Paragraph 180 of the NPPF states that "*planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

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

b. *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*".

Paragraph 182 goes on to state that '*Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed*.'

Technical Guidance (Planning Practice Guidance) to the Implementation of the National Planning Policy Framework, published in 2012, and updated in December 2014, indicates that noise should be considered when:

- New developments may create additional noise; and/or,
- New developments would be sensitive to the prevailing acoustic environment.

The guidance indicates that Local Planning Authorities should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur,
- Whether or not an adverse effect is occurring or likely to occur, and,
- Whether or not a good stand of amenity can be achieved.

The Planning Practice Guidance summarised the noise exposure hierarchy, based on the likely average response to noise, as set out in Table 2 below:

Table 2: Hierarchy of Noise Exposure Responses

Perception	Examples of Outcomes	Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

3.1.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise. The document serves to provide policy on the need to avoid and mitigate adverse noise effects on health arising from and impacting on new development.

The NPSE attends to three types of noise,

- ‘Environmental noise’ which includes noise from transportation sources,
- ‘Neighbour noise’ which includes noise from inside and outside people’s homes, and
- ‘Neighbourhood noise’ which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

In line with the aims determined in the NPPF (presented above), the NPSE determines three aims:

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

The explanatory note to the NPSE introduces three concepts relating to the adverse impacts of noise. The following three statements have been reproduced from the explanatory note:

- '**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 noise.'
- '**LOAEL – Lowest Observed Adverse Effect Level**: This is the level above which adverse effects on health and quality of life can be detected.'
- '**SOAEL – Significant Observed Adverse Effect Level**: This is the level above which significant adverse effects on health and quality of life occur.'

The NPSE acknowledges that the values for NOEL, LOAEL and SOAEL are likely to vary depending on the noise source and environment and at present there are no defined numerical values to allow flexibility within the policy until further evidence and guidance is presented.

3.2 Local Planning Policy

The LBBD Local Plan consists of a series of Development Plan Documents (DPDs) of which the most important is the Core Strategy, adopted in July 2010.

The Core Strategy DPD sets out the council's long-term vision, spatial strategy and core policies for shaping the future development of the LBBD up to 2025. All new development will be expected to respect, protect and wherever possible enhance the Borough's environmental assets, to comply with sustainable design and construction principals, and to have minimal negative impacts, on land, air and water quality, and **noise** or light disturbance.

The Local Plan also includes guidelines that developers must follow in order to develop land in the LBBD. These guidelines follow the policies contained in the Core Strategy DPD but give more detail about what new developments should include and what standards they should meet.

The Borough Wide Development Polices DPD, adopted March 2011 refers to Policy BR13: Noise Mitigation; this text, with other relevant text contained within the document, is stated below:

Policy BR13: Noise Mitigation

Any new developments likely to generate harmful levels of noise will be directed away from existing noise sensitive locations, or areas allocated for noise sensitive developments.

Where it is not possible to fully separate noise sensitive and noise generating land uses, planning permission will only be granted if there will be no exposure to noise above an acceptable level. To achieve this, measures should be taken to minimise noise and mitigate its impact in accordance with Policy 4A.20 of the London Plan.

> *New noise-sensitive development (such as housing, schools and hospitals) will not normally be permitted in the vicinity of existing noisy developments such as those included in the noise exposure category D in PPG24*.
>
> *To determine whether noise is likely to be a determining factor in the consideration of applications for residential development, reference should be made to the Noise Exposure Categories set out in government guidance Planning Policy Guidance Note 24 Planning and Noise.*
>
> *The purpose of this policy is to protect existing and new residents from unacceptable levels of noise as well as to ensure that continuing vital employment and industrial uses are not compromised.*

It is specifically noted that with regard to Planning Policy Guidance Note 24 Planning and Noise as referenced in Policy BR13 this has been withdrawn and is no longer current UK Guidance, being replaced by the '*ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development*' (Institute of Acoustics *et al*., 2017).

3.3 Specific Acoustic Guidance: Noise

The brief requires consideration of the noise impacts associated with the proposed site in accordance with BS7445-2:1991. This part of BS7445 describes methods for the acquisition of data; providing descriptors that enable a description of the environmental noise climate to be made in a uniform way.

This is however a desktop assessment and does not consider any survey data. The Standards set out below are considered only to the level of detail necessary to support a desktop consideration of the site. These Standards will however be fully considered through any detailed design and planning application for the site for residential end use.

3.3.1 BS4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound

This revision to British Standard 4142 provides a methodology for the rating and assessing of sound associated with both industrial and commercial premises. The purpose of the Standard is clearly outlined in the opening section where it states the method is appropriate for the consideration of:

- Sound from industrial and manufacturing processes,
- Sound from fixed installations which comprise mechanical and electrical plant and equipment,
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and,
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The Standard is based around the premise that the significance of the impact of an industrial/commercial facility can be derived from the numerical subtraction of the background noise climate level (not necessarily the lowest background level measured, but the typical background of the receptor) from the measured/calculated rating level of the specific sound under consideration.

This comparison will enable the impact of said sound to be concluded based upon the premise that typically "the greater this difference, the greater the magnitude of the impact". This difference is then considered as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context,
- A difference of around +5dB is likely to be an indication of an adverse impact, depending upon context, and,
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

BS4142 further states that "*where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact*" again depending upon the specific context of the site. The Standard further qualifies the assessment protocol by outlining conditions to the comparative assessment and stating that "*not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact*", thus implying that all sites should be assessed on their own merits and specifics.

The Standard quantifies the typical reference periods (for the purposes of the standard) to be used in the assessment of noise:

- Typical Daytime 07:00 – 23:00 1hr assessment period
- Typical Night-time 23:00 – 07:00 15min assessment period

The Standard outlines a number of methods for defining appropriate "character corrections" within the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. These are a) the Subjective Method, b) the Objective Methods for tonality, and c) the Reference Method. It is noted by the Standard that where multiple features are present the corrections should be added in a linear fashion to the Specific level.

The Subjective Method is based on the following corrections:

Table 3 BS4142 Subjective method rating corrections

Level of Perceptibility	Tonal Correction	Impulsivity Correction	Correction for "Other sound characteristics"	Intermittency Correction
No Perceptibility	+0 dB	+0 dB	Where neither tonal nor impulsive but clearly identifiable +3 dB	If intermittency is readily identifiable +3 dB
Just Perceptible	+2 dB	+3 dB		
Clearly Perceptible	+4 dB	+6 dB		
Highly Perceptible	+6 dB	+9 dB		

The Objective Methods are based around the actual quantification of 1/3 octave data for the sound under investigation where possible.

However, the Standard states that the assessment methodology provided is not intended for the derivation of internal noise levels arising from sound levels outside or "*where background sound levels and rating levels are low",* however, with regard to the latter no definition of "low" is provided.

Where these situations prevail, it is considered appropriate to reference the absolute guidance levels provided in British Standard BS 8233: 2014 '*Guidance on Sound Insulation and Noise Reduction for Buildings*' and the World Health Organisation '*Guidelines for Community Noise' and 'Night Noise Guidance for Europe*'.

3.3.2 BS8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

The Standard is mainly concerned with building design from an acoustic standpoint. It does however contain information relevant to environmental noise, more specifically by stating guidance for desirable internal noise levels for dwellings and other buildings.

With regard to external noise levels, BS8233: 2014 states that "*For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments*". However, it also recognises that these levels are not achievable in all situations and further states that "*In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited*".

3.3.3 Institute of Acoustics (IOA) Professional Practice Guidance on Planning and Noise New Residential Development

The '*ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development* (ProPG)' (Institute of Acoustics *et al*., 2017) sets out advice on establishing a site risk evaluation for new residential development that will be exposed predominantly to airborne noise from existing transport sources. The approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment, provided that it is not the dominant noise source. Where industrial and/or commercial noise is considered to be the dominant source then ProPG states that the guidance of BS 4142:2014 should be referred to.

The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

The ProPG has augmented the internal noise guidance provided in BS8233:2014 and advocates the internal noise levels presented in Table 4 below.

Table 4: ProPG Internal Noise Level Guidelines

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35dB $L_{Aeq,(16hour)}$	-
Dining	Dining room /area	40dB $L_{Aeq,(16hour)}$	-
Sleeping (Daytime resting)	Bedroom	35dB $L_{Aeq,(16hour)}$	30dB $L_{Aeq,(8hour)}$ 40dB $L_{AF\ Max,}$ (Note 4)

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A of ProPG).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.

3.4 Specific Acoustic Guidance: Vibration

The brief requires consideration of the vibration impacts associated with the proposed site in accordance with BS ISO 4866:2010. BS ISO 4866 presents guidelines for the measurement of vibrations and evaluation of their effects on structures.

As this is however a desktop assessment and does not consider survey data; BS6472-1, as set out below, would be used to consider vibration constraints associated with the site, should this be deemed necessary.

3.4.1 BS6472-1: 2008 'Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting'.

Structural vibration in buildings can be detected by the occupants and can affect them in many ways; their quality of life can be reduced, as can their working efficiency. BS6472-1 provides best available information on the application of methods of measuring and evaluating vibration in order to assess the likelihood of adverse comment.

BS6472-1:2008 describes how to determine the vibration dose value, VDV, from frequency-weighted vibration measurements. The vibration dose value is used to estimate the probability of adverse comment which might be expected from human beings experiencing vibration in buildings. BS6472 sets out the threshold of vibration for humans together with the levels (below) that are considered acceptable for the time of day and night and for the type of activity or building use.

Table 5: Vibration Dose Value Ranges Which May Result in Various Probabilities of Adverse Comment in Residential Buildings (Source BS6472-1: 2008)

Place and Time	Low Probability of Adverse Comment $m.s^{-1.75}$	Adverse Comment Possible $m.s^{-1.75}$	Adverse Comment Probable $m.s^{-1.75}$
Residential Buildings 16-hour day	0.2 -0.4	0.4 – 0.8	0.8 – 1.6
Residential Buildings 8-hour night	0.1 – 0.2	0.2 – 0.4	0.4 – 0.8
NOTE: For offices and workshops, multiplying factors of 2 and 4 respectively should be applied to the above vibration dose value ranges for a 16-hour day.			

4 RESIDENTIAL FEASIBILITY ASSESSMENT

4.1 Introduction

It is specifically noted that this is a desk-based study, and at this point is not supported by any on site monitoring or assessment in accordance with appropriate UK noise guidance.

Should the site be taken to planning, and a potential for noise and vibration risk be confirmed, further detailed study would be required to be undertaken to support any planning application.

4.2 Potential Receptors

The proposal for the site is to develop the land for residential end use; however, the site layout and design are currently not concluded.

Proposed development of the site would be considered in terms of the existing noise and vibration climate of the site and other associated constraints.

4.3 Potential Development Constraints

Potential constraints that may impact the development of residential properties on this site include:

- The nearby A1112 Rainham Road North is located approximately 35m to the east of the site. Road traffic noise will likely impact the noise climate around the site.
- Industrial and commercial based premises are located approximately 135m to the north-west of the site, which may contribute to the noise climate. These industrial and commercial based properties are associated with the Dagenham Business Centre, and a LBBD Reuse and Recycling Area which is fairly extensive in area.
- There may be increased noise levels at the site from the other surrounding roads, however the noise climate on these roads is not known.
- There is a potential for general activity noise associated with an area such as this, such as human activities and natural noises.

Although there are industrial activities, and the presence of some railway lines to the south that have been identified within the scope of the desk top review, it is unlikely that ground borne vibration would be a risk at the site. As such there is no further consideration of ground borne vibration necessary relating to this site.

4.4 Defra Noise Mapping

In the absence of site-specific baseline noise data, the road traffic maps produced by the Department for Environment, Food and Rural Affairs (Defra) have been considered at this early stage. It is fully appreciated and noted that the limitations of the Defra data stipulate that they are not intended for planning purposes or informing planning decisions. However, in the absence of other, more detailed information, the maps have been consulted to provide an indication of road traffic and infrastructure noise contribution in the vicinity of the site. These have been used to consider the potential for constraints to development, particularly noise sensitive development such as residential, educational or health care facilities.

The Defra noise maps consider large urban areas and major airports, roads and railways. A major road is defined in the Environmental Noise (England) Regulations, Regulation 3(8) as a road which the Secretary of State regards as a trunk road, or a motorway that is not a trunk road, or a principal or classified road that has more than three million vehicle passages a year; concluded to be regionally, nationally or internationally significant. The Defra noise maps do not represent all local noise sources which could include noise from

smaller more local roads to the site, and from industrial and commercial premises located to the south-east of the site.

Defra acknowledges that in England there is limited data available for road and rail traffic flows at night to date, meaning that the first set of night-time noise maps are less accurate than the daytime noise maps. Defra therefore indicates that the strategic noise mapping provides no more than an indication of the night noise impacts from road traffic.

The Defra noise maps as viewed on http://www.extrium.co.uk/noiseviewer.html (Ref 11) show estimated levels of road traffic according to the strategic noise mapping within agglomerations and along major transport routes. Noise levels were modelled on a 10m grid at a receptor height of 4m above ground.

This data is a product of the strategic noise mapping exercise undertaken by Defra in 2019 to meet the requirements of the Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended).

4.4.1 Road Traffic Noise $L_{Aeq,16\ hour}$ (daytime, 07:00 – 23:00)

The daytime $L_{Aeq,\ 16\text{-}hour,}$ day road noise contour produced by Defra indicated high road traffic levels along the A1112 Rainham Road North, to the east of the site. However, residential properties may shield some noise from the site, reducing the levels slightly from those presented.

During the daytime, road traffic noise has potential to impact on internal noise levels as well as the amenity of garden areas. Residential development could be considered acceptable but further noise assessment would be required.

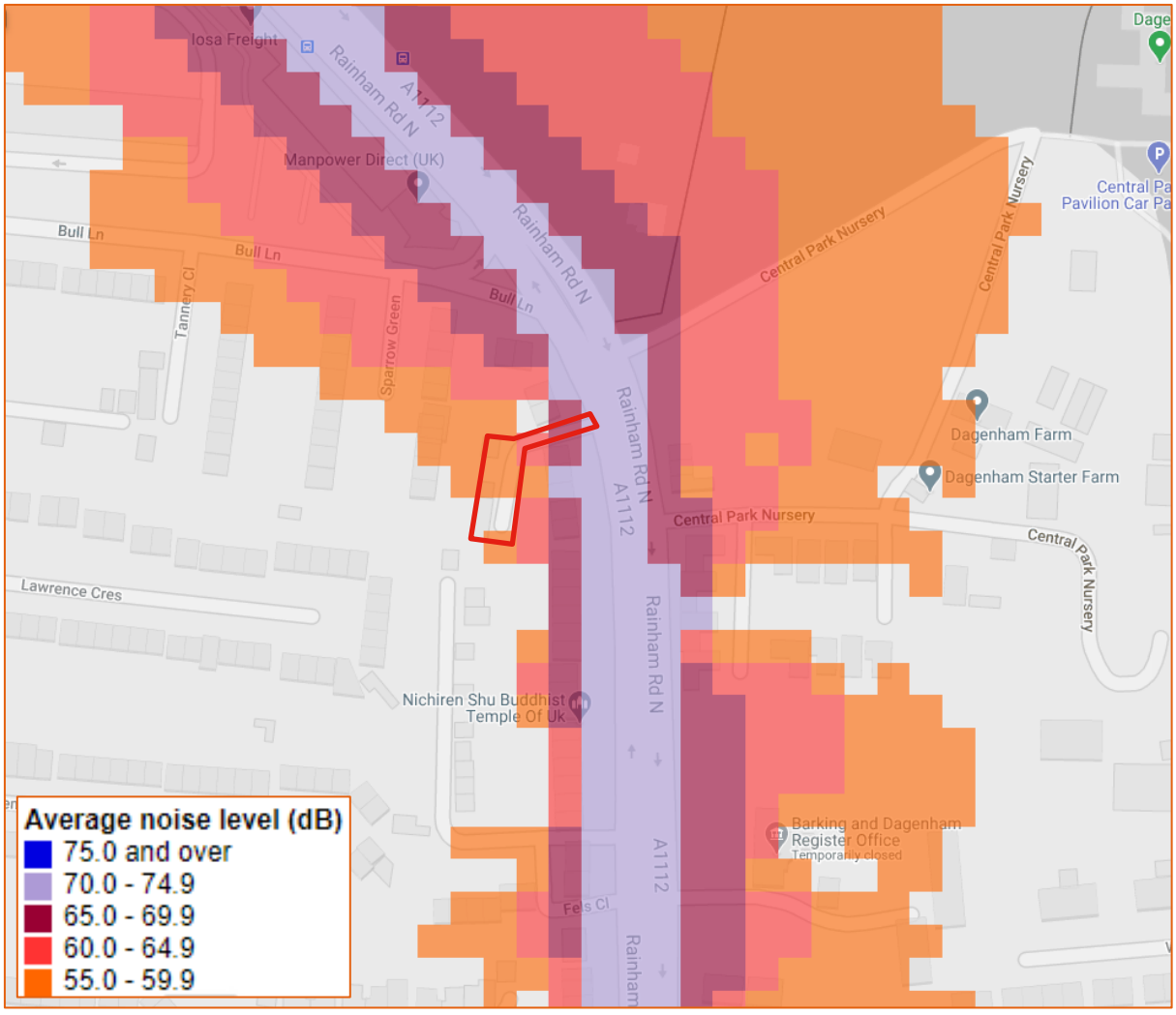


Figure 2: Defra L_{Aeq} 16-hour daytime road noise contour. The red outline indicates the approximate location of the site.

4.4.2 Road Traffic Noise L_{night} (23:00 – 07:00)

Night-time road traffic noise maps indicate high road traffic levels along the A1112 Rainham Road North, to the east of the site, with road traffic noise presenting a potential constraint to development.

Night-time road traffic presents the potential for sleep disturbance and would therefore be of concern for residential development.

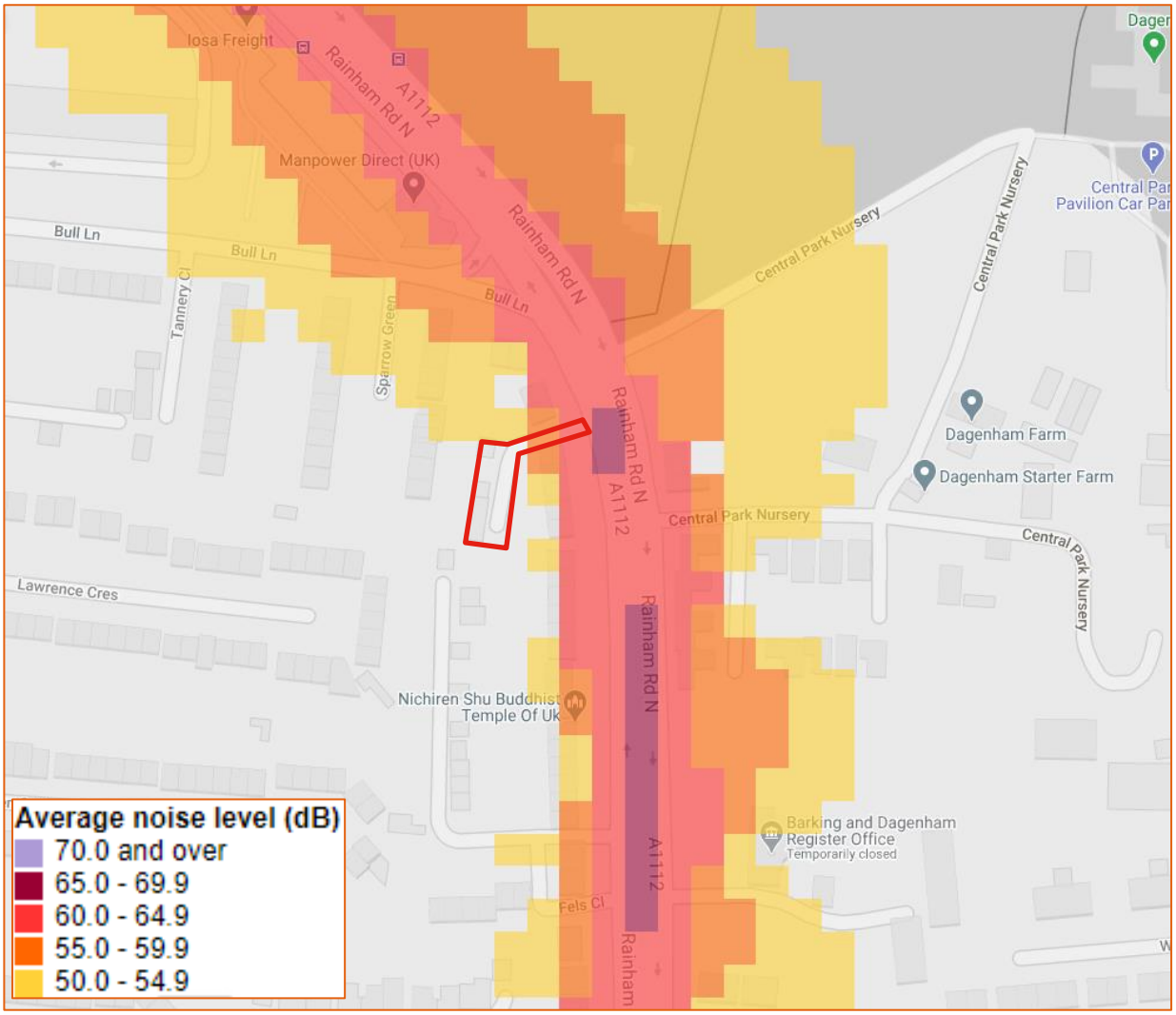


Figure 3: Defra L_{night} road noise contour. The red outline indicates the approximate location of the site.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Limitations

To date the assessment does not include any site-based baseline surveys. The assessment only considers desk-based information sources such as the Defra strategic noise maps. However, it is acknowledged that the road traffic noise maps produced by Defra are not intended for planning purposes or informing planning decisions; in this case they are used to inform the process only.

5.2 Design Considerations

A noise and vibration assessment would need to be carried out in accordance with ProPG in support of any planning application to develop the site for residential end use.

Baseline and ambient noise surveys would typically inform this study and would require to be agreed with the Environmental Health Officer (EHO) at LBBD. The need for vibration surveys would need to also be confirmed during the consultation with the EHO; but in this instance are not considered to be an issue necessitating consideration, and as such ground borne vibration following occupation of the dwellings would be scoped out of the assessment for this site.

However, consideration of noise would need to form part of any planning application to develop the site on the basis of consideration of the below main elements:

- Confirm whether there are any acoustic mitigation requirements based upon the prevailing noise climate,
- Ensure appropriate façade mitigation measures (glazing specification) to ensure that internal noise climates are acceptable and determine where trickle vents or mechanical ventilation will be required,
- Consider layout to ensure that noise is controlled to avoid locating external sensitive areas in positions exposed to noise sources such as local roads, and,
- Provide for acoustic screening where necessary either through optimum placement and design of intervening buildings (layout options) or specific acoustic fencing/screening.

The noise assessment will be informed by baseline and ambient noise surveys. Any noise surveys would be subject to agreement with the LBBD and will also require to be undertaken in suitable weather conditions and following good practice protocols by a specialist acoustic consultancy.

The assessment would inform the layout of the site to ensure internal and external amenity for future residents.

5.3 Construction Considerations

The construction noise and vibration impacts will be temporary in nature, occurring for the duration of works only. The level of noise will depend on the construction method and plant used; the resulting impacts would also be dependent upon the duration of the works, the time of day the works are taking place and the proximity of construction works to receptor locations.

As required by the Control of Pollution Act 1974 (CoPA) (Ref 12), “Best Practicable Means” (BPM) will be employed by the Contractor throughout construction in relation to the construction methodologies adopted, the selection of plant and equipment and the employment of suitably trained and qualified personnel.

There are various physical mitigation measures that can be considered to assist in reducing noise and vibration impacts during construction. These key measures include:

- Restricting construction works to Core Hours (weekday 0800-1800 and Saturday 0800 – 1300),

- Careful selection of plant and construction methods. Only plant conforming to relevant national, European Union or international standards, directives and recommendations on noise and vibration emissions will be used; and,
- Design and use of acoustic screening measures where practicable and necessary, at the earliest opportunity to meet any noise limits that may be agreed with the Council.

Much of the area surrounding the site is residential and so measures will need to be taken in order to cause the least disruption possible to those surrounding the site.

5.4 General Conclusions

Based upon the desk-based assessment undertaken to date, it is concluded that residential development on the site would not be out of character with current land use in the area, being positioned within the middle of an existing residential area. Further assessment would however be required should the site be progressed for development and taken through planning.

The assessment would include baseline surveys for noise. The need for vibration surveys would need to be based on consultation with the EHO but indications would be that it would not be a requirement at this site.

The potential need for a BS4142 assessment for the industrial and commercial based premises nearby (Frizlands Lane Recycling Centre) would need to be based on consultation with the EHO.

The baseline surveys will quantify the prevailing noise climate and ensure any proposed residential development complies with the ProPG. The noise (and vibration) assessment would inform detailed site layout and design to mitigate noise (and vibration) as and where required.

Vehicle access to the site may present new noise impacts to existing residents that will need to be considered in any assessment should the site be progressed for development.

6 REFERENCES

1. National Planning Policy Framework, Department for Communities and Local Government (2019)
2. The Noise Policy Statement for England (NPSE).
3. Technical Guidance to the Implementation of the NPPF (PPG Noise) (Department for Communities and Local Government, 2014 as updated 2019).
4. London Borough of Hounslow Local Plan. 2015 – 2030 (Adopted 15th September 2015).
5. BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.
6. BS8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.
7. 'ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development (ProPG Planning & Noise) (Institute of Acoustics, Association of Noise Consultants, and Chartered Institute of Environmental Health (2017).
8. BS 7445-2:1991, ISO 1996-2:1987 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use.
9. BS ISO 4866:2010 Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures.
10. BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting.
11. Defra Noise Maps [online]. Available at http://www.extrium.co.uk/noiseviewer.html
12. Control of Pollution Act 1974 (COPA). HMSO

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