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Noise Risk Assessment & Acoustic Design Statement

Prepared: 2nd March 2022

Report No	22007-1
Client	Vistry East Midlands
Site	Mepal Road Sutton Cambridgeshire

1. Quality Management

Report Number	22007 - 1
Issue	Issue 1
Prepared	2nd March 2022
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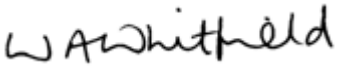
Authorised By	 Bill Whitfield PhD, MSc, MIOA

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3. Contents

4. Executive Summary

4.1.1. An environmental noise survey has been carried out for a proposed residential development at Mepal Road, Sutton, Cambridgeshire ("Proposed Development").

4.2. Measurement, Assessment and Evaluation

4.2.1. The survey was carried out to BS7445-1:2003[1] and BS7445-2:1991[2] which are covered under our UKAS Accreditation.

4.2.2. The interpretation of the data and the specification of suitable mitigation or treatment are outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

4.3. Scope

4.3.1. This report covers all aspects of the noise survey, including:

- the identification of acoustic design criteria;
- an objective sound pressure level survey of the existing site;
- analysis of the data; and,
- the design of any mitigation to meet the required internal noise criteria.

4.4. Noise Risk Assessment

4.4.1. A noise risk assessment of the proposed development has been carried out based on the results of the objective sound pressure level survey.

Risk assessment	Comment
Medium	*"As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse impact will be avoided in the finished development."*
High	*"High noise levels indicate that there is an increased risk that the development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice."*

Table 1 – Noise risk assessment for the Proposed Development site

Conclusions Summary

4.4.2. The facade sound insulation required to meet the guideline values from BS8233:2014 are summarised in Table 2. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

Living rooms (Daytime)	Bedrooms (Night-time)
26dB $R_w + C_{tr}$ /32dB $D_{ne,w} + C_{tr}$	31dB $R_w + C_{tr}$ /37dB $D_{ne,w} + C_{tr}$

Table 2 – Required facade sound insulation (Glazing/Ventilator)

[1] BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"
[2] BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

5. Background

5.1. Noise Policy Statement for England

5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to *"promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".*

5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood 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;
- Where possible, contribute to the improvement of health and quality of life.

5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

5.2.1. The National Planning Policy Framework (NPPF) was published on the 27th of March 2012 and was most recently updated on the 20th July 2021; it sets out the Government's planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

> *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".*

5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:

1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.

5.2.3. Existing businesses near to proposed development 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.

5.3. National Planning Practice Guidance

5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was published on the 29th November 2016 and is regularly updated to reflect the changes made to the NPPF and make it more accessible.[3]

[3] http://planningguidance.communities.gov.uk/

5.3.2. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

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 (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
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 (SOAEL)			
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 intrusive	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

Table 3 – Noise exposure hierarchy

5.3.3. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

PPG and Agent of Change

5.3.4. Where residential development is proposed close to existing commercial premises. Suitable mitigation measures may need to be put in place to avoid those activities having a significant adverse effect on future residents.

5.3.5. Where this is the case, the developer (or 'agent of change') would need to identify commercial premises that could cause a noise nuisance. This should include potential future noise sources that may not be present at the time a planning application is made. The agent of change will also need to mitigate and minimise noise to avoid potential significant adverse effects.

> "Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring)."
>
> **NPPG 009 Reference ID: 30-009-20190722 - Revision date: 22nd July 2019**

5.3.6. What constitutes noise, as opposed to sound, is subjective and there is not a simple relationship between the level of a sound and the impact on those affected but could be dependent on:

- the source and absolute level of the noise;
- the time of day it occurs;
- how a new noise source and/or receiver relates to the existing sound environment; and,
- the time and frequency characteristics of the noise

5.3.7. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include:

- engineering the noise sources to be quiet;
- minimising the impact of noise through layout;
- using conditions/obligations to restrict activities; and,
- mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

> "More specific factors to consider when relevant include:"
> "whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."
> **Paragraph: 006 Reference ID: 30-006-20190722 Revision date: 22nd July 2019**

5.3.8. Care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development.

5.3.9. It is possible that noise effects may be counteracted by providing: quiet facades containing habitable rooms, quiet private gardens or balconies, or quiet public amenity space within 5-minute walking distance.

6. Introduction

6.1.1. An environmental noise survey has been carried out for a proposed residential development at Melpal Road, Sutton, Cambridgeshire.

6.2. Proposed Development

6.2.1. An image showing the proposed location and layout of the Proposed Development is given in Figure 1.

Figure 1 - Plan showing the layout of the Proposed Development

6.3. Noise Climate

6.3.1. At the time of the survey visits the technician noted that the noise climate on site was dominated by road traffic noise.

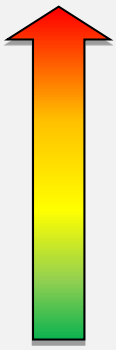
7. Assessment Criteria

7.1. Noise From Existing Transportation Sources

7.1.1. The Professional Practice Guidance (ProPG) was published in May 2017 refers specifically for the consideration of new residential developments that will be exposed predominantly to airborne noise from transport sources. The ProPG advocates a two stage risk based approach to noise when planning new residential developments:

- Stage 1 – an initial noise risk assessment of the site; and
- Stage 2 – a systematic consideration of the acoustic design.

7.1.2. An initial noise risk assessment is required to determine the prevailing sound pressure levels at the location of the Proposed Development to indicate whether the proposed site is at a negligible, low, medium or high risk from noise caused by transportation sources. The assessment is based on free-field levels on the existing site and, therefore, does not take into account any new treatment (such as bunds or fences) that will be introduced as part of the development. The guidance on negligible, low, medium and high risk levels has been summarised in Figure 2.

Risk	Day		Night	
High	≈ 70dB(A)		≈ 60 dB(A)	High noise levels indicate that there is a risk of refusal. High risk may be mitigated and minimised by following a good acoustic design process that is demonstrated in an ADS.
Medium	≈ 65dB(A)		≈ 55dB(A)	As noise levels increase the site is less suitable, from a noise perspective. Any application may be refused unless a good acoustic design process is illustrated in an ADS.
Low	≈ 55dB(A)		≈ 45dB(A)	At low noise levels the site is likely to be acceptable, from a noise perspective.
Negligible	<50dB(A)		<40dB(A)	These noise levels indicate that the development site is likely to be acceptable from a noise perspective and the application need not normally be delayed on noise grounds.

A. *Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures*
B. *Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".*
C. $L_{Aeq,16hr}$ *is for daytime 0700-2300,* $L_{Aeq,8hr}$ *is for night-time 2300-0700*
D. *An indication that there may be more than 10 noise events at night (2300-0700) with* L_{AFMAX} *> 60dB means the site should not be regarded as negligible risk.*

Figure 2 – Stage 1 – Initial site noise risk assessment

7.1.3. The ProPG stresses that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker.

Element 1 – Good Acoustic Design Process

7.1.4. Good acoustic design should avoid 'unreasonable' acoustic conditions and prevent 'unacceptable' acoustic conditions. ProPG notes that good acoustic design does not mean over-engineering or 'gold plating' all new developments but instead should aim to provide an optimum acoustic outcome for a particular site.

Element 2 - Internal Noise Level Guidelines

7.1.5. The guideline values proposed are the same as those provided in BS 8233:2014 and WHO, including the recommendation that maximum noise levels should not exceed 45dB L_{Amax} more than 10 times per night.

Element 3 - External Amenity Area Noise Assessment

7.1.6. Sound pressure levels of 50 – 55 dB $L_{Aeq,16hr}$ in gardens and external amenity areas, where such areas are an intrinsic part of the overall design. If these values cannot be achieved in all areas, the development should be designed to achieve the lowest practicable noise levels. The provision of relatively quiet alternative publically accessible external amenity space may help to offset the noise impact in high noise areas.

Element 4 - Assessment of Other Relevant Issues

7.1.7. It is acknowledged that there may be other local issues affecting the ability to achieve the required acoustic design criteria

7.2. Guideline Values

7.2.1. BS8233:2014 draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their function. The standard provides guideline internal values for dwellings for steady external noise sources. These have been summarised in Table 4.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 4 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

7.2.2. The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year's Eve.

7.2.3. 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 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In such cases, the lowest practicable levels should be achieved in external amenity areas but the development should not be prohibited.

7.3. Ventilation Requirements

7.3.1. This section addresses ventilation issues that may conflict with the acoustic design of the building. They are provided for reference purposes only as this report is addressing the acoustic parameters of the development and building design only.

7.3.2. BS8233:2014 states that, if relying on closed windows to achieve the guideline values, there needs to be an appropriate alternative ventilation scheme that does not compromise the facade sound insulation or the resulting noise level. However, rooms should have adequate ventilation, i.e. trickle ventilators should be assumed to be open for any assessment. Ventilation requirements for dwellings are covered under Building Regulations Approved Document F[4] ("ADF"). It describes the purpose of ventilation as for the removal of stale air from inside a building and replacement with fresh air from outside.

7.3.3. ADF prescribes three types of ventilation provision:

1. **Whole dwelling ventilation** – running continuously (includes background ventilation)
2. **Extract ventilation** – removing vapour/pollutants from a space e.g. from bathrooms and kitchens
3. **Purge ventilation** – manually controlled rapid ventilation

7.3.4. ProPG[5] states that the internal noise guidelines are generally not applicable under "purge ventilation" conditions as defined by ADF, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food). Where a means of ventilation is required as an alternative to open windows, there are four broad categories of ventilation system that each meet the requirements of ADF:

- **System 1** – Background ventilators and intermittent extract fans
- **System 2** – Passive stack ventilation
- **System 3** – Continuous mechanical extract ventilation (MEV)
- **System 4** – Continuous mechanical supply and extract with heat recovery (MVHR)

7.3.5. Systems 1-3 require penetrations in the facade to allow air to flow into and out of the building. In order to control the noise break-in from external noise sources, it should be checked that the penetration offers sufficient resistance to the passage of sound. The sound insulation of these, typically small, penetrations is often specified in terms of the element normalised sound pressure level difference, $D_{ne,w}$, which is often corrected for the spectrum shape of road traffic using the C_{tr} correction term.

7.3.6. Ventilation provisions, including open windows, will not necessarily meet cooling needs. Building Regulations Approved Document L2a[6] ("ADL2a") requires that overheating be mitigated by controlling the solar gains by means of building orientation, shading and the g-value of the glazing. It recommends that the developer assess the overheating risk using CIBSE TM 37.[7]

[4] Approved Document F: Means of Ventilation (2010 Edition)
[5] The Professional Practice Guidance on Planning and Noise, ANC, May 2017
[6] Approved Document L2a: Conservation of Fuel and Power (2013 Edition)
[7] CIBSE Guide TM 37 "Design for Improved Solar Shading Control"

8. Survey

8.1. Measurement Locations

8.1.1. Fixed position monitoring took place at one position to account for the likely dominant noise sources. The monitoring equipment was located 1.5m from the ground and at least 3m from the next nearest reflecting surface. The monitoring positions are shown in Figure 3.

Figure 3 - Noise monitoring locations on site

8.1.2. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003[8] before and after the surveys. The calibration details are also detailed in the appendix.

8.2. Meteorology

8.2.1. During the survey the weather information was noted. This is summarised in Table 5.

	23rd February 2022	26th February 2022
Roads(Wet/Dry)	Dry	Dry
Wind Speed (ms^{-1})/Direction	6 / SW	5 / SSE

Table 5 - Meteorological data noted during the survey

[8] BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"

8.3. Measurement and Timescale

8.3.1. Unattended monitoring was carried out between 23rd February 2022 and 26th February 2022. The measurements that have been made are summarised in Table 6

Date	Type	Quantity
23/02/2022 – 26/02/2022	Fixed/unattended	$L_{Aeq,5min}$

Table 6 – Measurements made at the site of the Proposed Development

8.3.2. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2[9]. All sound pressure levels are in dB (re 20μPa).

8.4. Results Summary

8.4.1. The worst case 16 hour day (07:00-23:00) and 8 hour night (23:00-07:00) for the survey duration have been reported and used for the purposes of this assessment. The fixed position external measurement results are summarised in Table 7.

Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
62.8	62.3

Table 7 - Summary of the external sound pressure levels measured

[9] BS7445-2:1991 "Description and measurement of environmental noise – Part 1:Guide to the acquisition of data pertinent to land use"

9. 3D Noise Model

9.1.1. A 3D noise model has been constructed using SoundPLAN™ in order to predict the propagation of sound across the site of the Proposed Development. The calculation procedure has been used from ISO9613-2:1996[10] to predict the propagation of sound from source to receiver, taking into account distance, screening, and atmospheric and ground conditions. Terrain data has been taken from Defra.

9.1.2. The results of the model have been illustrated in noise contour maps in Figure 4 and Figure 5.

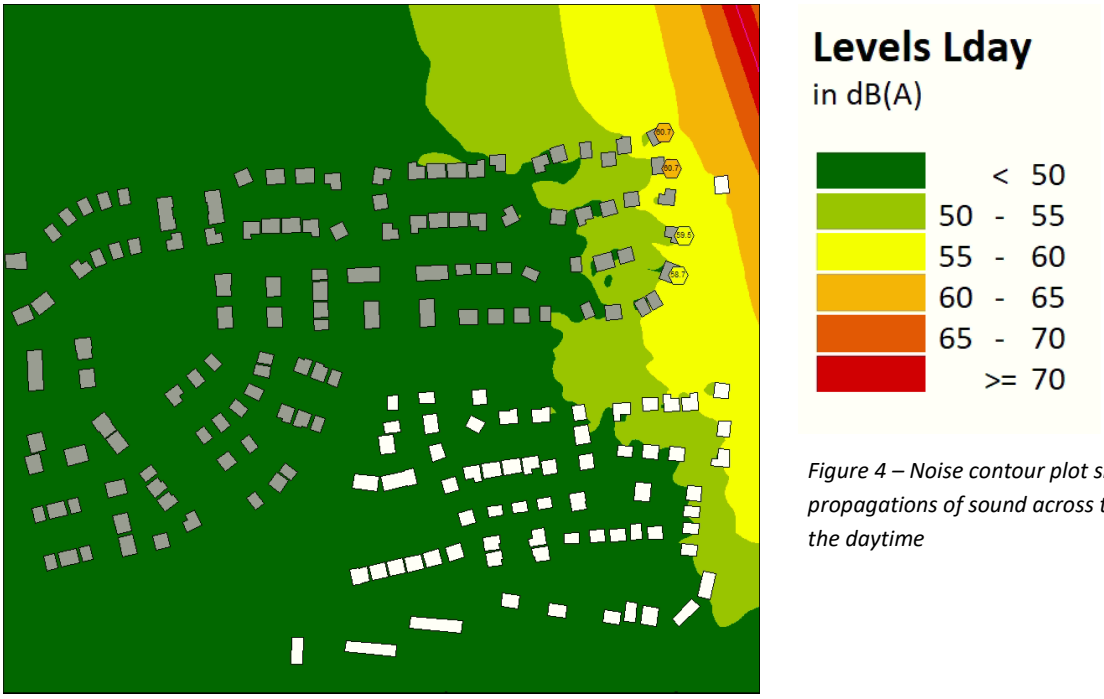


Figure 4 – Noise contour plot showing the propagations of sound across the site during the daytime

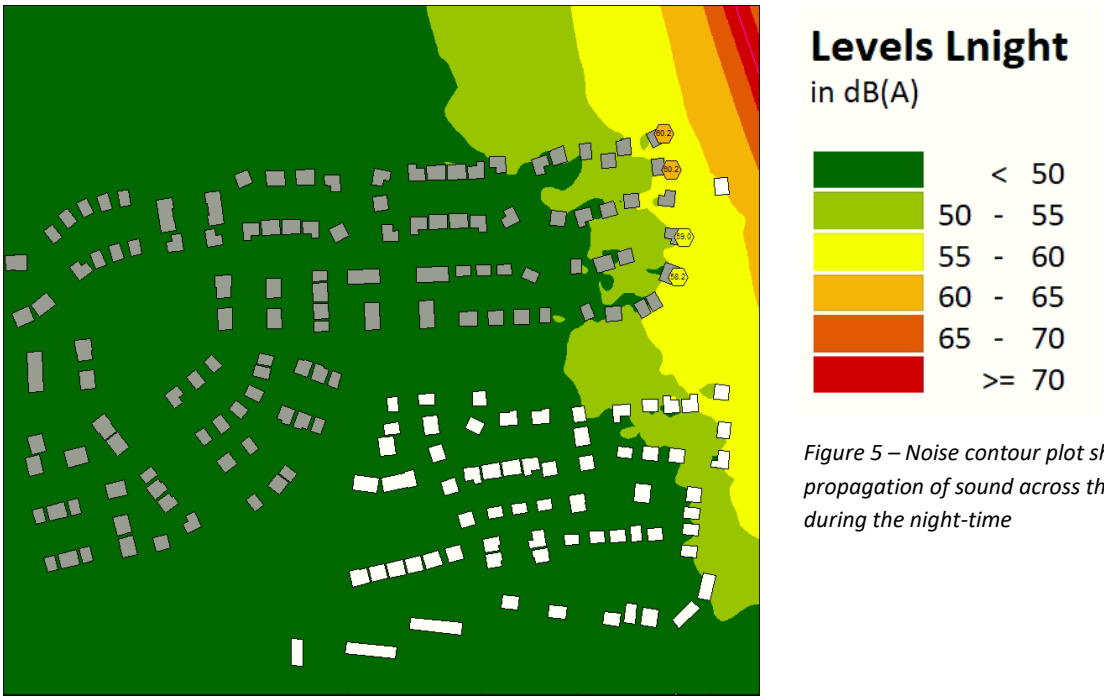


Figure 5 – Noise contour plot showing the propagation of sound across the site during the night-time

[10] ISO9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation"

10. Noise Risk Assessment

10.1. Site Risk Assessment

10.1.1. The noise risk assessment should not be seen as the basis for the recommendation to the decision maker. The aim is that higher risk sites will be recognised at the earliest possible stage and the increasing importance of good acoustic design can be emphasised. The risk assessment for the site is summarised in Table 8.

Risk assessment	Comment
Medium	*"As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse impact will be avoided in the finished development."*
High	*"High noise levels indicate that there is an increased risk that the development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice."*

Table 8 – Noise risk assessment for the Proposed Development site

10.1.2. The noise risk assessment indicates that a good acoustic design process, documented in an acoustic design statement, is required to ensure that the impacts of noise will be mitigated and minimised.

11. Mitigation

11.1. Element 1: Good Acoustic Design Process

11.1.1. The client has appointed an acoustics consultant at an early stage. The proposed development has been arranged so that dwellings are set back from the dominant noise sources and gardens are located behind their associated dwellings to provide screening.

11.2. Element 2: Internal Noise Level Guidelines

11.2.1. Based on the measured and predicted free-field sound pressure levels at the worst affected facades, the simple calculation method from BS8233:2014 has been used to determine the necessary sound reduction to meet the guideline values. Standard forms of construction are assumed such that the glazing is likely to be the lowest performing facade element.

Required Mitigation

11.2.2. The single figure glazing and ventilator performance requirements in order to achieve the internal design criteria are summarised in Table 9. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

Living Rooms (Daytime)	Bedrooms (Night-time)
26dB $R_w + C_{tr}$ /32dB $D_{ne,w} + C_{tr}$	31dB $R_w + C_{tr}$ /37dB $D_{ne,w} + C_{tr}$

Table 9 – Required facade sound insulation (Glazing/Ventilator)

11.2.3. A plan showing where these specifications apply has been provided in the appendix.

Glazing and Ventilator Specifications

11.2.4. The glazing and ventilator performance has been specified based on the performance data provided by Saint-Gobain and Greenwood Airvac. These are suggested configurations and any other glazing and vent combination can be used provided it achieves the minimum performance levels given in Table 9. The recommended glazing specification is given in Table 10.

Living Rooms (Daytime)	Bedrooms (Night-time)
Saint Gobain 4(12)4	Saint Gobain 4(6)6

Table 10 - Our recommended glazing configurations

11.2.5. Should penetrations be required for ventilation purposes our recommended ventilator configurations, calculated to work in conjunction with the above glazing specifications, are summarised in Table 11. The specification provides an equivalent area of at least 5000mm^2. It should be checked by a suitably qualified person that this ventilator specification meets the requirements of Approved Document F.[11]

Living Rooms (Daytime)	Bedrooms (Night-time)
Greenwood 5000EA	Greenwood 5000EAW.AC1

Table 11 - Our recommended ventilator configurations.

11.2.6. Given the assumptions in this method the information in this section should be treated as general guidance only. The acoustic performance of third party products cannot be guaranteed by noise.co.uk.

[11] Approved Document F: Means of Ventilation (2010 Edition)

Open Windows

11.2.7. A model has been calculated to show the plots that can achieve the 'reasonable' internal criteria from BS8233 with the windows open. 10dB sound reduction from an open window has been assumed (most window types will provide 13dB-17dB sound reduction depending on opening type and size).

11.2.8. **NOTE: the assessment of open window situations can be predicted with a greater degree of certainty once the window type and window restrictor opening details are known. It is for this reason worst case scenario has been predicted.**

11.2.9. The image maps in Figure 6 (Day) and Figure 7 (Night) show the facades where windows will need to remain closed in red in order to achieve the planning criteria internal ambient noise level for day and night.

Figure 6 - Markup showing facades that require closed windows to achieve 'reasonable' internal criteria from BS8233 (Day 07:00-23:00)

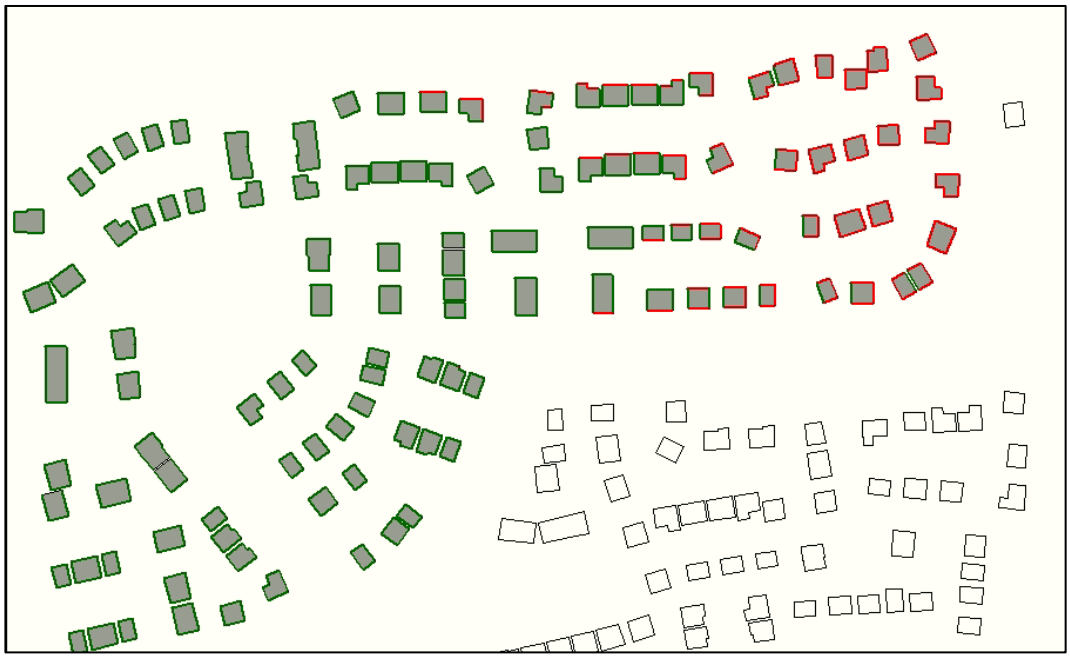


Figure 7 - Markup showing facades that require closed windows to achieve 'reasonable' internal criteria from BS8233 (Night 23:00-07:00)

11.2.10. It is understood that the client is considering installing a 2.5m barrier along the A41. However, this is predicted to only have a significant effect on the ground floor windows. The first floor windows will be afforded less protection from the road by the barrier and are not predicted to achieve the internal criteria with the windows open given our (worst case) assumptions above. There is also a proposed entrance road

into the site that prevents a continuous barrier along the boundary with the A41. A model has been created with a 2.5m tall earth bund along the boundary with the road which shows the facades where internal level are not predicted to be achieved based on the worst case assumptions. The image map shows the worst case affected windows (i.e. first floor). This is given in Figure 8 and Figure 9.

Figure 8 - Markup showing facades that require closed windows to achieve 'reasonable' internal criteria from BS8233 (Day 07:00-23:00) – with 2.5m bund along boundary

Figure 9 - Markup showing facades that require closed windows to achieve 'reasonable' internal criteria from BS8233 (Night 23:00-07:00) – with 2.5m bund along boundary

11.3. Element 3: External Amenity Area Noise Assessment

11.3.1. BS8223 states that it is desirable that the external noise level for amenity spaces, such as gardens and patios, does not exceed 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

11.3.2. In this situation, the results of the modelling illustrate that the external sound pressure levels are likely to meet the guideline values. It should be noted that no garden fences have been included in the model and so the sound pressure levels in the garden areas are likely to be lower than predicted with the fences in place.

11.4. Element 4: Assessment of Other Relevant Issues

11.4.1. To the best of our knowledge, at this current time, the design advice in this acoustic design statement does not conflict with any other local guidance and is not expected to affect amenity for future residents.

12. Conclusions

12.1.1. An environmental noise survey has been carried out at the site of a proposed residential development at Melpal Road, Sutton, Cambridgeshire to determine typical ambient sound levels. The sound levels have been used to calculate the required facade sound insulation to meet the guideline internal levels from BS8233:2014.

12.1.2. Table 9 in section 11 gives the required facade sound reduction by any glazing and ventilator combination to be compliant with the guideline values.

12.1.3. An assessment of where windows can remain open and still achieve the internal ambient levels has also been produced based in the first instance on worst case conditions. Further work can be done when more details on the window type and opening s are known.

12.1.4. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991	BS 8233:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Vistry East Midlands	
D	Full site address	Melpal Road Sutton Cambridgeshire	
E	Date of surveys	Survey Date: 23rd February 2022 – 26th February 2022	
F	Description & identification of Proposed Development	It is proposed to develop the site for residential use.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

12.1.5. Measurements were made using the following equipment:

Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	SoftdB Piccolo 2 (PO221070105)	BSWA CA114 (590010)

12.1.6. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
SoftdB Piccolo 2 (PO221070105)	94.0 dB	94.0 dB

12.1.7. There was no adverse deviation.

APPENDIX D: Glazing Markup Plan

Living Rooms (Daytime)	Bedrooms (Night-time)
26dB $R_w + C_{tr}$ /32dB $D_{ne,w} + C_{tr}$	31dB $R_w + C_{tr}$ /37dB $D_{ne,w} + C_{tr}$

Standard thermal double glazing is predicted to be sufficient for all unmarked facades.