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LAND OFF WORKHOUSE LANE, BURBAGE
NOISE ASSESSMENT RE CONDITION 13

On behalf of:
Cameron Homes Limited

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NOISE ASSESSMENT RE CONDITION 13

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1. INTRODUCTION

1.1 Hepworth Acoustics was commissioned by Cameron Homes Limited to carry out a noise impact assessment in connection with a reserved matters planning application pursuant to the outline approval for the residential development of the site known as Land off Workhouse Lane, Burbage, as allowed on appeal, as per PINS reference: APP/K2420/W/22/3311038.

1.2 The appeal decision includes Condition 13, which states the following:

> *"No development approved by this permission shall be commenced until details of noise mitigation to be incorporated as part of the development as well as a timetable for the provision of mitigation measures has been submitted to and approved in writing by the local planning authority. The approved measures shall be provided in accordance with the approved timetable and thereafter they shall be retained."*

1.3 The site is currently an open field and is bounded by Workhouse Lane to the northeast, by existing residences to the northwest and, generally, by open fields to all other sides, plus a further existing residence to the southeast.

1.4 Workhouse Lane is a no-through road that carries very limited amounts of traffic. The M69 motorway runs southeast/northwest at a distance of about 300m southeast from the closest part of the site, across intervening land predominantly of open fields.

1.5 The site location is identified in Figure 1.

1.6 The proposed reserved matters layout plan is shown in Figure 2.

1.7 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2. ACOUSTIC CRITERIA

2.1 Condition 13 of the relevant outline planning consent does not provide specific noise criteria for the reserved matters scheme. Accordingly, the provisions described below have been adopted to determine appropriate criteria to assist in identifying whether mitigation measures are necessary to commensurately protect the amenities of future occupiers from noise.

2.2 Brish Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings,* which carries the full weight of an adopted British Standard, recommends guidance on design criteria for acceptable noise levels within residential accommodation, as summarised in Table 1.

Table 1: BS 8233 Recommended Acoustic Design Criteria

Activity	Location	Internal Noise Levels	
		Daytime 0700-2300hrs	Daytime 0700-2300hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.3 BS 8233 also states that, "*where development is considered necessary or desirable … the internal target levels* [i.e. those in Table 1] *may be relaxed by up to 5dB and reasonable internal conditions still achieved*".

2.4 BS 8233 clarifies that the above guidance relates only to noise without specific character and that at sites where noise does exhibit distinct characteristics (such as noise with a distinguishable, discrete and continuous tone, or noise that is irregular enough to attract attention, or which has strong low-frequency content), lower noise design values might be appropriate.

2.5 Further, BS 8233 states that if there is a reliance on closed windows to meet the guide values, "*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*". It is also stated that assessments should be based on a room with "*adequate ventilation provided (e.g. trickle ventilators should be open)*".

2.6 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise*' 2017 states that "*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*".

2.7 Regarding outdoor living areas, Clause 7.7.3.2 of BS 8233 states that "*it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas such as city centres or urban areas adjoining the strategic transport network, 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, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*."

3. NOISE SURVEY

3.1 A survey of currently prevailing noise levels at the site was carried out over a continuous 24-hour period commencing at 0800hrs on Monday 3 August 2026, at a single location identified as Location 1 in Figure 1.

3.2 Location 1 is representative of the closest area of proposed residential development to the M69, as per the reserved matters layout in Figure 2.

3.3 The noise monitoring was undertaken using a NTi Audio XL2-TA 'Class 1' sound analyser (serial no. A2A-23512), field calibrated using a Norsonic Acoustic Calibrator, Type 1251 (serial no. 20804), with no variation in calibration level observed.

3.4 The measurement microphone was fitted with a wind shield and mounted in free-field conditions at 1.4m above local ground.

3.5 The weather during the survey was generally dry, warm and clear with a light easterly / south-easterly wind. Hence, there was a positive wind vector from the M69 towards the site throughout the noise survey period.

3.6 The measured noise levels were processed to determine the sequential 2-minute period noise levels for the full monitoring period. The actual daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise exposure levels have been obtained from the logarithmic average of all the $L_{Aeq,2min}$ noise measurement samples over each of those periods.

3.7 To provide a robust interpretation of BS 8233 and ProPG guidelines relating to L_{Amax}, the overall night-time L_{Amax} noise level at Location 1 has been determined for assessment purposes as the measured $L_{Amax,2min}$ level exceeded no more than 10 times over the full night-time period.

3.8 Based on the above, the overall road traffic noise levels at Location 1 are summarised in Table 2.

Table 2: Overall Daytime and Night-time Road Traffic Noise Levels at Location 1

Location	Daytime (0700-2300hrs)	Night-time (2300-0700hrs)	
	dB $L_{Aeq,16hr}$	$L_{Aeq,8hr}$	L_{Amax}
1	58	55	64

3.9 The measured noise levels are presented in full in Appendix B.

4. NOISE ASSESSMENT

4.1 Based on the overall daytime $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ noise level measurements, set out in Table 2 and the acoustic criteria outlined in Section 2, it is not necessary to incorporate any specific noise mitigation measures to control internal noise levels in any areas of the reserved matters scheme.

4.2 Standard thermal double glazing and traditional external wall and roof constructions, along with standard non-acoustic trickle ventilators, will be adequate to ensure internal noise levels within the targets set out in BS 8233 / ProPG in all areas.

4.3 It is noted that the above recommendation relating to internal noise levels do not take account of the requirement of Approved Document O of the Building Regulations (ADO), as that is not a planning matter. However, although additional assessment may be required for a formalised Building Regulations submission, based on the overall night-time $L_{Aeq,8hr}$ noise level measurement set out in Table 2 and in line with ADO provisions it is possible that there will be a need for mechanical or alternative means of cooling for bedrooms in certain areas.

4.4 Regarding private outdoor amenity areas (gardens), based on the measured daytime $L_{Aeq,16hr}$ noise level measurements at the closest area of proposed residential development to the M69, as per the reserved matters plan in Figure 2, when there is a positive wind vector from the M69 towards the site, as was the case throughout the noise survey period, which is hence representative of worst-case conditions, then the existing noise levels exceed the 'upper guideline value' of BS823 by 3dB.

4.5 It is noted that in other conditions, including a prevailing south-westerly wind, and even more significantly in any type of northerly wind conditions, noise levels from the M69 will be considerably lower.

4.6 Notwithstanding this, it is noted that the final reserved matters plan has employed 'Good Acoustic Design' as described in ProPG, such that across almost all of the development, private rear garden areas will be well protected from M69 noise by the proposed dwelling buildings themselves, as well as other existing off-site buildings at the eastern extents of the site. Accordingly, it may be anticipated that future garden noise levels will be comfortably below the BS823 'upper guideline value' in almost all cases, without the need for any additional mitigation.

4.7 The potential slight exceptions to above are Plot 20 to the southern extent of the development, and (to a lesser extent due to additional distance) Plot 15 to the western extent of the development, some residual M69 noise may be experience in gardens without additional protection. It is therefore recommended that the south-westerly facing boundaries of these two gardens are provided with acoustically effective garden boundary screening.

4.8 These acoustic barriers should be at least 1.8m in height and should be of overall mass not less than 10kg/m2 and nominal thickness not less than 20mm. They should be imperforate with no holes or gaps and should be sealed at the base. Proprietary acoustic barriers or masonry walls are recommended, albeit readily taking the visual form of a standard garden fences / walls.

5. SUMMARY

5.1 Hepworth Acoustics was commissioned by Cameron Homes Limited to carry out a noise impact assessment in connection with a reserved matters planning application pursuant to the outline approval for the residential development of the site known as Land off Workhouse Lane, Burbage, as allowed on appeal, as per PINS reference: APP/K2420/W/22/3311038.

5.2 A noise survey has been undertaken at the site and the prevailing daytime and night-time noise levels have been determined.

5.3 Recommendations of modest but appropriate noise mitigation measures have been made in order to achieve appropriate acoustic design criteria in line with relevant British Standard guidelines and hence fulfil the requirements of Condition 13 of the appeal decision.



Do not scale from this figure

Key:

Project: P26-266

Ref: **Figure 1**

Title: Site Location

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SCHEDULE OF ACCOMMODATION
FREZENBERG CLOSE
JUBILEE SQUARE
Balancing Pond
Pond
Balancing Pond
White House Farm
Pp
PUBLIC OPEN SPACE
Do not scale from this figure
Key:
Project: P26-266
Ref: Figure 2
Title: Reserved Matters Layout
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APPENDIX A: ACOUSTICS UNITS & INDICES

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. There are also a number of ways to describe sound insulation performance.

The indices used in this report are described below:

$L_{Aeq,T}$ **A-weighted Equivalent Continuous Sound Level:** An average of the total sound pressure measured over a specified time period (T). In other words, $L_{Aeq,T}$ is the level of a steady sound which has the same total A-weighted sound pressure as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for most forms of environmental noise.

L_{Amax} **Maximum A-weighted Sound Level with Fast Time-weighting:** The maximum A-weighted sound pressure level during the measurement period, using the Fast time-weighting of 125ms. L_{Amax} used in this report refers throughout to L_{AFmax} with the Fast time weighting, denoted L_{AFmax} or $L_{Amax,f}$ in other documents but L_{Amax} in BS 8233:2014 standard notation.

$L_{A10,T}$ **A-weighted 10 Percentile Level:** The A-weighted sound level exceeded for 10% of a measurement time period (T). $L_{A10,T}$ is often used for calculations of road traffic noise, such as in '*Calculation of Road Traffic Noise*' (CRTN) 1988.

$L_{A90,T}$ **A-weighted 90 Percentile Level:** The A-weighted sound level exceeded for 90% of a measurement time period (T). $L_{A90,T}$ is generally used as a measure of Background Sound Level.

APPENDIX B: NOISE SURVEY RESULTS

