



205-219 Henley Road, Caversham

Noise Assessment

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prepared for

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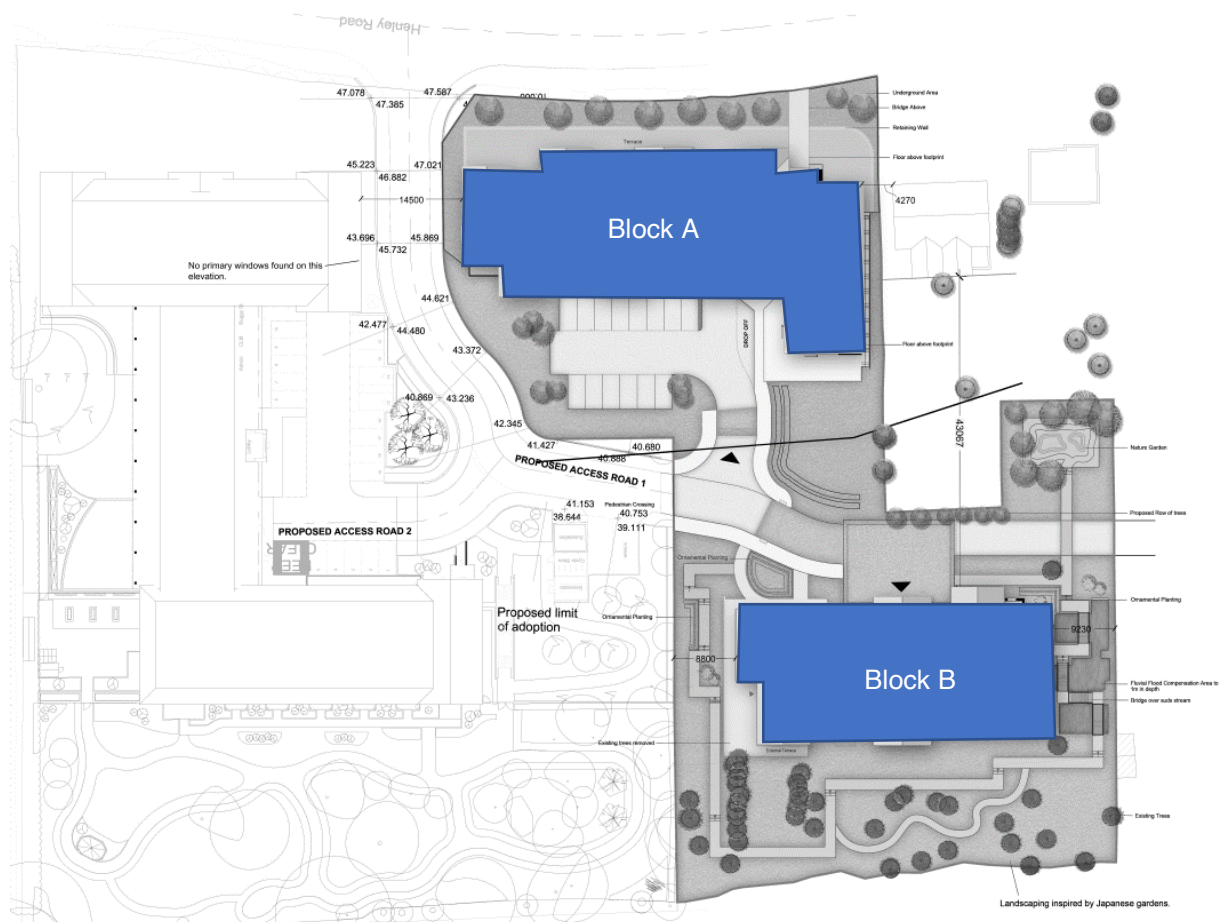
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1.0 Introduction

- 1.1 A new set of apartments consisting of two blocks are proposed on the Henley Road in Caversham.
- 1.2 The scheme is to include the demolition of nos. 205-213 Henley Road and rear gardens of nos. 205-219 Henley Road and erection of 2 retirement living apartments blocks (C3 use-age restricted) comprising 59 apartments including communal spaces with supporting car parking, open space, landscaping and associated infrastructure.
- 1.3 We understand a noise assessment has been requested by the Local Authority to be included in the planning application to consider noise intrusion.
- 1.4 A noise survey has been undertaken at the Site, on which a break-in noise assessment has been undertaken. This report sets out the noise survey, assessment, and mitigation requirements.

2.0 Locality and Scope

- 2.1 The site is located on the southern side of the A4155 Henley Road as indicated in the following plan. The site is surrounded by residences and access into the site is from the adjacent development on Henley Road.



3.0 Planning Context

3.1 The following criteria have been used within the assessment; the derivations of these can be found within Appendix A.

- 35 dB $L_{Aeq,16hour}$ daytime within habitable rooms;
- 30 dB $L_{Aeq,8hour}$ night-time within habitable rooms;
- 45 dB $L_{Amax,F}$ night-time within habitable rooms not normally exceeded more than 10 times per night;
- Aspirational target of 55 dB $L_{Aeq,16hour}$ for external amenity areas.

3.2 Due consideration has also been given to the guidance in Acoustics, Ventilation and Overheating: Residential Design Guide (AVO:2020) to ensure noise during the overheating condition is appropriately considered.

4.0 Noise Survey

Methodology and Instrumentation

4.1 Unattended noise measurements were undertaken at a single position on site over a 24hr period between 3-4 August 2021.

4.2 These were undertaken with a Norsonic 140 sound level analyser fitted with a weatherproof windshield (Norsonic 1214). The analyser was calibrated before and after the survey, with no significant drift recorded during the survey.

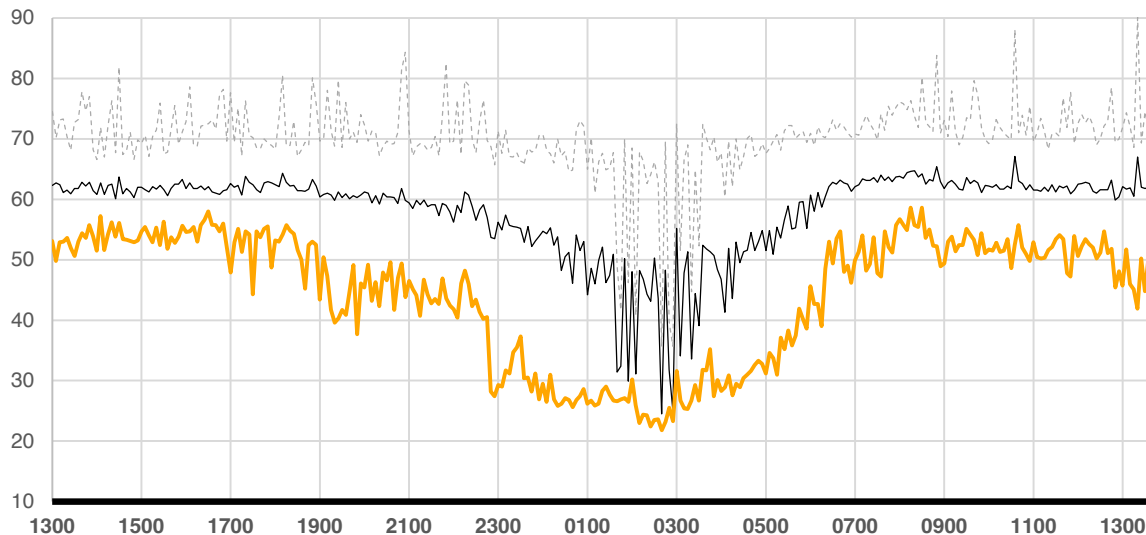
4.3 The microphone was attached to a pole out of a first-floor window at 211 Henley Road, facing towards Henley Road and being 1m from the façade, as can be seen in the image below:



4.4 When setting the equipment up, the weather was warm and sunny with some cloud cover and no wind noted. Weather conditions were similar upon collection and are expected to have remained suitable overnight. No rain fell during the survey period.

Survey Results

4.5 The following graphs presents the measured background ($L_{A90,5min}$, orange), ambient ($L_{Aeq,5min}$, black) and short-duration maximum ($L_{Amax,5min}$, grey dashed) noise levels. The graph is in terms of sound pressure level (dBA, y-axis) against time (hours, x-axis).



4.6 Representative ambient day and night-time levels have been calculated (via logarithmic averaging of the relevant time period) to be:

- Daytime $L_{Aeq,16hr}$ (0700-2300) 62 dB
- Night-time $L_{Aeq,8hr}$ (2300-0700) 55 dB

4.7 The representative maximum event level is taken to be:

- Night-time L_{Amax} (2300-0700) 71 dB

4.8 The noise climate is dominated by traffic on Henley Road, as can be seen by the diurnal pattern in the time history above, when traffic lessens overnight. The L_{Amax} event is taken to be a vehicle passing, as suggested by analysis of the event noise spectrum.

4.9 Construction works were noted to the west at what was 205 Henley Road. The majority of the noisy works occurred to the rear and are expected to have had an insignificant effect on the measured noise levels. Infrequent events are expected to have occurred in view of the microphone, which are shown by the small peaks in the ambient noise levels during the daytime; these peaks have not been removed from the levels used in the assessment to form a robust approach.

5.4 For Façade groups B and C, noise levels are below the SOAEL (as described in Appendix A) so openable windows are an acceptable means of ventilation in the overheating scenario. Acoustically upgraded glazing is required to meet internal noise levels; acoustically enhanced passive trickle vents are required to allow adequate background ventilation and maintaining internal noise levels.

5.5 For façade group D, which corresponds to all locations not indicated in the above figure, we find that there is no acoustic requirement for glazing or ventilation. Windows may be openable for background ventilation (and in the overheating scenario) and need not be closed to achieve BS 8233 internal levels.

5.6 Rearranging the internal building layout, to place non habitable rooms and possibly dining rooms on the noisier facades, could substantially improve this situation, but alternative layouts have been considered and not found to be practicable. Alternative means of ventilation will therefore need to be considered during detailed design and is expected to include MVHR for the affected units on Façade Group A.

5.7 To control noise intrusion the following acoustic measures will be necessary:

Table 5.2 Summary Noise Control Measures

Façade Group	Non-glazed elements	Glazing	Background Ventilation	Overheating Control
A	Standard construction	Upgraded glazing	Acoustic trickle vents	MVHR
B	Standard construction	Upgraded glazing	Acoustic trickle vents	Window open
C	Standard construction	Standard thermal double glazing	Non-acoustic trickle vents	Window open
D	n/a	Window may be open	Window open	Window open

5.8 The following table 5.3 sets out the acoustic performance requirement for each of the above elements.

Table 5.3 Acoustic performance of façade elements

Item	Typical Construction	Index	Octave Band Centred Frequency					
			125	250	500	1k	2k	4k
Non-glazed elements	Brick/Block wall	R'	35	40	45	50	55	55
Upgraded Glazing	10mm glass, 16mm airspace, 6mm glass	R'	25	25	31	34	34	36
Acoustic Trickle Vents	Such as 2no. Greenwood AWW39	D _{n,e}	37	36	35	36	34	34

5.9 Typical glazing configurations are quoted for guidance only and alternatives may be utilised, in any case acoustic performance of the system proposed must be demonstrated to the satisfaction of Suono. The sound reduction performance quoted above must be achieved by the glazing system taken as a whole in its installed condition. The specification therefore applies to the glazing, the frames and all seals on any openable parts of the systems and any required ventilation or

condensation control mechanisms. This list is not exhaustive: no part of the glazing system shall cause the above figures not to be achieved. The glazing supplier should be expected to prove by means of certified test results that the above sound reduction figures can be achieved by the system being proposed. The tests shall be conducted in accordance with BS EN ISO 10140-2:2021.

5.10 The above $D_{n,e}$ value specifies the acoustic reduction of a single¹ vent, based on its area, standardised to an absorption area of 10m^2 . Therefore, the figure is higher than the actual insertion loss that will be provided by the ventilator, as it is dependent on the area of the vent. The $D_{n,e}$ figure is only therefore useful in specifying the product against a given $D_{n,e}$ requirement. Suono shall need to review the selected products, based on the test data provided by the manufacturer, to make sure the required performance will be achieved. Laboratory tests to conform with BS EN ISO 10140-2:2021 "Laboratory measurement of sound insulation of building elements".

5.11 Outdoor areas behind Block A are below $55\text{ dB } L_{Aeq,16hr}$ and so meet the aspirational criteria for external amenity areas.

6.0 Conclusions

6.1 An assessment of noise intrusion has been undertaken of the proposed new development at 209-219 Henley Road, Caversham.

6.2 A noise survey has been undertaken on site to quantify day and night-time levels incident on the site.

6.3 A detailed review of national and local planning policy, and other relevant guidance, has been made, from which suitable criteria have been derived.

6.4 Calculation of noise levels at each façade of the building have been made, and a careful consideration of external noise intrusion with and without windows open has resulted in a number of acoustic recommendations, including; detailed design requirement for ventilation other than open windows on the noisiest façade, and acoustic specifications for glazing and acoustic trickle vents on various façade groups.

6.5 The assessment has demonstrated that a pragmatic approach to the detailed design of the scheme can yield acceptable internal and external noise levels.



¹ As noted in Table 5.3, the noise intrusion calculation allows for two vents, as may be necessary to achieve the background ventilation rate for larger rooms, but the $D_{n,e}$ value is to be achieved by only one vent.

Appendix A: Planning Policy

A review of Planning Policy and Assessment Guidance

National Policy

Noise Planning Policy Framework

The NPPF is the relevant document for defining the national policy toward noise sensitive development. The document was originally published in March 2021 and most recently updated in July 2021.

Paragraph 130 states that planning policies and decisions should ensure that developments:

“create places that [...] promote health and well-being, with a high standard of amenity for existing and future users...”

Further to this and on the subject of noise, paragraph 174 states that planning policies and decisions should contribute to and enhance the natural and local environment by:

“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”

Paragraph 185 of the NPPF states:

“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 impacts 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;”*

Clause “a)” in paragraph 185 makes reference the Noise Policy Statement for England which is discussed in the following section.

Noise Policy Statement for England

The NPSE (March 2010) also does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise thresholds which determine whether noise sensitive development is suitable and, if so, whether mitigation factors need to be considered.

Instead, the NPSE sets out the principle of “SOAEL, LOAEL and NOEL” which are defined as follows:

Significant Observed Adverse Effect Level (SOAEL): This is the level [of noise exposure²] above which significant adverse effects on health and quality of life occur.

Lowest Observed Adverse Effect Level (LOAEL): This is the level [of noise exposure²] above which adverse effects on health and quality of life can be detected.

No Observed Effect Level (NOEL): This is the level [of noise exposure²] below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

Given the overall thrust of the NPSE, the SOAEL is an important assessment threshold although the NPSE also comments in section 2.22 that:

“It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.”

Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted again in respect of the NPPF that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable, and it is not necessary or reasonable to seek to achieve no impact at all.

In addition to the principles set out above, the NPSE sets out three key aims:

The first aim of the Noise Policy Statement for England

“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.”

The second aim of the Noise Policy Statement for England

“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.”

The third aim of the Noise Policy Statement for England

“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.”

Paragraph 2.24 of the NPSE states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.

Each development site must be judged on its ability to deliver on each of these aims, and while rating the prevailing noise against predefined thresholds is no longer necessary, defining the prevailing noise levels is an essential first step in assessing a given site under the current regime.

² Additional text drawn from the Planning Practice Guidance Definition

Planning Practice Guidance (PPG)

In March 2014 the Department for Communities and Local Government (DCLG) launched the national Planning Practice Guidance (PPG) web-based resource. The PPG on Noise (last updated in July 2019) expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment.

Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment. The PPG includes a section on noise, paragraph 003 of the which states:

“Plan-making and decision making need to 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 standard of amenity can be achieved.”*

It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to the relevant SOAEL, LOAEL and, by inference, the NOEL. Definitions for these thresholds are provided again with the PPG, which differ very slightly in wording to the NPSE, but are taken to be identical in their meaning.

In relation to the SOAEL, LOAEL and NOEL, the PPG makes the following important statement:

“Although the word ‘level’ is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs.”

The guidance then presents a table, which is reproduced in the following table. The implication of the final line of the table is that only the 'present and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

On that basis, noise levels deemed to be below the SOAEL can be considered acceptable providing noise has been mitigated and reduced to a minimum. It is therefore necessary to seek to define appropriate noise values to adopt as SOAELs in the context of noise during periods of overheating.

Planning Practice Guidance summary of noise exposure hierarchy.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
NOEL - No Observed Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL - Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL - Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

It is noteworthy that the PPG states that:

"Noise impacts may be partially offset if residents have access to one or more of:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;

- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony).

Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;

- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or

- a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).

Local Policy

Adopted Local Plan, 2019

Policy CC8 “Safeguarding Amenity”, of the Adopted 2019 Reading Local Plan, states:

“Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

*Privacy and overlooking;
Access to sunlight and daylight;
Visual dominance and overbearing effects of a development;
Harm to outlook;
Noise and disturbance;
Artificial lighting;
Vibration;
Dust and fumes;
Smell;
Crime and safety; or
Wind, where the proposals involve new development of more than 8 storeys.*

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy....”

Furthermore, Policy EN16 “Pollution and Water Resources” states:

“...Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution...”

No further guidance or requirement is given relevant to this assessment, although footnote 60 of the Local Plan does reference the ProPG document discussed below.

Guidance Documents

The ProPG and BS 8233:2014

The Professional Practice Guidance on Planning & Noise – New Residential Development, 2017 (ProPG) was prepared by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants.

In relation to residential development, the ProPG builds on the principles and criteria set out BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings (BS 8233).

While the ProPG it is helpful in many ways, it must be noted that the guidance and supplementary documents “does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate.”

Section 2.27 of the ProPG states:

“It is considered that suitable guidance on internal noise levels can be found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests indoor ambient noise levels for dwellings (when unoccupied) and states that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.”

Indeed, ProPG expands on the advice and notes of BS 8233 Table 4, with relevant sections presented below.

Activity	Location	Internal Ambient Noise Level	
		0700-2300 hrs	2300-0700 hrs
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 $L_{Aeq,8hr}$ 45 dB $L_{Amax,f}$ (Note 4)

Note 4

“... 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”

Note 5

“... 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 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.”

With respect to external amenity spaces, ProPG again points to BS 8233 that states:

“the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$...”

“...These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.”

The ProPG sets out the principle of the “Acoustic Design Statement” (ADS) in which noise is quantified and assessed, and mitigation measures determined in line with the methodology set out therein. The preparation of an ADS is not relevant or appropriate for all sites, however many of the principles are those which would typically be adopted when preparing noise assessment for planning submissions etc.

Features which may be included within an ADS comprise:

- An initial site noise risk assessment;
- A description of external site noise levels before and after mitigation measures;
- Demonstrations of good acoustic design principles;
- Details of how internal noise guidelines will be achieved;
- Assessment of the impact of $L_{Amax,F}$ noise levels where guidelines values are exceeded;
- An aim to achieve internal noise guidelines with windows open where practical, noting this approach will not necessarily be possible. Due consideration should be given to ventilation and thermal comfort with windows closed;
- Acoustic design to achieve good living conditions where internal noise guidelines can only be achieved with windows closed (noting the guidelines are not applicable when windows are open to provide purge ventilation);
- Information regarding the steps taken to minimise overheating where this is relevant to noise;
- A consideration of noise to external amenity areas;
- A presentation of the findings of the assessment, resulting noise impacts and any mitigation measures that may be required.

Neither the ProPG of BS 8233 form statutory guidance or regulations and it therefore falls to the acoustics practitioner (or other similar party) to determine how the documents should be interpreted and their contents applied to any given scheme.

AVO Residential Design Guide, 2020

As previously discussed, the ProPG highlights the need to consider overheating in the context of noise. The Acoustics, Ventilation and Overheating Residential Design (AVO) Guide, prepared by the Association of Noise Consultants, provides further guidance with respect to this.

A key principle of the AVO is that internal noise in excess of the normal criteria set out within the ProPG and BS 8233:2014 are acceptable during the overheating condition, when open windows are used to provide a cooling effect. The amount by which internal noise conditions may be elevated is related to the duration over which overheating occurs and the guidance regencies the numerous methods to control overheating (beyond simple open windows).

Where external noise levels are equal to or below fall below circa 53 dB $L_{Aeq,16hr}$ or 48 dB $L_{Aeq,8hr}$ the use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect. Above these thresholds, it is for the acoustics practitioner to determine the potential for adverse effect.

Where external noise levels are high (above approximately 65 dB $L_{Aeq,16hr}$ or 55 dB $L_{Aeq,8hr}$) a “Level 2 assessment” is recommended, where the internal noise levels in the above BS 8223 table are effectively taken as the LOAEL.

Interpreted values of the AVO guide Table 3-3 (for Level 2 assessment) are repeated below with reference to the PPG thresholds for clarity.

Bedroom Internal Ambient Noise Level (with windows open)			Action
Daytime $L_{Aeq,16hr}$	Night $L_{Aeq,8hr}$	Night $L_{Amax,F}$	
NOAEL – No Observed Adverse Effect Level			
≤ 35 dB	≤ 30 dB	Not normally exceeding 45 dB more than 10 times per night	No specific measures required
LOAEL - Lowest Observed Adverse Effect Level			
35 dB	30 dB	Exceeding 45 dB more than 10 times per night but not exceeding 65 dB	Mitigate and reduce to a minimum
SOAEL - Significant Observed Adverse Effect Level			
50 dB	42 dB	Normally exceeds 65 dB	Avoid / Prevent

The implication is that for circumstances where additional ventilation is necessary for cooling, but internal noise levels with windows open are between the LOAEL and a SOAEL, means to reduce noise should be introduced where possible but it is not necessary to achieve the BS 8233 levels.

