



**58 Kings Road
Reading**

Acoustic Report

17 December 2021

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SUMMARY

A new residential development is proposed to the rear of 58 Kings Road in Reading. An assessment of external noise levels has been undertaken in relation to Reading Borough Council's standard requirements.

A noise survey has been undertaken to determine environmental noise levels affecting the proposed development site.

The noise survey results have been assessed in relation to Reading Borough Council's standard requirements and the proposed scheme of sound insulation has been proposed to achieve suitable internal noise levels within the proposed dwellings.

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1.0 Introduction

A new residential development is proposed to the rear of 58 Kings Road in Reading. An assessment of external noise levels has been undertaken in relation to Reading Borough Council's standard requirements.

The following report presents the methodology and results of an environmental noise survey carried out at the site and an assessment of the potential impact of external noise on the proposed development.

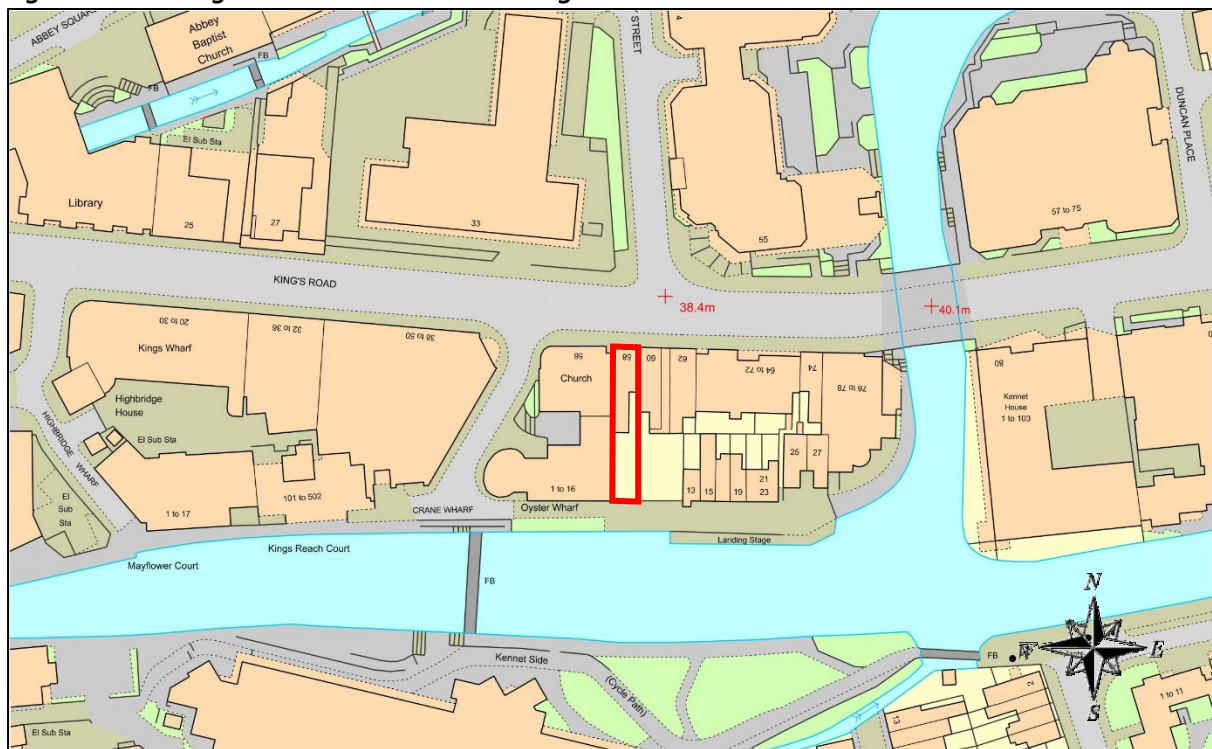
2.0 Description of Site and Proposals

The site is located on the southern side of Kings Road in central Reading and is currently occupied by a commercial building and open air car park.

A development of residential apartments is located immediately adjacent to the west of the site, with houses located to the east. The river is located to the south of the site.

Figure 2.1 shows the approximate existing site extent in **red** in relation to the surrounding area.

Figure 2.1 Existing Site Extent and Surroundings



A development of residential apartments is proposed on southern portion of the site.

3.0 Reading Borough Council Standard Requirements

Reading Borough Council's typical requirements regarding external noise affecting new residential developments are as follows:

"No development shall take place until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be

designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233: 2014. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233: 2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS 8233 internal levels being exceeded."

British Standard (BS) 8233: 2014 "Guidance on sound insulation and noise reduction for buildings" is the industry standard for 'desirable' internal noise level standards for dwellings, Table 4 of which is recreated in Table 3.1.

Table 3.1 BS 8233 Desirable Internal Noise Levels

Activity	Location	07:00 to 23:00 (hours)	23:00 to 07:00 (hours)
Resting	Living room	35 dB L _{Aeq,16hour}	-
Dining	Dining room/area	40 dB L _{Aeq,16hour}	-
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}

The standard advises that the limits shown in Table 3.1 could be increased by 5 dB whilst still achieving 'reasonable' conditions.

We have therefore considered the above in our noise survey methodology and external noise intrusion assessment.

4.0 Noise Survey

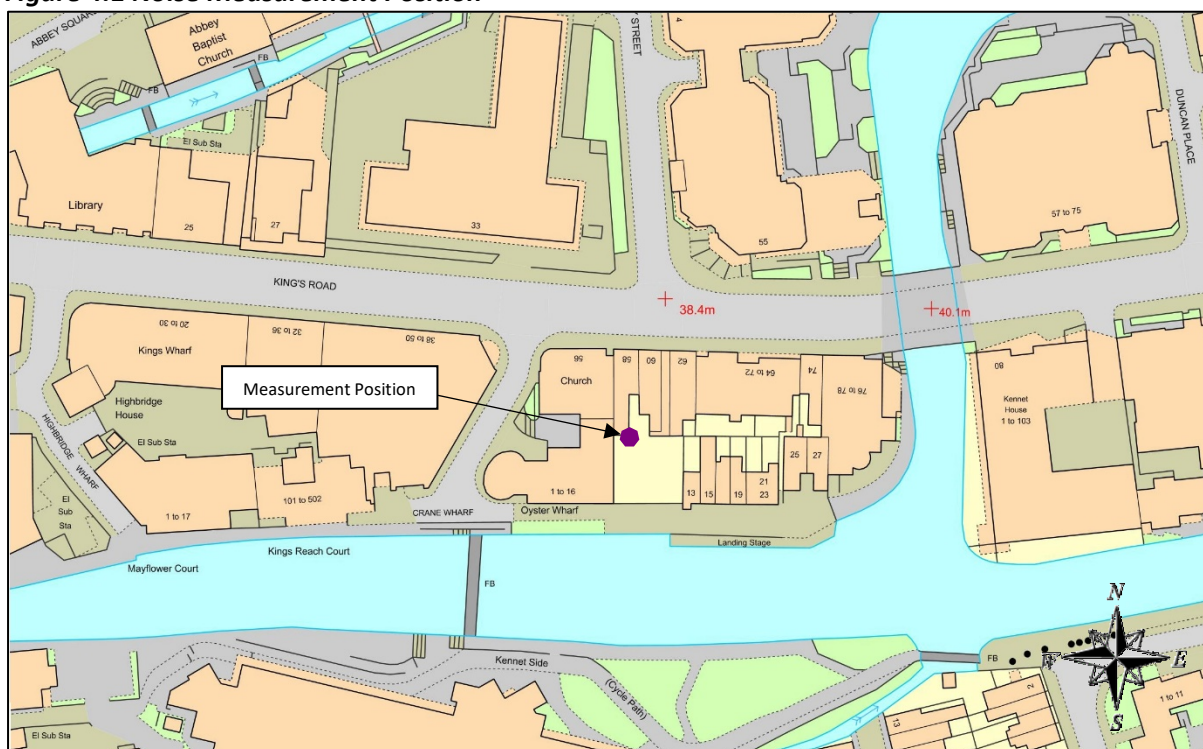
4.1 Noise Survey Methodology

An unmanned environmental noise survey was undertaken over a 4-day period between Friday 10 December 2021 and Tuesday 14 December 2021.

The noise survey period was selected to determine typical noise levels affecting the proposed development site during the daytime and night-time, over weekday and weekend periods, when the apartments will be occupied.

The noise survey was undertaken with the measurement microphone protruding from a ground floor level window in the southern façade of the existing building. Figure 4.1 indicates the approximate measurement location in **purple**.

Figure 4.1 Noise Measurement Position



The measurement position was selected as being the most secure, accessible location that is representative of noise levels affecting the proposed residential apartments.

The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	01dB FUSION	12032
Type 1 ½" microphone	GRAS 40CE	330829
Calibrator	01dB CAL31	87267

L_{Aeq} sound pressure levels were measured over contiguous 125-millisecond intervals throughout the noise survey period.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period. However, at the beginning of the survey period, conditions were dry with a clear sky and light wind. We understand these conditions were representative of the remainder of the survey period and are considered appropriate for undertaking environmental noise measurements.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

4.2 Noise Survey Results

Appendix B presents a time history graph showing the L_{Aeq} sound pressure levels measured throughout the noise survey.

As the measurement microphone was located approximately 1m from an existing façade, a correction of -2 dB has been applied to the measurement results so as to replicate free-field conditions, in accordance with BS 8233: 2014.

We would consider the measured levels to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

4.3 Observations

At the beginning and end of the survey period the daytime noise climate at the measurement position was noted to be dominated by road traffic using Kings Road to the north of the site and more distantly Queen's Road more to the south of the river.

4.4 Correction to Typical Conditions

As a result of the Covid-19 pandemic during 2020 and subsequent government restrictions, motor vehicle use across the UK (and hence road traffic noise) has been affected.

To assess the potential effect of this, the Department for Transport (DfT) are currently publishing daily transport use data, relative to more typical conditions in early 2020.

The DfT data for all motor vehicle use during the noise survey period (Friday 10 December 2021 – Tuesday 14 December 2021) indicates that usage was on average at approximately 99% of typical conditions, resulting in current road traffic noise levels being **0.04 dB** less than typical. Whilst this is a negligible difference, the correction has been applied to the noise data.

5.0 External Noise Intrusion

This section presents our assessment of the measured external noise levels in relation to the Reading Borough Council standard requirements.

5.1 External Noise Levels

Based on the noise survey results, the worst-case external noise levels affecting the proposed residential facades are presented in Table 5.1.

Table 5.1 Noise Levels affecting Worst-Case Façades

Daytime L_{Aeq} (16 hour) (dB)	Night-time L_{Aeq} (8 hour) (dB)
51	47

5.2 Internal Noise Level Predictions

Based on the measured external noise levels, we have undertaken calculations to predict the internal noise levels in the proposed dwellings.

Calculations are based on room and window dimensions as indicated on the latest drawings for the development.

The non-glazed areas of façades are assumed to achieve a sound reduction performance significantly greater than the glazing/ventilators, such that the glazing and ventilators are the dominant path of sound transmission from outside to inside. Our calculations have assumed a sound reduction performance of at least R_w 52 dB for the non-glazed façade areas (e.g. cavity masonry wall or suitable lightweight façade).

5.3 Proposed Constructions

Results of the calculations show that the standards described in Section 3.0 could be achieved by using suitable external façade constructions.

Table 5.2 presents the recommended minimum specifications for the glazing and trickle ventilators for habitable rooms to achieve the internal noise standards.

Table 5.2 Recommended Glazing and Ventilator Specifications

Location	Room	Glazing	Ventilation
All dwellings	Living Rooms	R_w 31 dB (min)	$D_{ne,w}$ 37 dB (min)
	Bedrooms	R_w 31 dB (min)	$D_{ne,w}$ 37 dB (min)

Appendix C presents datasheets for the proposed glazing and trickle ventilators (Simon Acoustic EHAS), which demonstrate that the required sound insulation performance should be achieved.

The above assumes windows are closed and ventilators are open.

5.4 Ventilation

Table 5.3 presents the predicted internal noise levels assuming a standard 13 dB reduction via an open window, in comparison with the Reading Borough Council standard requirements.

Table 5.3 Predicted Internal Noise Levels with Open Windows

Scenario	Daytime L_{Aeq} (16 hour) (dB)	Night-time L_{Aeq} (8 hour) (dB)
Predicted Internal Noise Level	38	34
BS 8233: 2014 Limit + 5 dB	40	35

It can therefore be seen that the limits are predicted to be exceeded, therefore in accordance with the typical Reading Borough Council requirements, mechanical ventilation will be not required.

We have also considered the guidance present in the “Acoustics, Ventilation and Overheating Residential Design Guide”, published in January 2020, which states that “it is considered reasonable to

A two-stage noise risk assessment is then proposed, based upon the levels of external noise affecting the site as shown in Figure 5.1 and the subsequent internal noise levels shown Figure 5.2.

Figure 5.1 Level 1 Noise Risk Assessment – External Noise Levels

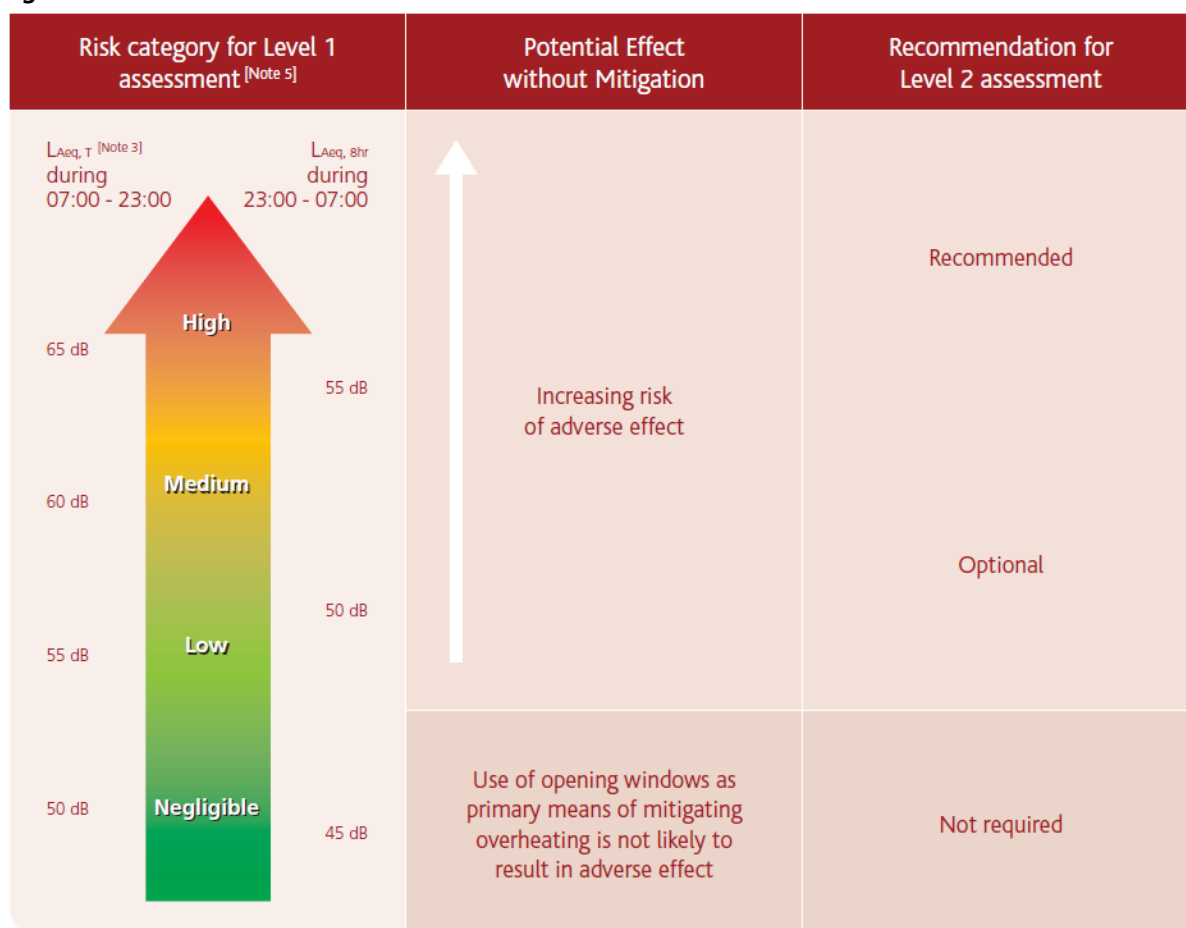
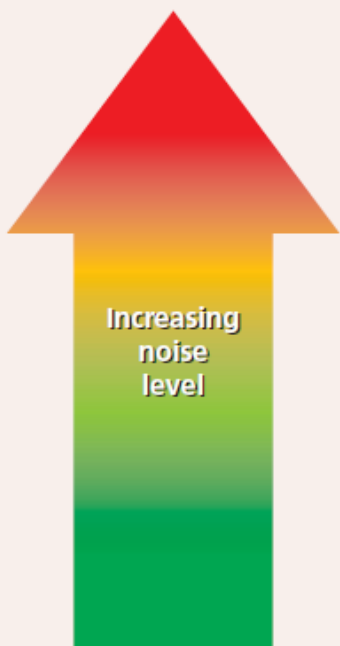


Figure 5.2 Level 2 Noise Risk Assessment – Internal Noise Levels

Internal ambient noise level [Note 2]			Examples of Outcomes [Note 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{AF,max}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. 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.
			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life.
			Noise can be heard, but does not cause any change in behaviour	At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. [Note 8]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{AF,max}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response [Note 9]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

Figures 5.1 and 5.2 are related by the 13 dB attenuation typically provided by an open window.

For noisier sites, the risk of an adverse effect increases with increasing noise level and further consideration may be required.

Comparing the measured external noise levels with the AVO Guide criteria above gives the daytime and night-time noise risk categories, and predicted internal noise levels, shown in Table 5.4.

Table 5.4 Noise Risk Categories

Period	Predicted External Noise Level at Façade	Noise Risk Category	Internal Noise Level with Windows Open
Daytime (07:00 – 23:00 hours)	51 dB L _{Aeq} (16 hour)	Negligible	39 dB L _{Aeq} (16 hour)
Night-time (23:00 – 07:00 hours)	47 dB L _{Aeq} (8 hour)	Negligible	31 dB L _{Aeq} (8 hour)

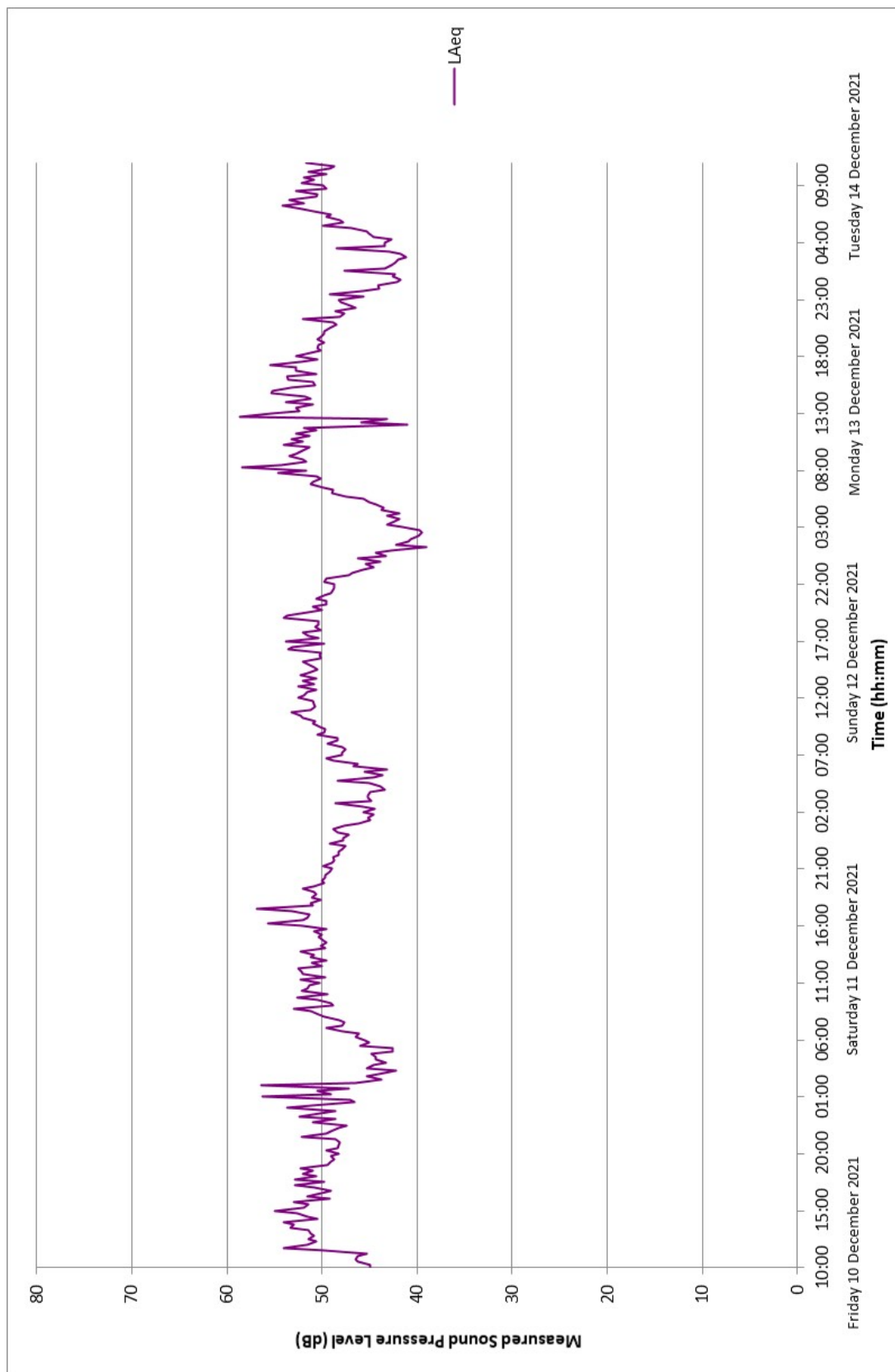
In relation to the AVO Guidance, it can be seen that no more than a negligible noise risk category is predicted during any period at the development when windows are open.

Therefore, according to the guidance for these façades, *“use of opening windows as a primary means of mitigating overheating is not likely to result in adverse effect”*.

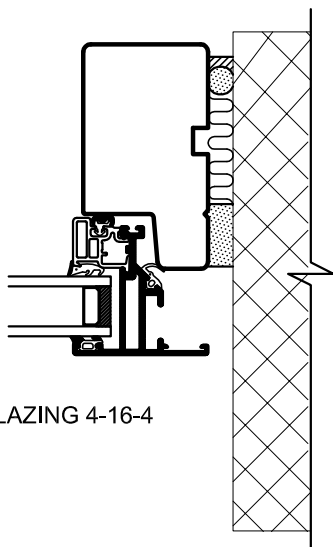
Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-6} Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L_{Amax}	The A-weighted maximum noise level measured during the measurement period.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T = 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
L_{A90} (15 min)	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15-minute period
R_w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz. The higher the value, the greater the sound insulation, and the more onerous the requirement.
$D_{n,e,w}$	The weighted (w) element (e) normalised (n) level difference (D), a single figure indicator of the ability of a small building element (such as a trickle ventilator) to reduce sound. The higher the value, the greater the sound reduction, and vice versa.

Appendix B – Time History Graph



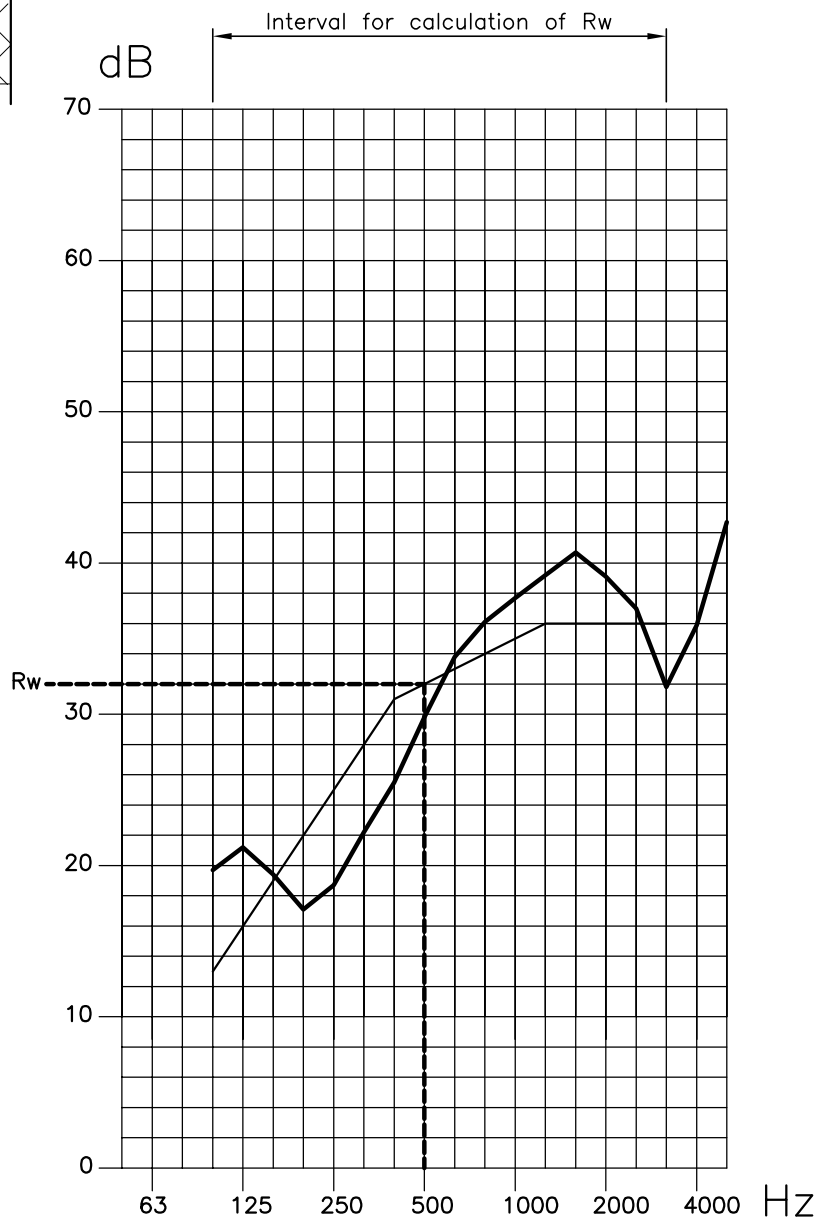
Appendix C – Glazing Datasheet



DOUBLE GLAZING 4-16-4

OFFICIAL REPORT
AVAILABLE
DANAK 2470

Frequency Hz	R dB	R dB
50	(24.9)	(21.5)
63	(19.2)	
80	(22.2)	
100	19.7	20.0
125	21.2	
160	19.4	
200	17.1	18.9
250	18.7	
315	22.2	
400	25.5	28.5
500	29.8	
630	33.8	
800	36.1	37.5
1000	37.7	
1250	39.2	
1600	40.7	38.7
2000	39.1	
2500	37.0	
3150	31.8	34.9
4000	35.9	
5000	42.7	
Rw	32	
Rw+C	31	
Rw+Ctr	27	



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SOUND REDUCING WINDOW

Kravspec. nr.

Matr.

4

3

2

Udg Uge/år Sign. Rettelse

Mål 1:3

Dato 28.11.2006

Sign. BTH

Kontr.

Sag nr. T06037

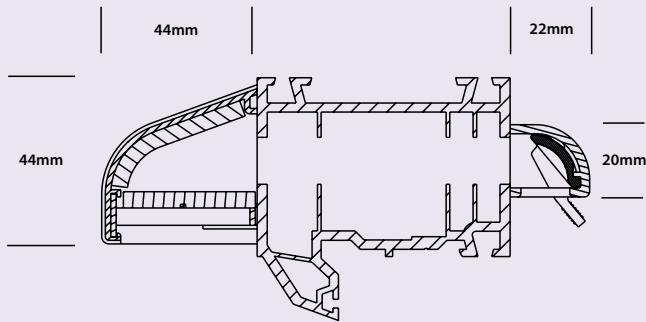
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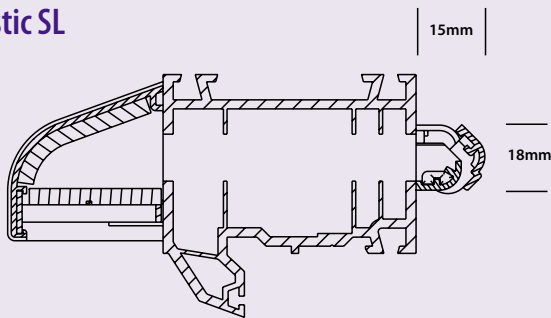
Udgave nr. 01

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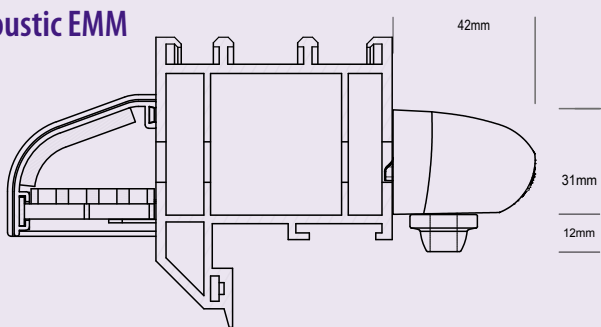
Simon Acoustic FV



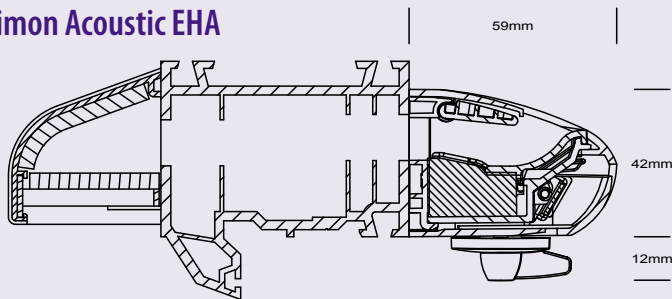
Simon Acoustic SL



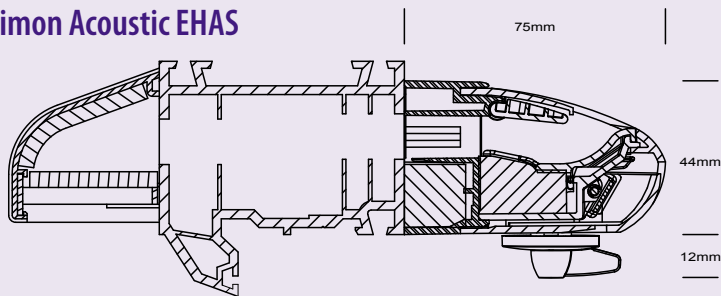
Simon Acoustic EMM



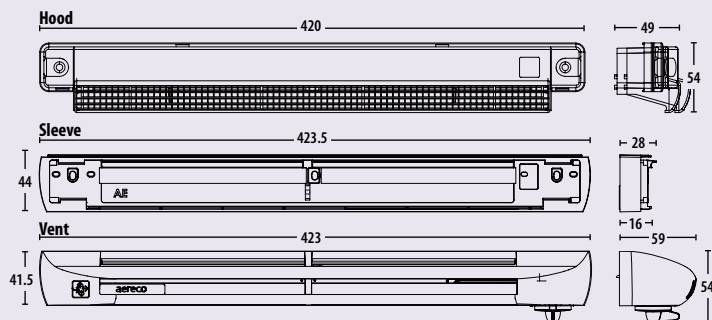
Simon Acoustic EHA



Simon Acoustic EHAS



Simon EHA/EHAS and AEA851



Simon Acoustic FV

- ◆ Supplied with a PVCu internal flap unit and aluminium external canopy
- ◆ Rod control option available

Simon Acoustic SL

- ◆ Manufactured fully from aluminium
- ◆ Rod control option available

Simon Acoustic EMM

- ◆ Supplied with a PVCu internal unit and aluminium external canopy
- ◆ Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room

Simon Acoustic EHA

- ◆ Supplied with a PVCu internal unit and aluminium external canopy
- ◆ Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room

Simon Acoustic EHAS

- ◆ Supplied with a PVCu internal unit and aluminium external canopy
- ◆ Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room
- ◆ Includes additional acoustic sleeve to increase the acoustic properties

Simon EHA and AEA851

- ◆ Supplied with a PVCu internal and external canopy
- ◆ Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room

Simon EHAS and AEA851

- ◆ Supplied with a PVCu internal and external canopy
- ◆ Uses a hygromatic sensor which opens and closes the flap dependent on the amount of moisture in the room
- ◆ Includes additional acoustic sleeve to increase the acoustic properties

Specifications

	dB Closed	dB Open	EA to BS 13141-1	Measured Area	Internal Dimension	External Dimension	Slot Size
Simon Acoustic FV	40	32	2830	4080	400 x 20	431 x 45	340 x 12
Simon Acoustic SL	39	33	2967	4080	375 x 18	431 x 45	340 x 12
Simon Acoustic EMM	39	33	3199	4080	404 x 31	431 x 45	340 x 12
Simon Acoustic EHA	38	36	2799	4080	423 x 54	431 x 45	340 x 12
Simon Acoustic EHAS	41	38	2799	4080	423 x 54	431 x 45	340 x 12
Acoustic EHA with AEA851	-	41	3912	3925	423 x 54	420 x 54	2 x (172x12)-(10mm land)
Acoustic EHAS with AEA851	-	42	3912	3925	423 x 54	420 x 54	2 x (172x12)-(10mm land)

Internal Colour Options

External Colour Options

Simon Acoustic FV	Standard white, bright white, black, tan, brown, cream & grey.	any standard RAL or silver anodised
Simon Acoustic SL	any standard RAL or silver anodised	any standard RAL or silver anodised
Simon Acoustic EMM	any standard RAL	any standard RAL or silver anodised
Simon Acoustic EHA	any standard RAL	any standard RAL or silver anodised
Simon Acoustic EHAS	any standard RAL	any standard RAL or silver anodised
Acoustic EHA with AEA851	any standard RAL	any standard RAL
Acoustic EHAS with AEA851	any standard RAL	any standard RAL

By adding additional units the acoustic performance may be reduced

