



79-80 HIGH STREET GRAVESEND DA11 0BH

BS8233 NOISE ASSESSMENT REPORT

21 May 2024

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1.0 INTRODUCTION

Aran Acoustics in collaboration with Airtight Building Solution Ltd have been appointed to carry out a noise assessment for the proposed residential development at 79-80 High Street, Gravesend.

The purpose of this assessment is to determine any appropriate noise control measures to protect the future occupants against noise ingress from the local environment and meet Planning Conditions relating to noise. Such to undertake this assessment an environmental noise survey was carried out at the site on 25 April 2024.

A review of the requirements of the building façade has then been provided, such to enable compliance with guidance given within BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'.

This report therefore describes the noise survey and its results. Section 4.0 provides the results of the noise survey. Section 5.0 provides a review of current legislation applicable to this type of development. Section 6.0 provides an assessment of internal noise levels in accordance with guidelines set out in BS8233.

2.0 SITE DESCRIPTION

The proposed site for development is located at 79-80 High Street in Gravesend. The scheme includes the retention of the ground floor commercial unit and conversion of the upper floors to residential accommodation.

The site is located in a built-up area of mixed use. High Street contains a mixture of mainly commercial units at ground floor level and commercial offices or residential accommodation on the upper floors of buildings in the immediate area. High Street is pedestrianised with no road traffic. To the rear of site is a car parking area accessed from West Street to the north of site.

A subjective assessment on site determined that the predominant noise sources to impact the proposed development is road traffic on surrounding roads.

Figure 3.1 below shows a location map and aerial photo of the site and surrounding area.

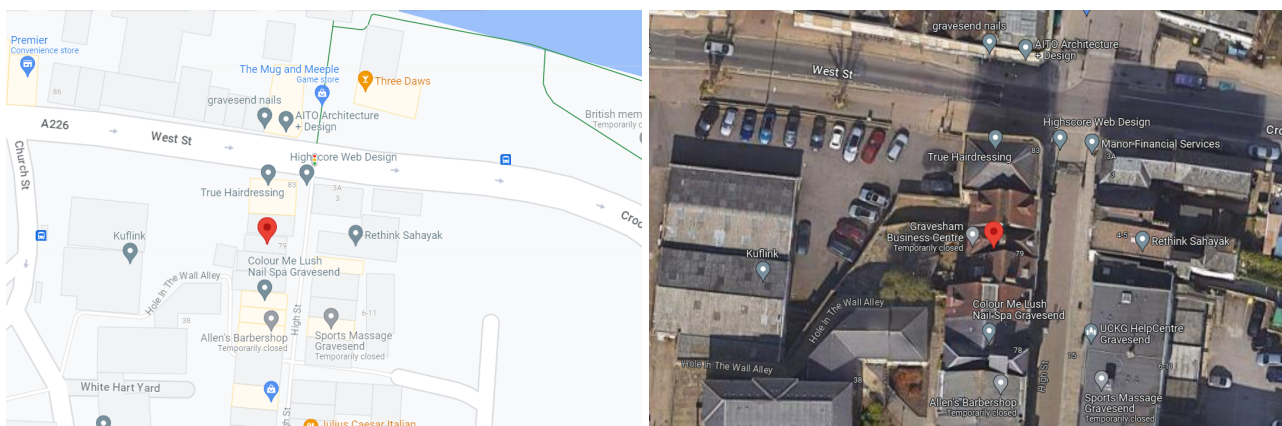


Figure 2.1 - Location map and aerial photo of proposed site*

**Imagery courtesy of Google Maps*

3.0 NOISE SURVEY

An environmental noise survey was carried out between Thursday 25 April and Monday 29 April 2024. The survey was carried over a weekend period and incorporated both day and night time measurements.

3.1 Measurement Position 1

A fixed noise monitor was placed at first floor level at the front elevation of the building overlooking High Street. The microphone extended approximately 1.5m from the façade with a direct line of sight to passing road traffic on West Street. Noise levels measured at this location are considered worst case to impact the front elevation of the proposed development.

3.2 Measurement Position 2

A fixed noise monitor was placed at first floor level at the rear elevation of the building overlooking High Street. The microphone extended approximately 1.5m from the façade with a direct line of sight to car park associated with the commercial unit opposite along with passing road traffic on West Street. Noise levels measured at this location are considered worst case to impact the rear elevation of the proposed development.

A site plan showing the microphone locations is provided in Appendix A. Site photos of the measurement positions are provided in Appendix B.

3.3 Measurement Equipment

The following measurement equipment was used, which complies with the performance specifications for Class 1 devices in accordance with BS EN 61672-1:2003.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 140	1404768	Nov 2022	Nov 2024
Norsonic Type 1209 Pre-amplifier	31313	Nov 2022	Nov 2024
Norsonic Type 1225 Microphone	157320	Nov 2022	Nov 2024
Norsonic Precision Sound Analyser Type 140	1403967	Feb 2024	Feb 2026
Norsonic Type 1209 Pre-amplifier	30873	Feb 2024	Feb 2026
Norsonic Type 1225 Microphone	112875	Feb 2024	Feb 2026
Rion Type NC-74 Acoustic Calibrator	35046846	Feb 2024	Feb 2025

Table 3.1 - Measurement equipment used on site

The meters were calibrated before and after the noise survey where no significant deviations were found. The meters were set to measure consecutive 'A' weighted 10-minute time samples.

3.4 Weather Conditions

The weather was partly overcast and dry for the duration of the survey. Wind speed remained below 5 m/s. The temperature range was approximately 06 - 17 °C.

The weather conditions were considered suitable for environmental noise surveying in accordance with BS 7445-1:2003 '*Description and measurement of environmental noise*'.

4.0 SURVEY RESULTS

The noise levels measured at the fixed measurement position are shown in Figure 4.1 below. The full set of acoustic data measured on site is available upon request.

4.1 Measured Noise Levels – Position 1

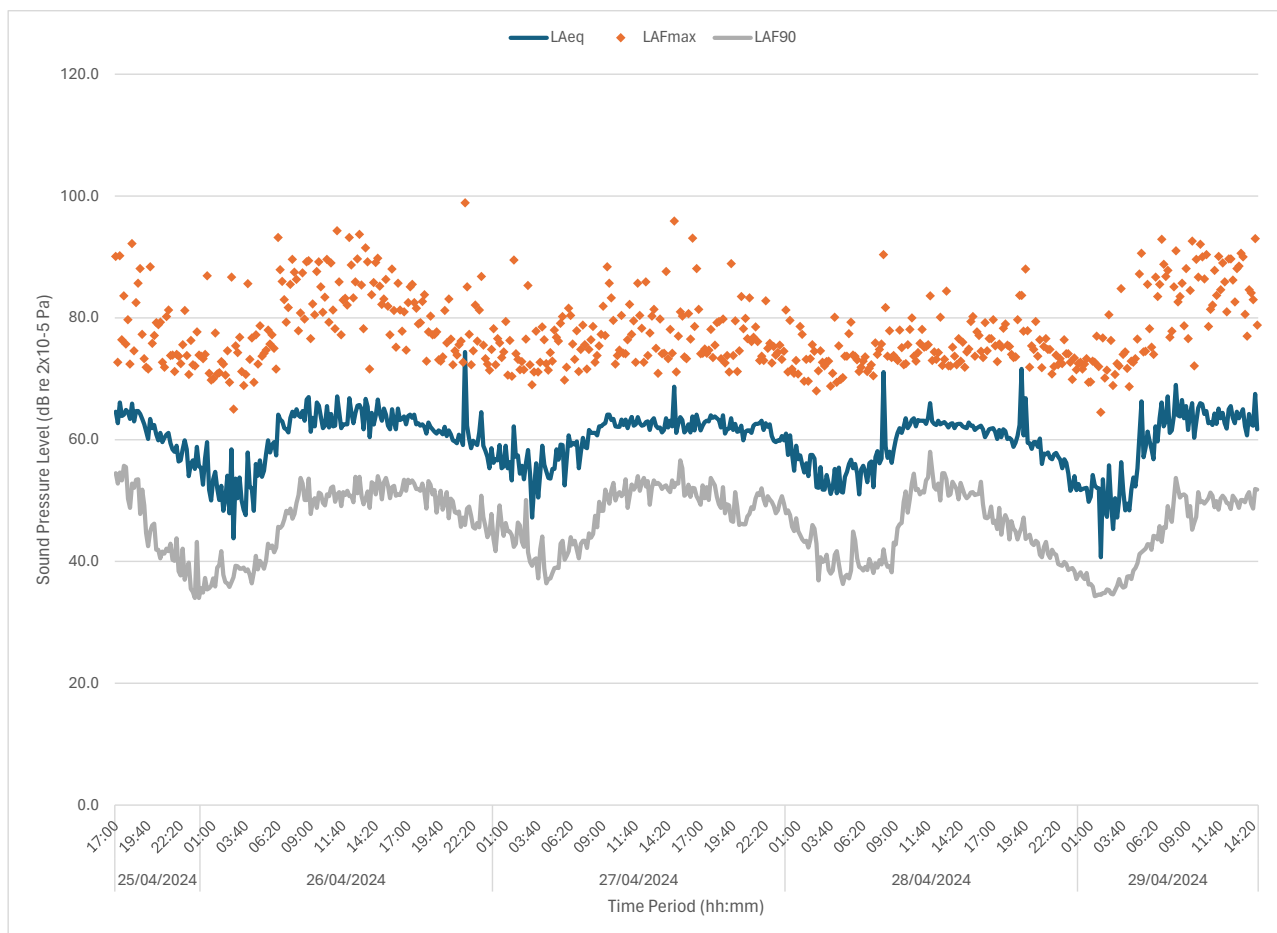


Figure 4.1 – Measured Noise Levels – P1

Results show that noise levels remained relatively consistent throughout the day time periods with a drop off in the late evening and night time periods.

The following table provides a summary of the measured noise levels including the logarithmically averaged equivalent noise level L_{Aeq} ; and maximum noise level, L_{Amax} .

Start Date	Time Period	Average Noise Levels L_{Aeq}	Maximum Noise Level L_{Aeq} , dB
25/04/2024	Daytime $L_{Aeq,16\text{ Hour}}$ (07:00 – 23:00 hours)	62.4	-
	Night time $L_{Aeq,8\text{ Hour}}$ (23:00 – 07:00 hours)	56.8	93.2
26/04/2024	Daytime $L_{Aeq,16\text{ Hour}}$ (07:00 – 23:00 hours)	63.8	-
	Night time $L_{Aeq,8\text{ Hour}}$ (23:00 – 07:00 hours)	57.5	89.5
27/04/2024	Daytime $L_{Aeq,16\text{ Hour}}$ (07:00 – 23:00 hours)	62.5	-

	Night time $L_{Aeq,8 \text{ Hour}}$ (23:00 – 07:00 hours)	56.5	81.3
28/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	62.0	-
	Night time $L_{Aeq,8 \text{ Hour}}$ (23:00 – 07:00 hours)	57.2	92.9
29/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	64.2	-

Table 4.1 – Summary of Measured Noise Levels – P1

4.2 Measured Noise Levels – Position 2

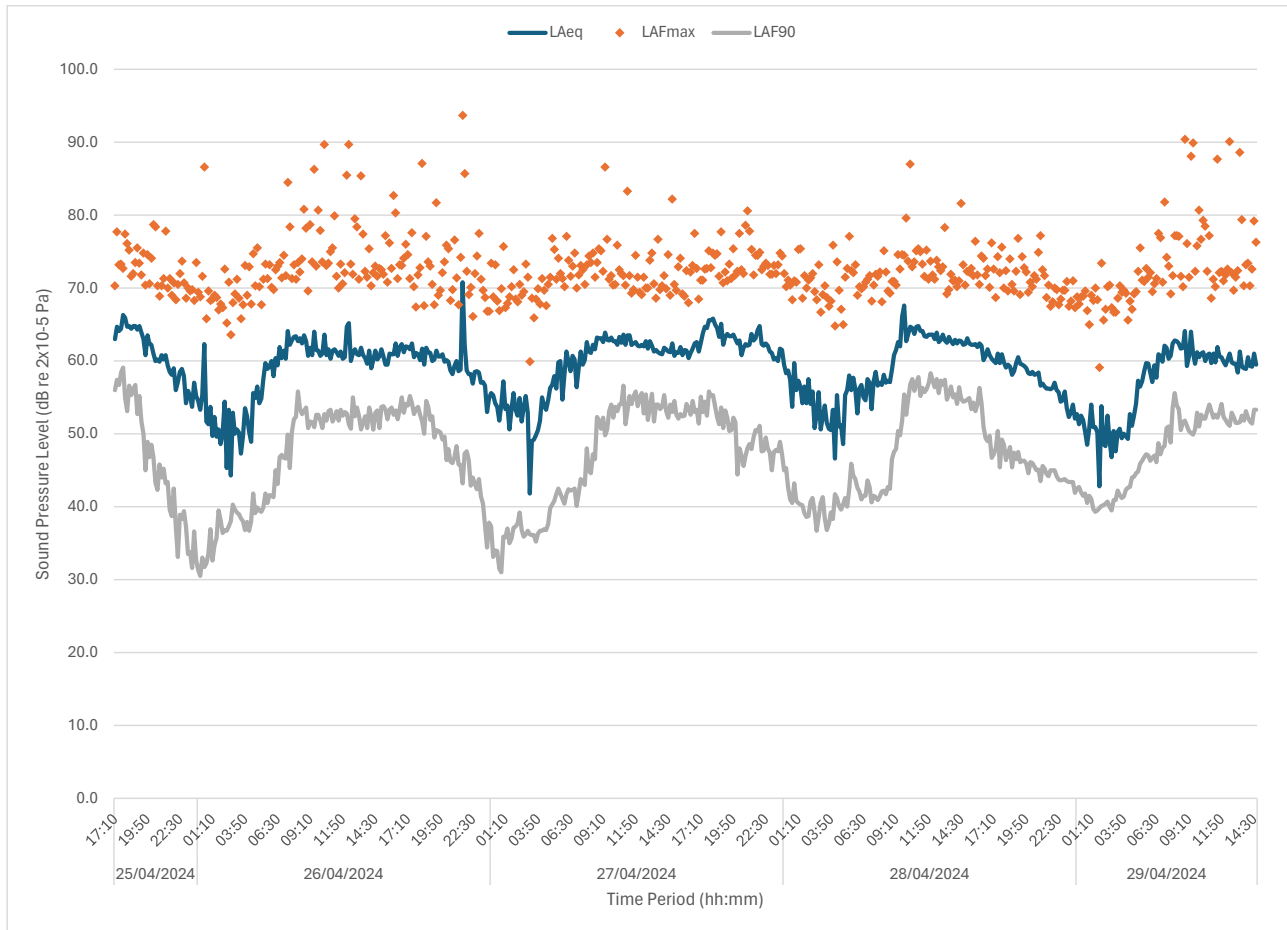


Figure 4.2 – Measured Noise Levels – P2

Results show that noise levels remained relatively consistent throughout the day time periods with a drop off in the late evening and night time periods.

The following table provides a summary of the measured noise levels including the logarithmically averaged equivalent noise level L_{Aeq} ; and maximum noise level, L_{Amax} .

Start Date	Time Period	Average Noise Levels L_{Aeq}	Maximum Noise Level L_{Aeq} , dB
25/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	62.6	-
	Night time $L_{Aeq,8 \text{ Hour}}$ (23:00 – 07:00 hours)	55.9	86.6
26/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	61.6	-

	Night time $L_{Aeq,8 \text{ Hour}}$ (23:00 – 07:00 hours)	56.0	77.5
27/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	62.6	-
	Night time $L_{Aeq,8 \text{ Hour}}$ (23:00 – 07:00 hours)	56.7	77.1
28/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	61.4	-
	Night time $L_{Aeq,8 \text{ Hour}}$ (23:00 – 07:00 hours)	54.7	77.5
29/04/2024	Daytime $L_{Aeq,16 \text{ Hour}}$ (07:00 – 23:00 hours)	60.9	-

Table 4.2 – Summary of Measured Noise Levels – P2

Results show that noise levels are a similar magnitude to the rear of the development.

Based on the measured noise levels presented in the sub-sections above, further calculations have been carried out to determine internal noise levels within the proposed residential dwellings. Details of noise break in calculations are provided within Section 6.0 of this report.

Note that we have used the highest measured 16-hour day and 8-hour night time noise levels for each elevation of the building within our calculations which would be seen as a worst case scenario.

5.0 GUIDANCE DOCUMENTATION – NOISE CONTROL

The section above provides a summary of the noise levels on site. The purpose of this section is to provide a summary of guidance documentation relating to this development.

5.1 National Planning Policy Framework

The Government published the National Planning Policy Framework (NPPF) which sets out the Government's planning policies for England and how these are expected to be applied.

The Framework replaced many of the Planning Policy documents including Planning Policy Guidance 24: Planning and Noise that provided guidance on the control of noise to sensitive developments which may be affected by noise and vice versa. The NPPF provides a framework within which local people and their council can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

With regards to noise, the Framework states that 'Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts²⁷ on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts²⁷ on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;²⁸ and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

²⁷ See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).

²⁸ Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.

With regards to 'adverse impacts' and 'significant adverse impacts' the NPPF does make reference to The Noise Policy Statement for England, published by Defra in March 2010.

5.2 Noise Policy Statement for England

The aim of the Noise Policy Statement for England (NPSE) is to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion. The NPSE applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

Noise Policy Vision: Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

Noise Policy 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; and
- where possible, contribute to the improvement of health and quality of life

The NPSE explanatory note provides further guidance on ‘adverse’ and ‘significant adverse’ impacts as follows:

- NOEL - No Observed Effect Level: the level below which no effect can be detected. Below this level there is no detectable effect on health and quality of life due to noise;
- LOAEL - Lowest Observable Adverse Effect Level: the level above which adverse effects on health and quality of life can be detected;
- SOAEL - Significant Observed Adverse Effect Level: the level above which significant adverse effects on health and quality of life occur.

The NPSE states 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.*

It can be concluded that the NPPF and NPSE define the concepts for the various levels of effect from noise however do not provide specific values. It is seen that it is up to the discretion of the Local Planning Authority to decide on what is deemed acceptable taking into account the specific circumstances for the proposed development.

5.3 World Health Organisation Guidelines

The World Health Organisation (WHO) document ‘Guidelines for Community Noise’ 1999 provides guidance to local authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments. Section 4 of the document provides guideline values with regards to specific environments and effects. The WHO document states the following:

In dwellings, the critical effects of noise are on sleep, annoyance and speech interference. To avoid sleep disturbance, indoor guideline values for bedrooms are 30 dB LAeq for continuous noise and 45 dB LMax for single sound events. Lower levels may be annoying, depending on the nature of the noise source.

WHO guidelines are typically adopted and applied to various noise sources with the criteria that indoor ambient noise levels in bedrooms at night does not exceed 30 dB LAeq and individual noise events should not normally exceed 45 dB LA_{Fmax}. For indoor areas during the daytime, noise levels should not generally exceed 35 dB LAeq.

5.4 British Standard 8233:2014

BS8233:2014 'Guidance for sound insulation and noise reduction for buildings' provides information on the design of buildings that have internal acoustic environments appropriate to their functions. It provides guidance on the control of noise from outside the building, noise from plant and services within it, and room acoustics for non-critical situations.

BS8233 provides a range of internal noise levels within unoccupied spaces depending on the buildings use. BS8233 states that for bedrooms at night, it is desirable that the indoor ambient noise level does not exceed 30 dB L_{Aeq} . For living rooms during the daytime, indoor ambient noise levels should not generally exceed 35 dB L_{Aeq} .

BS8233:2014 advises that: *Regular individual noise events can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.*

5.5 Summary of Guidance Documentation and Conclusion

The Noise Policy Statement for England does not provide any specific guidance on noise levels for residential developments however there are a number of documents that provide guideline values.

It is proposed that the noise level criteria within the WHO Guidelines 1999 and BS8233:2014 are adopted. These noise level targets have been imposed upon similar developments and are seen as suitable design targets where disturbance to future habitants are unlikely. These target noise level values are tabulated within the table below.

Habitable Space	Time Period	Noise Level Target
Sleeping (night)	23:00 – 07:00 hours	30 dB $L_{Aeq\ 8hr}$ / 45 dB L_{AFmax}
Resting / Sleeping (day)	07:00 – 23:00 hours	35 dB $L_{Aeq\ 16hr}$

Table 5.1 - Proposed noise level targets

6.0 BS8233 FAÇADE ASSESSMENT

To determine internal noise levels, an indicative façade noise break-in assessment has been undertaken in accordance with the method given within BS8233:2014 for both day and nighttime noise levels. We have used approximate window sizes based on current planning drawings. It is seen as the responsibility of the Client or their designer to ensure all dimensions are correct.

Sample calculations are shown in Appendix C and use the worst-case noise levels for both the day and nighttime period given within Table 4.1 along with measured spectral data.

6.1 External Envelope Construction

It is understood the solid element of the façade is formed from a 300mm masonry wall construction with internal plasterboard lining.

Calculations show that to achieve a reasonable internal acoustic environment in habitable rooms as specified within BS 8233, the building envelope constructions should be selected to meet the sound reduction values R_w , presented in Table 6.1. INSUL data sheets are provided in Appendix D.

Building Element	Sound Insulation R_w	Example Construction
Masonry Wall	60 dB	300mm Brick / 12.5mm plasterboard lining

Table 6.1 - Building envelope sound insulation performance requirements

6.2 Glazing Specifications

It is understood existing windows are to be retained and a secondary glazed system installed. Based on measured noise levels, calculations show that glazing to habitable rooms should match or exceed the SRI values within Table 6.2.

Room Description	Octave Band Centre Frequency, dB						R_w
	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz	
Front & Side Elevations	18	36	45	50	51	53	45

Table 6.2 – Minimum SRI for double glazing to habitable room

To achieve the SRI values in Table 6.2 above the following example glazing specifications are provided:

Example Glazing Specifications	Acoustic Performance, R_w
4mm Existing Glass / 100mm Air Cavity / 6mm Secondary Glass	45

Table 6.3 – Example Glazing Specifications

The SRI values in Table 6.2 above are based on a sealed double glazed system. The overall performance of the units is not only dependent on the glazing configuration. Window seals should be fitted correctly with no air gaps and the frame been fully sealed into the aperture when closed. Existing windows should be made good prior to the installation of the secondary glazed system.

Verification should be provided by the glazing supplier to ensure the glazing achieves the sound insulation performance values in Tables 6.2 above.

6.3 Ventilation

It is generally accepted that a partially open window provides 10 – 15 dB attenuation from external noise sources. Where external noise levels are 15 dB higher than the internal noise target, openable windows should generally be avoided for ventilation purposes.

Based on the measured results it is seen that external noise levels exceed BS8233 criteria for openable windows therefore alternative means of ventilation should be provided.

Where a passive ventilation system is incorporated into the design, ventilation openings to habitable rooms should be acoustically treated and match or exceed the minimum sound reduction values in the Table 6.4.

Room Location	Octave Band Centre Frequency, dB						$D_{n,e,w}$
	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz	
Rear Elevation	41	36	35	32	40	41	36¹
Front Elevation	46	41	40	37	45	46	41²

Table 6.4 - Minimum Sound reduction for trickle vents

Approved Document F of the Building Regulations requires purge ventilation to be provided for occupants to quickly clear smoke and other air pollutants. The opening of windows is considered acceptable for purge ventilation as any increase of internal noise levels would be temporary.

6.4 Maximum Internal Noise Levels

For a reasonable standard in bedrooms at night, the World Health Organisation document 'Guidelines for Community Noise' advises that individual noise events should not regularly exceed 45 dB L_{Amax} . The WHO document references research by Vallet & Vernet which defines regularity as no more than 10 - 15 times per night.

Based on a glazing specification that provides 45 dB R_w sound reduction for Bedrooms, it is seen that external noise levels should not regularly exceed 90 dB L_{Amax} during the night time period.

¹ Performance data based on Simon Acoustic EHA trickle vents.

² Performance data based on Simon Acoustic EHA trickle vents with AEA851 inserts.

Analysis of results shows that the maximum number of exceedances was 2 no. during one night time period which is not considered regular enough to cause disturbance therefore no further mitigation is proposed at this stage.

7.0 PLANT NOISE

It is understood no external plant is to be installed at the property therefore it is considered that a full BS4142 plant noise assessment will not be required at this stage.

Kitchen and Bathroom extract fans along with MVHR duct inlets and outlets should be attenuated if they produce a noise level greater than 46 dBA when measured at 1m from the duct termination points.

To prevent noise break-in to noise sensitive spaces, duct outlets should be located in areas away from the main noise sources. If this is not possible suitable attenuators should be fitted to the ducts.

Attention should be given to the installation of services to ensure there is no transmission of excessive tactile and audible frequency vibration to adjacent areas, due to the operation of equipment and/or its connection to pipe work, duct work or conduits.

8.0 SUMMARY

A noise assessment was carried out for the proposed redevelopment at 79-80 High Street, Gravesend. The scheme includes the conversion of an existing building to provide a commercial unit at ground floor and residential flats of the upper floors.

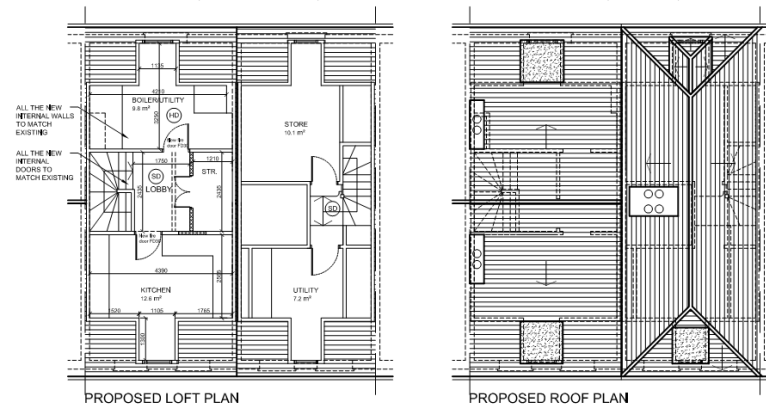
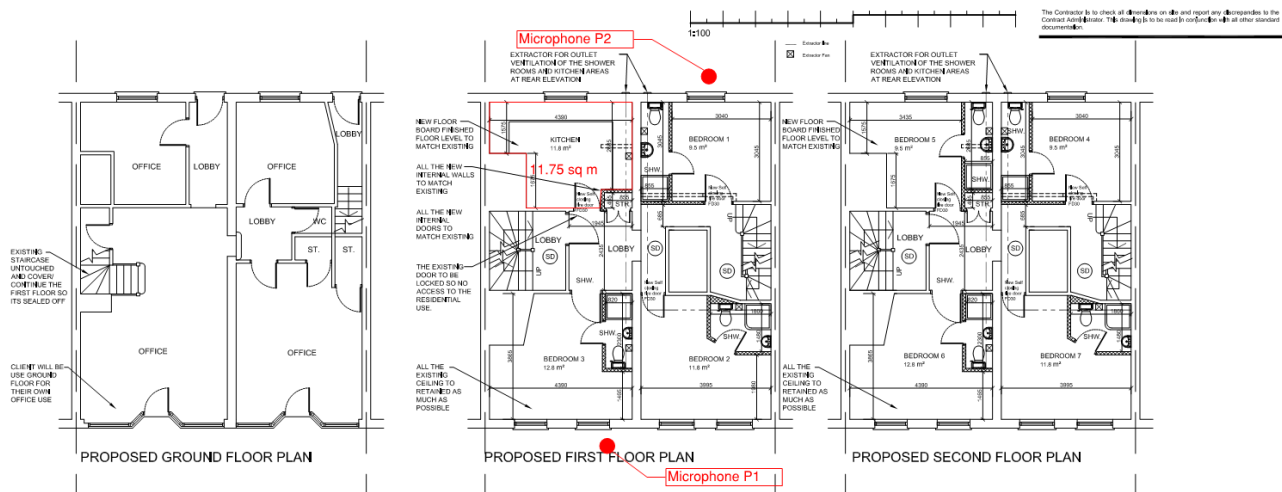
To determine internal noise levels, an indicative façade noise break-in assessment has been undertaken in accordance with the method given within BS8233:2014 for both day and night time noise levels.

To comply with the internal noise level criteria given in BS8233:2014, a suitable glazing system should be installed on all facades of the building that match or exceed the sound reduction values provided in Table 6.2 above.

Based on the measured results it is seen that external noise levels exceed BS8233 criteria for openable windows therefore alternative means of ventilation should be provided.

No external plant is to be installed at the property therefore it is considered that a full BS4142 plant noise assessment will not be required at this stage.

APPENDIX A – SITE PLANS



rev.	description	date	checked
1	ISSUED FOR PERMIT	20.07.2022	SS

drawn	SS	checked	SS	date	20.07.2022
status	Planning	scale	1:100@A3	proj no	1961
desig	REC 05	rev no	B		



APPENDIX B – SITE PHOTOS



APPENDIX C – CALCULATION SHEETS

C:\Projects\BS8233 Assessments\240520 - 79-80 High Street Gravesend\Noise Data\Front Façade - Overview140_240520_235603.xlsx>Data								
79-80 High St Gravesend: 1F - KLD (Day)								
BS8233 Façade Noise Break In Calculation		125	250	500	1000	2000	4000	dBA
Average External Noise Level - L _{eq}		55.7	54.5	54.9	58.6	57.0	52.1	62.5
Maximum External Noise Level - L _{max}								6.3
Safety Tolerance	3 dB	3.0	3.0	3.0	3.0	3.0	3.0	
Correction Factors								
Traffic Flow Correction	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction L2 = L1 - 10*log(D1/D2)	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Barrier Correction Ab = 10 log10 (D + d) dB	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Angle of View Correction Av = 10 log(θ/180)	180	0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade		58.7	57.5	57.9	61.6	60.0	55.1	65.5
Calculation of environmental noise break-in to residential rooms								
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)								
Room Volume =	29.4 m3							
Reverberation Time =	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)		1.1	1.1	1.1	1.1	1.1	1.1	
FAÇADE Elements								
Total Façade Area 1		12.3 m2						
Glazing Area, Sg - Façade 1		2.0 m2						
4mm Glass / 100mm Air Cavity / 6mm Glass		SRI	18	36	45	50	51	53
		Sg/Sf	-26	-44	-53	-58	-59	-61
Predicted noise level in building from glazing 1			36.9	17.7	9.1	7.8	5.2	-1.7
Solid Area, Sw - Façade 1		10.3 m2						
300mm Brick / PB Lining		SRI	45	45	47	57	67	75
		Sw/Sf	-46	-46	-48	-58	-68	-76
Predicted noise level through solid façade 1			17.0	15.8	14.2	7.9	-3.7	-16.6
Roof/Floor Area, Sc - Façade 1		0.0 m2						
No Roof		SRI	42	52	59	64	66	66
		Sc/Sf	0	0	0	0	0	0
Predicted noise level through solid façade 3 / Roof			0.0	0.0	0.0	0.0	0.0	0.0
Trickle Vent(s) - Façade 1		1 Vent						
Simon Acoustic EHA		Dne	41	36	35	32	40	41
		Ao/S	-41	-37	-36	-33	-41	-42
Predicted noise level through trickle vents Lff-Dne+10log(A0/A)+K			21.4	24.6	26.4	32.6	23.3	17.5
Combined Internal Noise Level - L _{eq}		37.1	25.9	26.8	32.6	23.5	17.9	34
Target Internal Noise Level (dBA)								35
								Pass

C:\Projects\BS8233 Assessments\240520 - 79-80 High Street Gravesend\Noise Data\Front Façade - Overview\140_240520_235603.xlsx>Data

79-80 High St Gravesend: 1F - Bed 1 (Day)

BS8233 Façade Noise Break In Calculation		125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}		55.7	54.5	54.9	58.6	57.0	52.1	62.5
Maximum External Noise Level - L_{max}								63
Safety Tolerance	3 dB	3.0	3.0	3.0	3.0	3.0	3.0	
Correction Factors								
Traffic Flow Correction	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction $L2 = L1 - 10 \log(D1/D2)$	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Barrier Correction $Ab = 10 \log(10 / (D + d))$ dB	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Angle of View Correction $Av = 10 \log(\theta / 180)$	180	0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade		58.7	57.5	57.9	61.6	60.0	55.1	65.5
Calculation of environmental noise break-in to residential rooms								
$L2 = L1 - R + 10 \log(S/A) + 3$ dB (Freefield version)								
Room Volume =	29.5 m ³							
Reverberation Time =	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	
$10 \log(S/A)$		0.5	0.5	0.5	0.5	0.5	0.5	
FAÇADE Elements								
Total Façade Area 1		10.8 m ²						
Glazing Area, S_g - Façade 1		4.8 m ²						
4mm Glass / 100mm Air Cavity / 6mm Glass	SRI	18	36	45	50	51	53	
	S_g/S_f	-22	-40	-49	-54	-55	-57	
Predicted noise level in building from glazing 1		40.7	21.5	12.9	11.6	9.0	2.1	25.4
Solid Area, S_w - Façade 1		6.0 m ²						
300mm Brick / PB Lining	SRI	45	45	47	57	67	75	
	S_w/S_f	-48	-48	-50	-60	-70	-78	
Predicted noise level through solid façade 1		14.6	13.4	11.8	5.5	-6.1	-19.0	11.7
Roof/Floor Area, S_c - Façade 1		0.0 m ²						
No Roof	SRI	44	57	68	77	75	75	
	S_c/S_f	0	0	0	0	0	0	
Predicted noise level through solid façade 3 / Roof		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trickle Vent(s) - Façade 1		1 Vent						
Simon Acoustic EHA	Dne	41	36	35	32	40	41	
	Ao/S	-41	-36	-35	-33	-40	-41	
Predicted noise level through trickle vents	$L_{ff-Dne} + 10 \log(A0/A) + K$	21.4	24.6	26.4	32.6	23.3	17.5	33.8
Combined Internal Noise Level - L_{eq}		40.7	26.6	26.7	32.6	23.5	18.0	34
Target Internal Noise Level (dBA)								35
								Pass

C:\Projects\BS8233 Assessments\240520 - 79-80 High Street Gravesend\Noise Data\Front Façade - Overview\140_240520_235603.xlsx>Data

79-80 High St Gravesend: 1F - Bed 1 (Night)

BS8233 Façade Noise Break In Calculation		125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}		48.4	46.5	47.6	51.4	51.6	48.4	56.6
Maximum External Noise Level - L_{max}								6.3
Safety Tolerance	3 dB	3.0	3.0	3.0	3.0	3.0	3.0	
Correction Factors								
Traffic Flow Correction	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction $L2 = L1 - 10 \log(D1/D2)$	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Barrier Correction $Ab = 10 \log(10 / (D + d))$ dB	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Angle of View Correction $Av = 10 \log(\theta / 180)$	180	0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade		51.4	49.5	50.6	54.4	54.6	51.4	59.6
Calculation of environmental noise break-in to residential rooms								
$L2 = L1 - R + 10 \log(S/A) + 3$ dB (Freefield version)								
Room Volume =	29.5 m ³							
Reverberation Time =	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	
$10 \log(S/A)$		0.5	0.5	0.5	0.5	0.5	0.5	
FAÇADE Elements								
Total Façade Area 1		10.8 m ²						
Glazing Area, S_g - Façade 1		4.8 m ²						
4mm Glass / 100mm Air Cavity / 6mm Glass	SRI	18	36	45	50	51	53	
	S_g/S_f	-22	-40	-49	-54	-55	-57	
Predicted noise level in building from glazing 1		33.4	13.5	5.6	4.4	3.6	-1.6	18.1
Solid Area, S_w - Façade 1		6.0 m ²						
300mm Brick / PB Lining	SRI	45	45	47	57	67	75	
	S_w/S_f	-48	-48	-50	-60	-70	-78	
Predicted noise level through solid façade 1		7.3	5.4	4.5	-1.7	-11.5	-22.7	4.4
Roof/Floor Area, S_c - Façade 1		0.0 m ²						
No Roof	SRI	44	57	68	77	75	75	
	S_c/S_f	0	0	0	0	0	0	
Predicted noise level through solid façade 3 / Roof		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trickle Vent(s) - Façade 1		1 Vent						
Simon Acoustic EHA	Dne	41	36	35	32	40	41	
	Ao/S	-41	-36	-35	-33	-40	-41	
Predicted noise level through trickle vents	$L_{ff-Dne} + 10 \log(A0/A) + K$	14.1	16.6	19.1	25.4	17.9	13.8	27.0
Combined Internal Noise Level - L_{eq}		33.5	18.8	19.6	25.5	18.4	14.7	28
Target Internal Noise Level (dBA)								30
								Pass

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79-80 High St Gravesend: 1F - Bed 2 (Day)

BS8233 Façade Noise Break In Calculation		125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}		62.3	62.2	60.6	60.2	55.4	48.6	63.8
Maximum External Noise Level - L_{max}								63
Safety Tolerance	3 dB	3.0	3.0	3.0	3.0	3.0	3.0	
Correction Factors								
Traffic Flow Correction	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction $L2 = L1 - 10 \log(D1/D2)$	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Barrier Correction $A_b = 10 \log(10 (D + d) \text{ dB})$	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Angle of View Correction $A_v = 10 \log(\theta/180)$	180	0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade		65.3	65.2	63.6	63.2	58.4	51.6	66.8
Calculation of environmental noise break-in to residential rooms								
$L2 = L1 - R + 10 \log(S/A) + 3 \text{ dB}$ (Freefield version)								
Room Volume =	29.5 m ³							
Reverberation Time =	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	
$10 \log(S/A)$		0.7	0.7	0.7	0.7	0.7	0.7	
FAÇADE Elements								
Total Façade Area 1		11.3 m ²						
Glazing Area, S_g - Façade 1		4.2 m ²						
4mm Glass / 100mm Air Cavity / 6mm Glass	SRI	18	36	45	50	51	53	
	Sg/Sf	-22	-40	-49	-54	-55	-57	
Predicted noise level in building from glazing 1		46.7	28.6	18.0	12.6	6.8	-2.0	31.2
Solid Area, S_w - Façade 1		7.1 m ²						
300mm Brick / PB Lining	SRI	45	45	47	57	67	75	
	Sw/Sf	-47	-47	-49	-59	-69	-77	
Predicted noise level through solid façade 1		22.0	21.9	18.3	7.9	-6.9	-21.7	18.0
Roof/Floor Area, S_c - Façade 1		0.0 m ²						
No Roof	SRI	42	52	59	64	66	66	
	Sc/Sf	0	0	0	0	0	0	
Predicted noise level through solid façade 3 / Roof		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trickle Vent(s) - Façade 1		1 Vent						
Simon Acoustic EHA with AEA851	Dne	46	41	40	37	45	46	
	Ao/S	-46	-42	-40	-38	-45	-46	
Predicted noise level through trickle vents	$L_{ff-Dne} + 10 \log(A_0/A) + K$	23.0	27.3	27.1	29.2	16.7	9.0	30.9
Combined Internal Noise Level - L_{eq}		46.7	31.5	28.1	29.3	17.5	11.3	34
Target Internal Noise Level (dBA)								35
								Pass

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79-80 High St Gravesend: 1F - Bed 2 (Night)

BS8233 Façade Noise Break In Calculation		125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}		53.7	51.8	52.1	54.3	50.4	44.5	57.4
Maximum External Noise Level - L_{max}								6.3
Safety Tolerance	3 dB	3.0	3.0	3.0	3.0	3.0	3.0	
Correction Factors								
Traffic Flow Correction	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction $L2 = L1 - 10 \log(D1/D2)$	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Barrier Correction $A_b = 10 \log(10 / (D + d))$ dB	0.0 dB	0.0	0.0	0.0	0.0	0.0	0.0	
Angle of View Correction $A_v = 10 \log(\theta / 180)$	180	0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade		56.7	54.8	55.1	57.3	53.4	47.5	60.4
Calculation of environmental noise break-in to residential rooms								
$L2 = L1 - R + 10 \log(S/A) + 3$ dB (Freefield version)								
Room Volume =	29.5 m ³							
Reverberation Time =	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	
$10 \log(S/A)$		0.7	0.7	0.7	0.7	0.7	0.7	
FAÇADE Elements								
Total Façade Area 1		11.3 m ²						
Glazing Area, S_g - Façade 1		4.2 m ²						
4mm Glass / 100mm Air Cavity / 6mm Glass	SRI	18	36	45	50	51	53	
	S_g/S_f	-22	-40	-49	-54	-55	-57	
Predicted noise level in building from glazing 1		38.1	18.2	9.5	6.7	1.8	-6.1	22.5
Solid Area, S_w - Façade 1		7.1 m ²						
300mm Brick / PB Lining	SRI	45	45	47	57	67	75	
	S_w/S_f	-47	-47	-49	-59	-69	-77	
Predicted noise level through solid façade 1		13.4	11.5	9.8	2.0	-11.9	-25.8	9.4
Roof/Floor Area, S_c - Façade 1		0.0 m ²						
No Roof	SRI	42	52	59	64	66	66	
	S_c/S_f	0	0	0	0	0	0	
Predicted noise level through solid façade 3 / Roof		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trickle Vent(s) - Façade 1		1 Vent						
Simon Acoustic EHA with AEA851	Dne	46	41	40	37	45	46	
	A_o/S	-46	-42	-40	-38	-45	-46	
Predicted noise level through trickle vents	$L_{ff-Dne} + 10 \log(A_o/A) + K$	14.4	16.9	18.6	23.3	11.7	4.9	24.4
Combined Internal Noise Level - L_{eq}		38.1	21.3	19.8	23.5	13.3	9.2	27
Target Internal Noise Level (dBA)								30
								Pass

APPENDIX D – INSUL DATA SHEETS

Sound Insulation Prediction (v8.0.7)

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- Key No. 1548

Margin of error is generally within $R_w \pm 3$ dB

Job Name:

Job No.:

Page No.:

Notes:

Date: 18 Oct 23

Initials:dhesn

File Name: insul



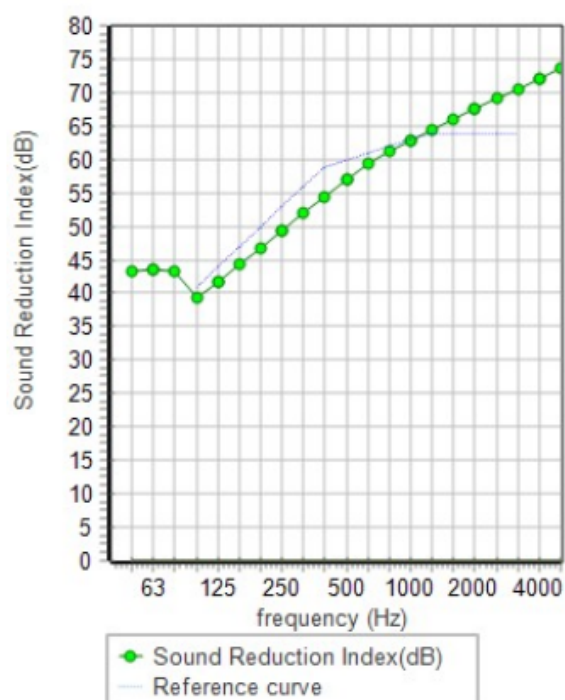
R_w	60 dB
C	-2 dB
C_{tr}	-6 dB
D_{nTw}	62 dB
	[V:50m3]
	[A:11m2]

System description

Panel 1 : 1 x 300.0 mm Brick (Solid) (ρ :1600 kg/m³, E:8.9GPa, ν :0.05)

frequency (Hz)	R(dB)	R(dB)
50	43	
63	44	43
80	43	
100	39	
125	42	41
160	44	
200	47	
250	49	49
315	52	
400	54	
500	57	56
630	59	
800	61	
1000	63	63
1250	64	
1600	66	
2000	67	67
2500	69	
3150	71	
4000	72	72
5000	74	

Panel Size 2.7x4 m; Mass 480.0 kg/m²



Sound Insulation Prediction (v8.0.7)

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- Key No. 1548

Margin of error is generally within $R_w \pm 3$ dB

Job Name:

Job No.:

Page No.:

Notes:

Date: 18 Oct 23

Initials: dhesn

File Name: insul



R_w 45 dB
 C -5 dB
 C_{tr} -12 dB
 D_{nTw} 47 dB [V:50m3]
[A:11m2]

System description

+ 1 x 4.0 mm Glass (? : 2430 kg/m³, E: 52 GPa, ? : 0.02)

+ 1 x 6.0 mm Glass (? : 2430 kg/m³, E: 52 GPa, ? : 0.02)

Mass-air-mass resonant frequency = 77 Hz

frequency (Hz)	R (dB)	R (dB)
50	16	
63	13	9
80	5	
100	14	
125	22	18
160	28	
200	33	
250	37	36
315	41	
400	44	
500	46	45
630	47	
800	49	
1000	50	50
1250	52	
1600	52	
2000	51	51
2500	50	
3150	50	
4000	54	53
5000	59	

Panel Size 2.7x4 m; Mass 24.6 kg/m²

