224 ST LEONARDS ROAD LONDON SW14 7BN

BS8233 NOISE ASSESSMENT REPORT

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BS8233 NOISE ASSESSMENT REPORT

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-	First Issue - Noise Assessment Report	Damien Hesnan	16/05/2024

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1.0 INTRODUCTION

Aran Acoustics in collaboration with Airtight Building Solutions Ltd have been appointed to carry out a noise assessment for the proposed residential flat conversion at 224 St Leonards Road, London.

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. Such to undertake this assessment an environmental noise survey was carried out at the site on 08 May 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 located at 224 St Leonards Road in London. The scheme includes redevelopment of land to the rear of property to create 2-3 new dwellings, with the whole site to accommodate 4-5 dwellings in total.

The site is located in a slightly built-up area of mainly residential use. South Circular Road runs along the western boundary of site on a high overpass bridge and was seen to carry a moderate volume of road traffic. A railway line connecting Mortlake and North Sheen station runs on the northern boundary of the proposed developments.

A subjective assessment undertaken on-site determined that the predominant noise source to impact the development background noise levels was from train passings on the railway line.

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

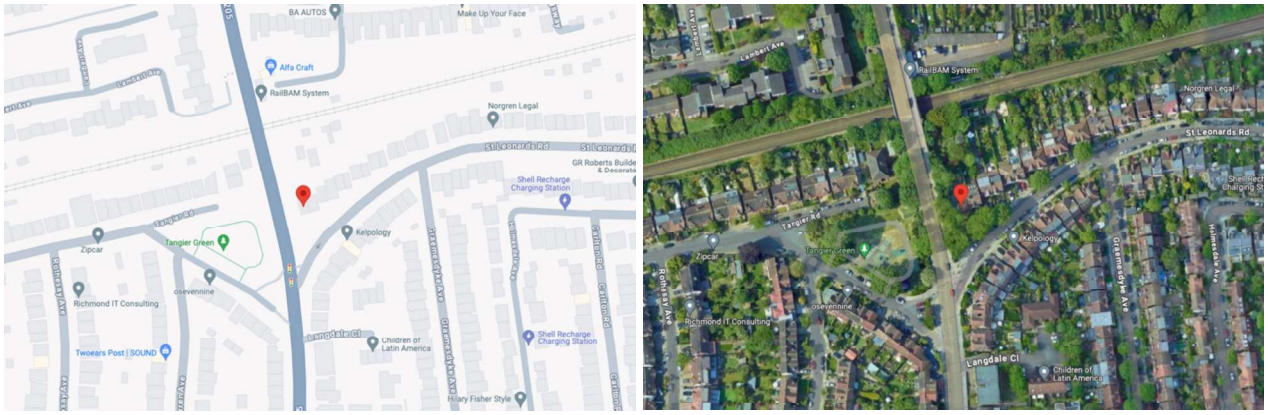


*Figure 2.1 - Location map and aerial photo of proposed site**

**Imagery courtesy of Google Maps*

3.0 NOISE SURVEY

An environmental noise survey was carried out between Wednesday 08 and Thursday 09 April 2024. The survey incorporated both day and night-time measurements.

3.1 Measurement Position

A fixed noise monitor was installed at the proposed location of the new build development. The microphone was placed on a boom pole and extended approximately 2.6m from ground level with a direct line of sight to the railway tracks. Noise from the south circular had a reduced effect on the development as it benefits from distance attenuation along with elevation difference. A correction has been incorporated into the calculations to account for the variation between the microphone height and the proposed location of the first-floor window. Noise levels measured at this location are considered worst case to impact the proposed development.

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

3.2 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
Rion Type NC-74 Acoustic Calibrator	35046846	Feb 2024	Feb 2025

Table 3.1 - Measurement equipment used on site

The meter was 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.

3.3 Weather Conditions

The weather remained dry for the duration of the survey. Wind speeds remained below 5 m/s. The temperature range was approximately 12 - 22 ^{o}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

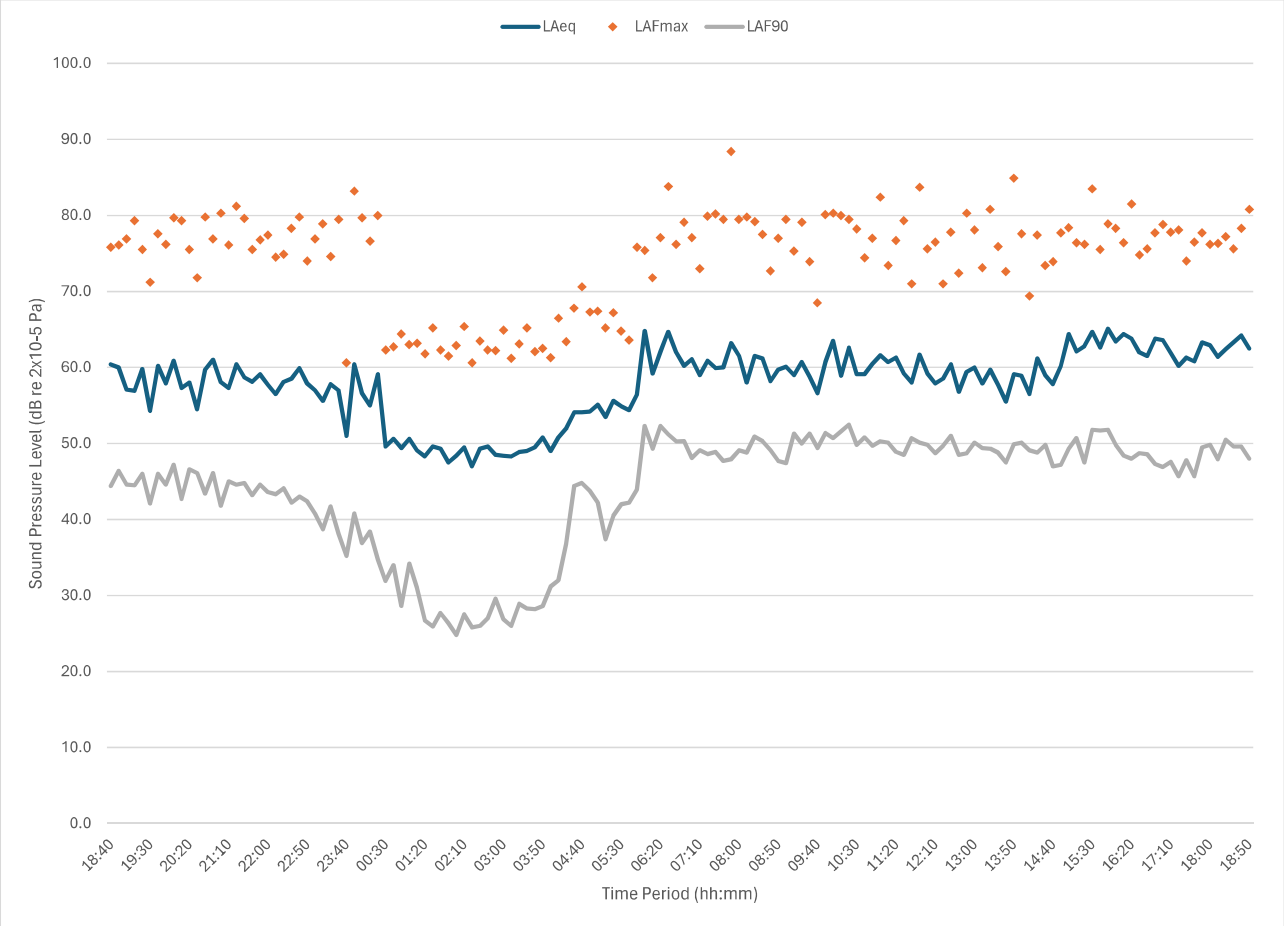


Figure 4.1 – Measured Noise Levels

Noise levels remained consistent throughout the day time period with drop off during the early hours. This is considered attributable to trains not running during this period.

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

Time Period	Average Noise Levels L_{Aeq}	Maximum Noise Level L_{Aeq}, dB
Daytime $L_{Aeq,16\ Hour}$ (07:00 – 23:00 hours)	61	-
Night time $L_{Aeq,8\ Hour}$ (23:00 – 07:00 hours)	56	84

Table 4.1 – Summary of Measured Noise Levels

Based on the measured noise levels, 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.

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 impacts[27] on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts[27] 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 LAmax 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 L_{Aeq} and individual noise events should not normally exceed 45 dB $L_{AFmax.}$ For indoor areas during the daytime, noise levels should not generally exceed 35 dB L_{Aeq}.

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 night time noise levels. Window and room sizes are based on current planning drawings.

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

6.1 External Envelope Construction

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.

	Octave Band Centre Frequency, dB						
Rooms Description	**125 Hz**	**250 Hz**	**500 Hz**	**1.0 K Hz**	**2.0 K Hz**	**4.0 K Hz**	**R_w**
Masonry Wall	45	43	47	56	67	77	**53**
Cladded Walls	28	41	47	54	54	60	**50**
Pitched Tile Roof	22	41	48	53	50	56	**49**

Table 6.1 - Building envelope sound insulation performance requirements

To assist in selecting suitable constructions the following sample specifications are provided.

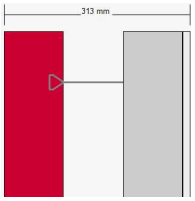
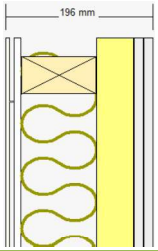
Wall Ref	Plan view	Construction Specification	Acoustic Rating
EW_01		• 100mm Brick or Block (density >1250 kg/m^3) • 100mm Cavity • 100mm Brick or Block (density >1250 kg/m^3) • 1 layer of 12.5mm WallBoard	**53 dB R_w**
EW_02		• Cladding on 10mm Cement Board • 100mm Stud • 100mm Mineral Wool (density >10 kg/m^3) • 50mm PIR Insulation • 2 layers of 12.5mm WallBoard	**50 dB R_w**
RF_01		• 14mm Tiles • 200mm Ceiling Joists • 100mm Mineral Wool (density >10 kg/m^3) • 1 layer of 12.5mm Plasterboard	**49 dB R_w**

Table 6.2 - Sample Building envelope constructions

6.2 Glazing Specifications

Based on measured noise levels, calculations show glazing to habitable rooms should match or exceed the SRI values within Table 6.3.

	Octave Band Centre Frequency, dB						
Rooms Description	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz	R_w
Living, Dining rooms	27	21	29	40	39	43	34
Bedrooms	30	25	35	43	40	54	36

Table 6.3 – Minimum SRI for glazing to habitable room

The SRI values in Table 6.3 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.

To achieve the SRI values in Table 6.3 above the following example glazing specifications are provided:

Example Glazing Specifications	Acoustic Performance, R_w
4mm Glass / 12mm Air Cavity / 6mm Glass	34
4mm Glass / 12mm Air Cavity / 8mm Glass	36

Table 6.4 – Example Glazing Specifications

Where existing glazing to habitable rooms fails to meet the sound insulation performance requirements in Table 6.3 this should either be replaced or a secondary glazed unit installed using 6mm glass with a minimum 50mm air gap between the primary and secondary units. This would have an expected sound insulation performance of approximately 41 dB R_w.

Verification should be provided by the glazing supplier to ensure the glazing including window frames achieves the sound insulation performance values in Tables 6.3 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 background 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 it is advised that ventilators are acoustically treated. Ventilation openings to habitable rooms should match or exceed the minimum sound reduction values in the Table 6.5.

The values provided in Table 6.5 are based on a maximum of 1 no. ventilator per window. Where additional vents are used, an allowance should be made for the increased number of openings.

	Octave Band Centre Frequency, dB						
Room Location	**125 Hz**	**250 Hz**	**500 Hz**	**1.0 K Hz**	**2.0 K Hz**	**4.0 K Hz**	**$D_{n,e,w}$**
All Habitable Rooms	41	36	35	32	40	41	**36**[1]
Bedrooms	40	36	34	35	44	40	**38**[2]

Table 6.5 - Minimum Sound reduction for acoustic 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 maximum internal noise level of 45 dB L_{Amax} and a glazing specification to bedrooms that achieves 38 dB R_w sound reduction, it is seen that external noise levels should not regularly exceed 83 dB L_{Amax} during the night time period.

Analysis of results shows that the external noise level did exceed 83 dB L_{Amax} on 2 no. occasions during the night time period which is not considered regular enough to cause disturbance therefore no further mitigation is proposed at this stage.

[1] Performance data based on Simon Acoustic EHA trickle vents.
[2] Performance data based on Simon Acoustic EHAS trickle vents.

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 that 46 dBA when measured at 1m from the duct termination points.

To prevent noise break in, duct outlets should be located in areas away from the main noise sources and 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 survey was carried out for a proposed residential development located at 224 St Leonards Road, London on 08 May 2024.

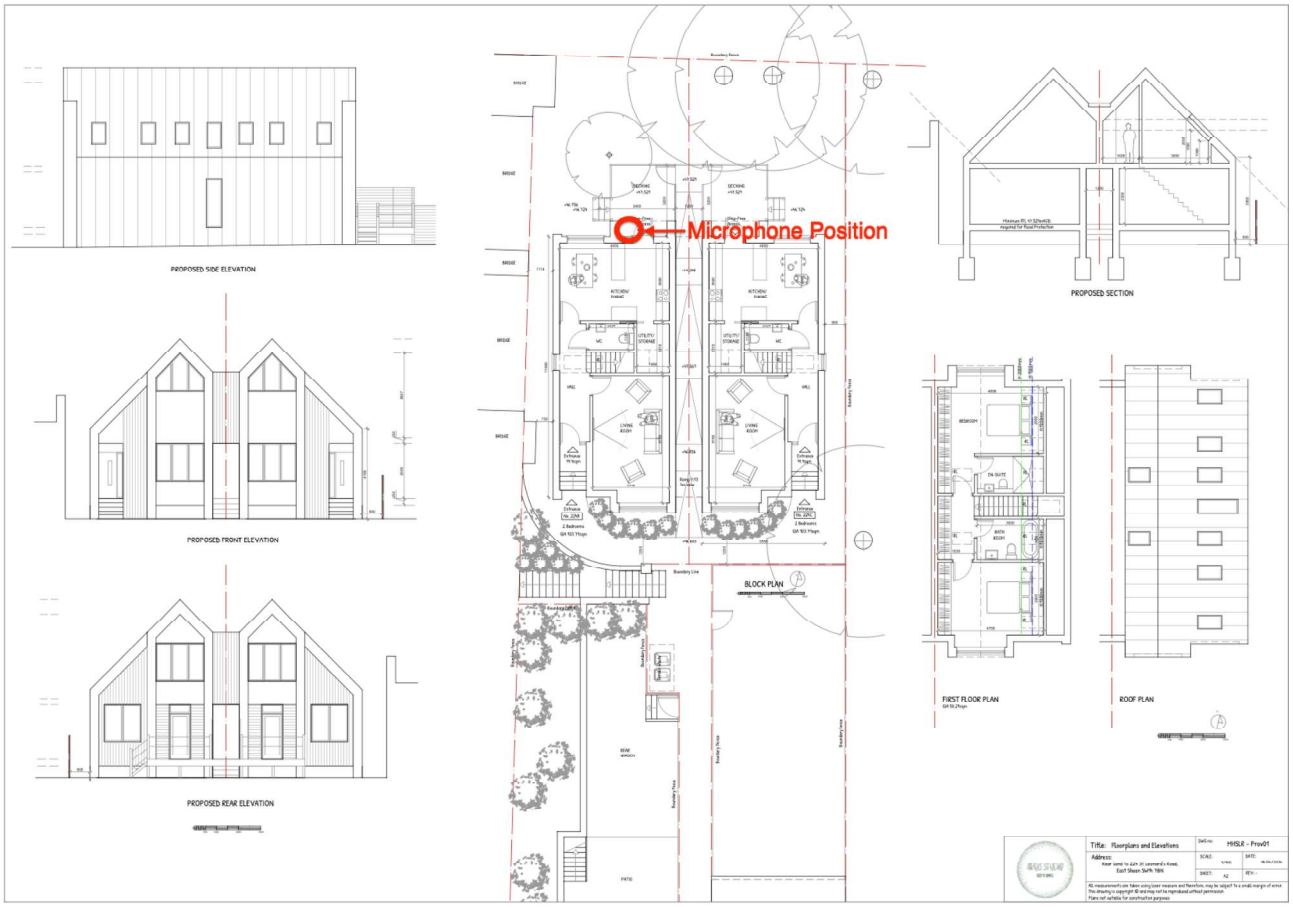
To determine internal noise levels, an indicative façade noise break-in assessment has been undertaken in accordance with the method given within BS8233:2014 for both day and night time noise levels.

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 6.3 above.

Based on the measured results it is seen that external noise levels exceed BS8233 criteria for openable windows therefore acoustically treated trickle vents should be used or 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



APPENDIX B – SITE PHOTOS

APPENDIX C – CALCULATION SHEETS

C:\Projects\BS8233 Assessments\240516 - 224 St Leonards Road London\Calcs\[BS8233 Facade Calc - 224 St Leonards Rd.xlsm]U.1- Bed 1 (Night)

224 St Leonards Road: U.1 - KD (Day)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			61.4	59.5	58.2	55.8	52.4	48.7	60.7
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									
Microphone Freefield Correction K	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/360)	90		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Noise Level at Façade			61.4	59.5	58.2	55.8	52.4	48.7	60.7
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	43.3 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			2.0	2.0	2.0	2.0	2.0	2.0	
FAÇADE Elements									
Total Façade Area 1	22.5 m2								
Glazing Area, Sg - Façade 1	5.0 m2								
4mm Glass / 12mm Air Cavity / 6mm Glass		SRI	27	21	29	40	39	43	
		Sg/Sf	-34	-28	-36	-47	-46	-50	
Predicted noise level in building from glazing 1			32.9	37.0	27.7	14.3	11.9	4.2	30.3
Solid Area, Sw - Façade 1	17.3 m2								
300mm Masonry Cavity Wall		SRI	45	43	47	56	67	77	
		Sw/Sf	-46	-44	-48	-57	-68	-78	
Predicted noise level through solid façade 1			20.3	20.4	15.1	3.7	-10.7	-24.4	15.5
Roof/Floor Area, Sc - Façade 1	0.0 m2								
No Roof		SRI	28	42	49	54	56	56	
		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		Dne	41	36	35	32	40	41	
		Ao/S	-44	-40	-38	-36	-43	-44	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			22.4	24.9	25.0	25.1	14.0	9.4	27.5
Combined Internal Noise Level - L_{eq}			**33.5**	**37.3**	**29.7**	**25.5**	**16.6**	**12.1**	**32**
Target Internal Noise Level (dBA)									35
									Pass

C:\Projects\BS8233 Assessments\240516 - 224 St Leonards Road London\Calcs\[BS8233 Facade Calc - 224 St Leonards Rd.xlsm]U.1 - Bed 1 (Night)

224 St Leonards Road: U.1 - Living (Day)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			61.4	59.5	58.2	55.8	52.4	48.7	60.7
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									
Microphone Freefield Correction K	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/360)	90		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Noise Level at Façade			61.4	59.5	58.2	55.8	52.4	48.7	60.7
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	48.3 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			3.3	3.3	3.3	3.3	3.3	3.3	
FAÇADE Elements									
Total Façade Area 1	34.0 m2								
Glazing Area, Sg - Façade 1	3.7 m2								
4mm Glass / 12mm Air Cavity / 6mm Glass		SRI	27	21	29	40	39	43	
		Sg/Sf	-37	-31	-39	-50	-49	-53	
Predicted noise level in building from glazing 1			31.1	35.2	25.9	12.5	10.1	2.4	28.5
Solid Area, Sw - Façade 1	30.3 m2								
300mm Masonry Cavity Wall		SRI	45	43	47	56	67	77	
		Sw/Sf	-46	-44	-48	-57	-68	-78	
Predicted noise level through solid façade 1			22.2	22.3	17.0	5.6	-8.8	-22.5	17.5
Roof/Floor Area, Sc - Façade 1	0.0 m2								
No Roof		SRI	28	42	49	54	56	56	
		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		Dne	41	36	35	32	40	41	
		Ao/S	-46	-41	-40	-38	-45	-46	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			21.9	24.4	24.5	24.6	13.5	8.9	27.1
Combined Internal Noise Level - L_{eq}			**32.1**	**35.8**	**28.6**	**25.0**	**15.8**	**11.6**	**31**
Target Internal Noise Level (dBA)									**35**
									Pass

C:\Projects\BS8233 Assessments\240516 - 224 St Leonards Road London\Calcs\[BS8233 Facade Calc - 224 St Leonards Rd.xlsm]U.1 - Bed 1 (Night)

224 St Leonards Road: U.1 - Bed 1 (Night)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			57.4	55.5	53.6	51.8	47.8	43.5	56.4
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									
Microphone Freefield Correction K	0.0 dB		0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction L2 = L1 - 10*log(D1/D2)	1.5 dB		1.5	1.5	1.5	1.5	1.5	1.5	
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/360)	180		0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade			61.9	60.0	58.1	56.3	52.3	48.0	60.9
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	46.0 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			3.2	3.2	3.2	3.2	3.2	3.2	
FAÇADE Elements									
Total Façade Area 1	31.5 m2								
Glazing Area, Sg - Façade 1	3.7 m2								
4mm Glass / 12mm Air Cavity / 8mm Glass		SRI	30	25	35	43	40	54	
		Sg/Sf	-39	-34	-44	-52	-49	-63	
Predicted noise level in building from glazing 1			28.8	31.9	20.0	10.2	9.2	-9.1	24.8
Solid Area, Sw - Façade 1	27.8 m2								
300mm Masonry Cavity Wall		SRI	45	43	47	56	67	77	
		Sw/Sf	-46	-44	-48	-57	-68	-78	
Predicted noise level through solid façade 1			22.6	22.7	16.8	6.0	-9.0	-23.3	17.6
Roof/Floor Area, Sc - Façade 1	18.4 m2								
Pitched Tile Roof / 200mm Joist / 100mm Mineral Wool / 12.5mm PB		SRI	28	42	49	54	56	56	
		Sc/Sf	-30	-44	-51	-56	-58	-58	
Predicted noise level through solid façade 3 / Roof			37.8	21.9	13.0	6.2	0.2	-4.1	22.7
Trickle Vent(s) - Façade 1	1 Vent								
Simon Acoustic EHAS		Dne	40	36	34	35	44	40	
		Ao/S	-45	-41	-39	-40	-49	-45	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			23.0	25.1	25.4	22.2	9.6	8.8	26.1
Combined Internal Noise Level - L_{eq}			**38.5**	**33.5**	**27.2**	**22.8**	**13.6**	**10.9**	**30**
Target Internal Noise Level (dBA)									30
									Pass

C:\Projects\BS8233 Assessments\240516 - 224 St Leonards Road London\Calcs\[BS8233 Facade Calc - 224 St Leonards Rd.xlsm]U.1 - Bed 1 (Night)

224 St Leonards Road: U.1 - Bed 2 (Night)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			57.4	55.5	53.6	51.8	47.8	43.5	56.4
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									
Microphone Freefield Correction K	0.0 dB		0.0	0.0	0.0	0.0	0.0	0.0	
Distance Correction L2 = L1 - 10*log(D1/D2)	1.5 dB		1.5	1.5	1.5	1.5	1.5	1.5	
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/360)	180		0.0	0.0	0.0	0.0	0.0	0.0	
Noise Level at Façade			61.9	60.0	58.1	56.3	52.3	48.0	60.9
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	43.3 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			3.0	3.0	3.0	3.0	3.0	3.0	
FAÇADE Elements									
Total Façade Area 1	28.0 m2								
Glazing Area, Sg - Façade 1	2.5 m2								
4mm Glass / 12mm Air Cavity / 8mm Glass		SRI	30	25	35	43	40	54	
		Sg/Sf	-40	-35	-45	-53	-50	-64	
Predicted noise level in building from glazing 1			27.4	30.5	18.6	8.8	7.8	-10.5	23.4
Solid Area, Sw - Façade 1	25.5 m2								
300mm Masonry Cavity Wall		SRI	45	43	47	56	67	77	
		Sw/Sf	-45	-43	-47	-56	-67	-77	
Predicted noise level through solid façade 1			22.5	22.6	16.7	5.9	-9.1	-23.4	17.4
Roof/Floor Area, Sc - Façade 1	11.2 m2								
Pitched Tile Roof / 200mm Joist / 100mm Mineral Wool / 12.5mm PB		SRI	28	42	49	54	56	56	
		Sc/Sf	-32	-46	-53	-58	-60	-60	
Predicted noise level through solid façade 3 / Roof			35.9	20.0	11.1	4.3	-1.7	-6.0	20.8
Trickle Vent(s) - Façade 1	1 Vent								
Simon Acoustic EHAS		Dne	40	36	34	35	44	40	
		Ao/S	-45	-41	-38	-40	-48	-45	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			23.3	25.4	25.7	22.5	9.9	9.1	26.4
Combined Internal Noise Level - L_{eq}			**36.8**	**32.4**	**27.1**	**22.9**	**13.1**	**11.0**	**29**
Target Internal Noise Level (dBA)									**30**
									Pass

APPENDIX D – INSUL DATA SHEETS

Sound Insulation Prediction (v8.0.7)

Program copyright Marshall Day Acoustics 2015

- Key No. 1548

Margin of error is generally within Rw +/- 3 dB

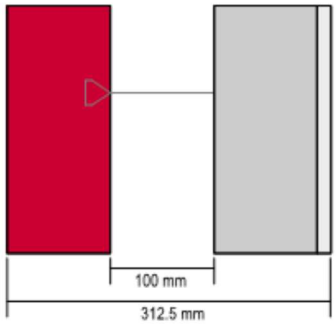
Job Name:

Job No.: Page No.:

Date: 9 May 24 Initials:dhesn

File Name: insul

Notes:



Rw 53 dB
C -1 dB
C_{tr} -4 dB
D_{nTw} 55 dB [V:59m3] [A:11m2]

System description

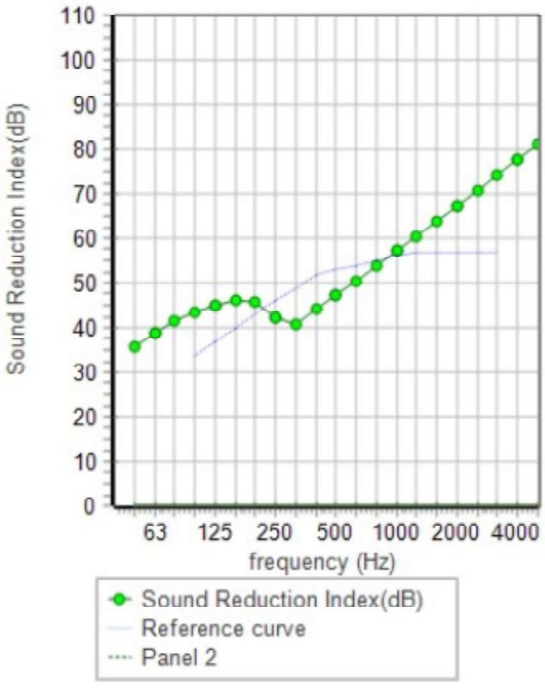
Panel 1 : 1 x 100.0 mm mm Brick (?:1600 kg/m3,E:8.9GPa,?:0.02)

Cavity: Butterfly Tie: Stud spacing 600 mm
Panel 2 + 1 x 100.0 mm mm Concrete Block (?:1250 kg/m3,E:8.3GPa,?:0.02) + 1 x 12.5 mm Gyproc Wallboard 12.5mm (?:640 kg/m3,E:1.6GPa,?:0.01)

Mass-air-mass resonant frequency =21 Hz

Panel Size 2.7x4 m; Mass 293.0 kg/m2

frequency (Hz)	R(dB)	R(dB)
50	36	
63	39	38
80	41	
100	44	
125	45	45
160	46	
200	46	
250	42	43
315	41	
400	44	
500	47	47
630	50	
800	54	
1000	57	56
1250	61	
1600	64	
2000	67	67
2500	71	
3150	74	
4000	78	77
5000	81	



Sound Insulation Prediction (v8.0.7)

- Key No. 1548

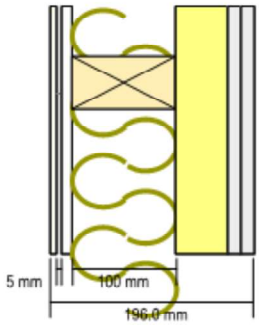
Margin of error is generally within Rw +/- 3 dB

Job Name:

Job No.: Page No.: Notes:

Date: 16 May 24 Initials:dhesn

File Name: insul



Rw 50 dB
C -2 dB
C_{tr} -8 dB
D_{nTw} 52 dB [V:50m3] [A:11m2]

System description

Panel 1 : 1 x 6.0 mm mm NuClad (?:1200 kg/m3,E:4GPa,?:0.01)

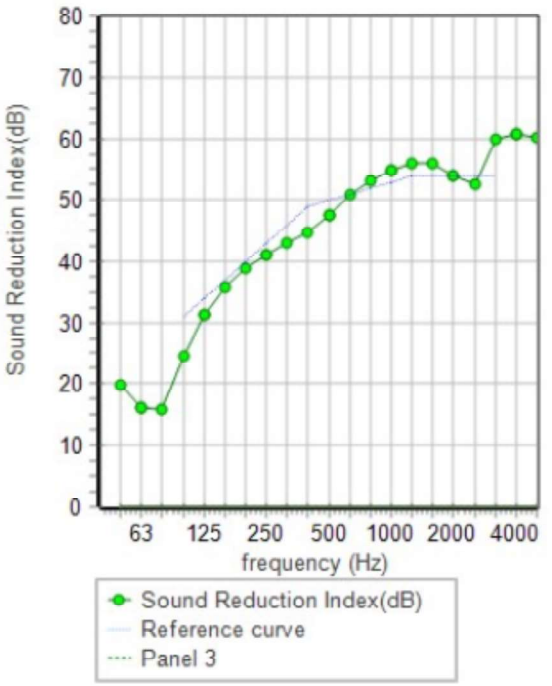
Cavity: Point connections: Stud spacing 600 mm
Panel 2 + 1 x 10.0 mm Eterboard (fibre cement) (?:1444 kg/m3,E:5.8GPa,?:0.01)

Cavity: Timber stud: Stud spacing 600 mm , Infill Fibreglass (10kg/m3) Thickness 100 mm (?:10 kg/m3, Rf:4000 Pa.s/m2)
Panel 3 + 1 x 50.0 mm PIR Insulation (?:50 kg/m3,E:0.04GPa,?:0.03) + 2 x 12.5 mm Gyproc Wallboard 12.5mm (?:640 kg/m3,E:1.6GPa,?:0.01)

Mass-air-mass resonant frequency =60 Hz , 459 Hz

Panel Size 2.7x4 m; Mass 41.1 kg/m2

frequency (Hz)	R(dB)	R(dB)
50	20	
63	16	17
80	16	
100	25	
125	31	28
160	36	
200	39	
250	41	41
315	43	
400	45	
500	47	47
630	51	
800	53	
1000	55	54
1250	56	
1600	56	
2000	54	54
2500	53	
3150	60	
4000	61	60
5000	60	



Sound Insulation Prediction (v8.0.7)

- Key No. 1548

Margin of error is generally within Rw +/- 3 dB

Job Name:

Job No.: Page No.:

Date: 10 May 24 Initials:

File Name: insul

Notes:

Rw	51 dB
C	-2 dB
C_{tr}	-9 dB
D_{nTw}	53 dB

[V:50m3] [A:11m2]

System description

Panel 1 : 1 x 14.0 mm Roofing tiles (?:2392 kg/m3,E:12GPa,?:0.01)

Cavity: Solid joist(timber or Twinaplate): Stud spacing 600 mm , Infill Fibreglass (10kg/m3) Thickness 100 mm (?:10 kg/m3, Rf:4000 Pa.s/m2)
Panel 2 + 1 x 12.5 mm Gyproc Wallboard 12.5mm (?:640 kg/m3,E:1.6GPa,?:0.01)

Mass-air-mass resonant frequency =46 Hz

frequency (Hz)	R(dB)	R(dB)
50	15	
63	13	14
80	15	
100	24	
125	31	28
160	36	
200	40	
250	43	42
315	45	
400	47	
500	49	49
630	51	
800	53	
1000	54	54
1250	56	
1600	56	
2000	54	56
2500	60	
3150	55	
4000	55	56
5000	59	

Panel Size 2.7x4 m; Mass 42.5 kg/m2