47 COLDHARBOUR LANE, HAYES UB3 3EE

BS8233 NOISE ASSESSMENT REPORT

13 March 2023

Mr Gill / Dhillon

Aran Acoustics Ltd
20-22 Wenlock Road,
London N1 7GU

t: 0845 544 2695
e: info@aranacoustics.com
w: www.aranacoustics.com

Airtight Building Solutions Ltd
11 Imperial Drive North, Harrow,
Middlesex, HA2 7BP

t: +44 77 1486 6707
e: info@airtightbuildingsolutions.co.uk
w: www.airtightbuildingsolutions.co.uk

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Document Reference: RPT.220313.0 - 47 COLDHARBOUR LANE HAYES - NOISE ASSESSMENT.DOCX

Revision	Description	Issued by	Issue date
-	First Issue - Noise Assessment Report	Damien Hesnan	13/03/2023

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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 47 Coldharbour Lane, Hayes.

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 02 March 2023.

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 6.0 provides a review of current legislation applicable to this type of development. Section 7.0 provides an assessment of internal noise levels in accordance with guidelines set out in BS8233. Section 8.0 provide a review of internal sound insulation.

2.0 PLANNING CONDITIONS

The following Planning Condition relating to noise impact are attached to the development:

4. Development shall not begin until a scheme for protecting the proposed development from (road traffic) (rail traffic) (air traffic) (other) noise has been submitted to and approved in writing by the Local Planning Authority. All works which form part of the scheme shall be fully implemented before the development is occupied and thereafter shall be retained and maintained in good working order for so long as the building remains in use.

3.0 SITE DESCRIPTION

The proposed site for development is located at 47 Coldharbour Lane in the London Borough of Hillingdon. The scheme includes the construction of a second floor to provide 1 x 2-bed self contained flat and first floor rear extension to existing flat.

The site is located in a built up area of mixed-use. Coldharbour Lane contains predominately commercial units at ground floor level and a mixture of office and residential accommodation on the upper floors of buildings in the immediate area. To the rear of site are the back garden of other residential housing.

A subjective assessment on site determined that the predominant noise sources to impact the proposed development is road traffic on Coldharbour Lane. No significant noise levels were observed to the rear of the site.

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

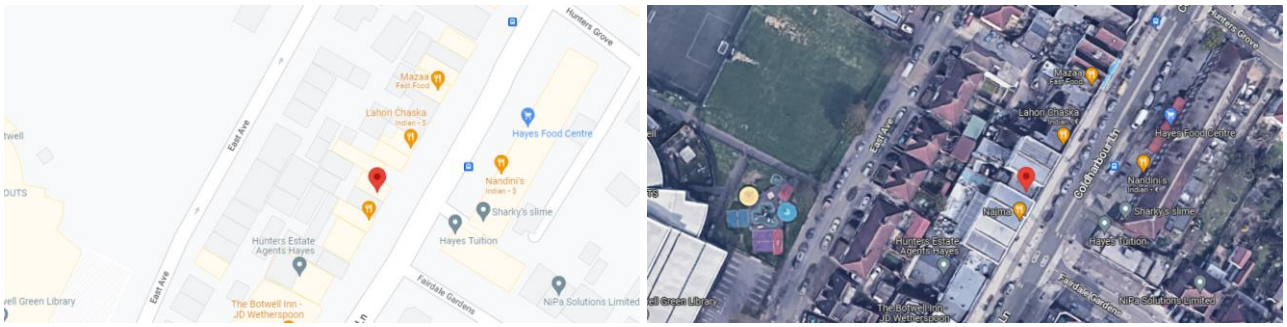


Figure 3.1 - Location map and aerial photo of proposed site*

**Imagery courtesy of Google Maps*

4.0 NOISE SURVEY

An environmental noise survey was carried out between Thursday 02 and Friday 03 March 2023. The survey incorporated both day and night time measurements.

4.1 Measurement Position

A fixed noise monitor was placed on the front elevation of the building at first floor level on temporary scaffolding overlooking Coldharbour Lane. The microphone was extended approximately 2m from the front façade with a clear line of sight to passing traffic. 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.

4.2 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.

Description	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	35168026	Nov 2022	Nov 2023

Table 4.1 - 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.

4.3 Weather Conditions

The weather was mainly clear and dry for the duration of the survey. Wind speeds remained below 5 m/s. The temperature range was approximately 05 - 11 ^{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'*.

5.0 SURVEY RESULTS

The noise levels measured at the fixed measurement position are shown in Figure 5.1 below. The full set of acoustic data measured on site is available upon request.

5.1 Measured Noise Levels

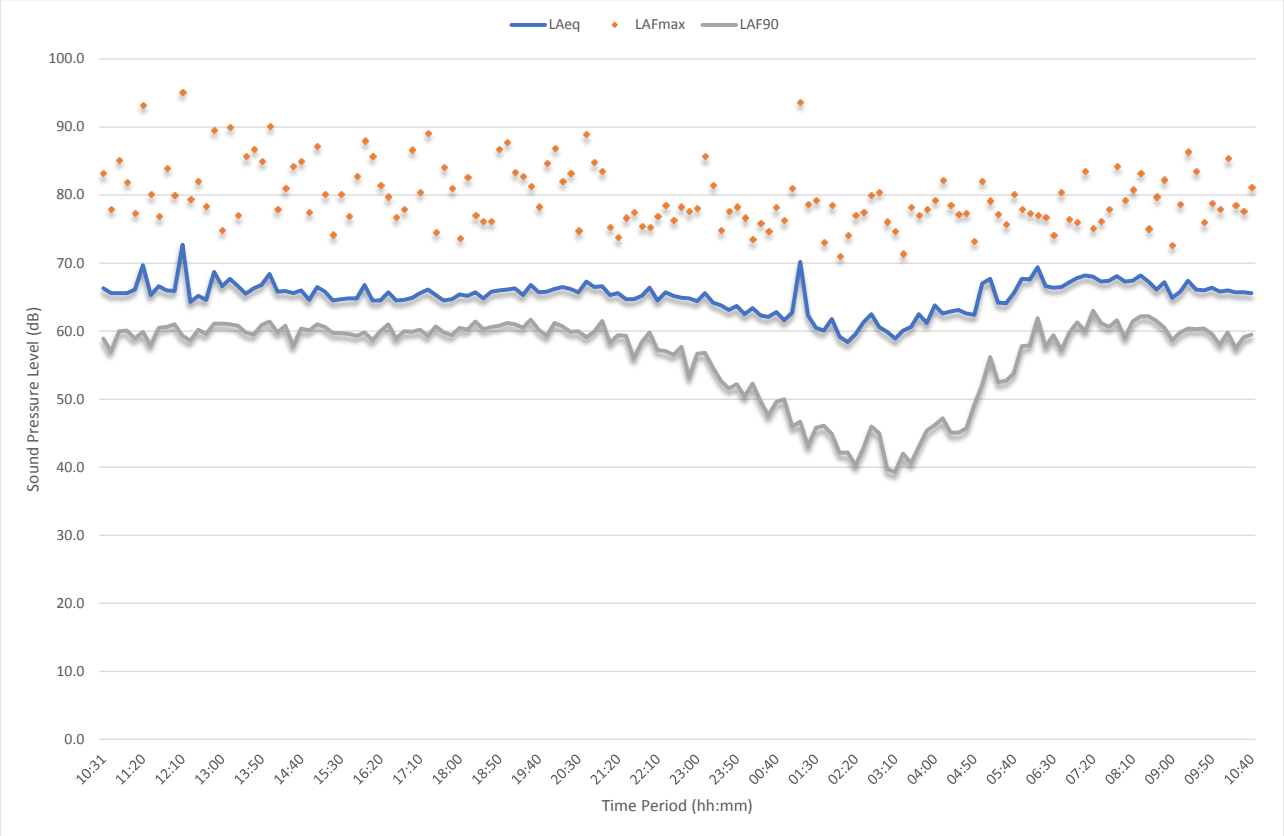


Figure 5.1 – Measured Noise Levels

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 $L_{Aeq,16\ Hour}$ between 07:00 – 23:00 hours	66 dB	-
Night time $L_{Aeq,8\ Hour}$ between 23:00 – 07:00 hours	64 dB	94 dB

Table 5.1 – Summary of Measured Noise Levels

Based on the measured results, 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 7.0 of this report.

6.0 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.

6.1 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.

6.2 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.

6.3 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}.

6.4 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.*

6.5 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 6.1 - Proposed noise level targets

7.0 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. As the development is in the early design stage, exact window sizes have not been determined therefore we have used approximate window sizes based on current layout 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 night time period given within Tables 5.1 along with measured spectral data.

7.1 External Envelope Construction

Noise ingress calculations have been carried out for both living rooms during the daytime period and bedrooms during the night time period. It is understood the solid element of the façade is formed from a 300mm masonry cavity wall construction with internal plasterboard wall 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 7.1. INSUL data sheets are provided in Appendix D.

Building Element	Sound Insulation R_w	Example Construction
Brick/Block Cavity Wall	**53 dB**	100mm Brick/100mm cavity/100mm Block/12.5mm plasterboard lining
Flat Roof	**53 dB**	18mm Plywood Deck / 200mm joists / 100mm mineral wool insulation/ 16mm resilient Bars / 12.5mm SoundBloc ceiling

Table 7.1 - Building envelope sound insulation performance requirements

7.2 Glazing Specifications

Based on measured noise levels, calculations show glazing to habitable rooms should match or exceed the SRI values within Table 7.2.

	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**
All Bedrooms	23	18	26	38	44	38	**31**
All Kitchen/Living	30	25	35	43	40	54	**36**

Table 7.2 – Minimum SRI for double glazing to habitable room

To achieve the SRI values in Table 7.2 above the following example glazing specifications are provided:

Example Glazing Specifications	Acoustic Performance, R_w
4mm Glass / 12mm Air Cavity / 4mm Glass	31
4mm Glass / 12mm Air Cavity / 8mm Glass	36

Table 7.3 – Example Glazing Specifications

The SRI values in Table 7.3 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.

Verification should be provided by the glazing supplier to ensure the glazing achieves the sound insulation performance values in Tables 7.3 above.

7.3 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.

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. The opening off windows for summer time cooling will require further investigation.

Based on the measured results it is seen that external noise levels exceed BS8233 criteria for openable windows therefore alternative means of background 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 7.4.

	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 Bedrooms	39	35	35	32	34	36	33
All Kitchen/Living	44	40	38	39	48	44	42

Table 7.4 - Minimum Sound reduction for acoustic trickle vents

The values provided in Table 7.4 are based on a maximum of 1 no. ventilator per room. Where additional vents are used, an allowance should be made for the increased number of openings. This is calculated using the equation *10*log(N)* where N represents the number of additional vents. All other openings through the façade to habitable rooms should be suitably sealed.

7.4 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 normally exceed 45 dB L_{Amax}. Based on a maximum internal noise level of 45 dB L_{Amax} and a glazing specification that achieves 31 dB R_w sound reduction for Bedrooms, it is seen that external noise levels should not regularly exceed 76 dB L_{Amax} during the night time period.

Due to the orientation of the bedrooms we have allowed a -10 dB barrier correction in our calculations. Analysis of results shows that the external noise level did exceed 76 dB L_{Amax} on 1no. occasion during the night time period which is not considered regular enough to attract cause disturbance therefore no further mitigation is proposed at this stage.

8.0 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. 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.

9.0 SUMMARY

A noise assessment was carried out for the proposed development at 47 Coldharbour Lane, Hayes. The scheme includes the construction of a second floor to provide 1 x 2-bed self contained flat and first floor rear extension to existing flat.

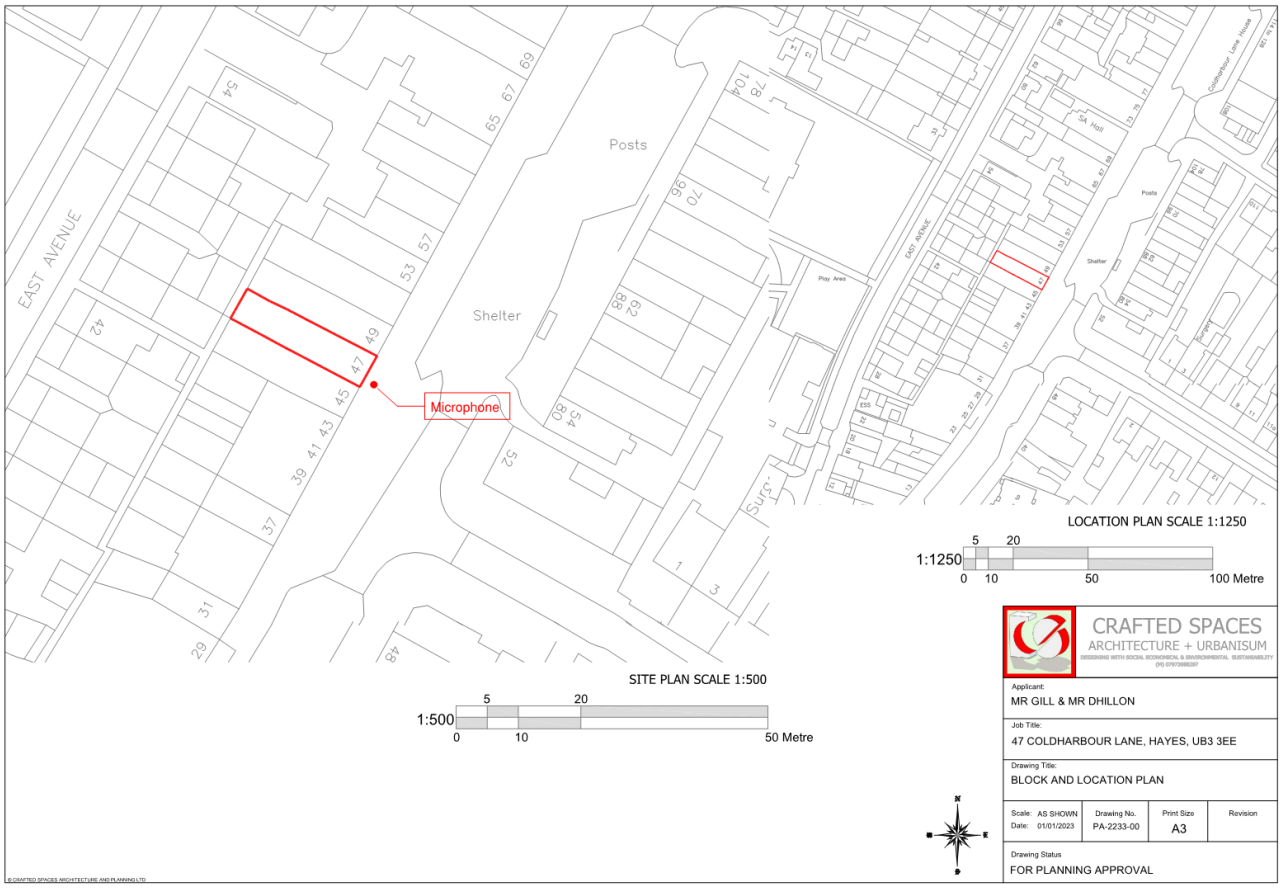
To determine internal noise levels, an indicative façade noise break-in assessment has been undertaken in accordance with the method given within BS8233:2014 for both day and night time noise levels.

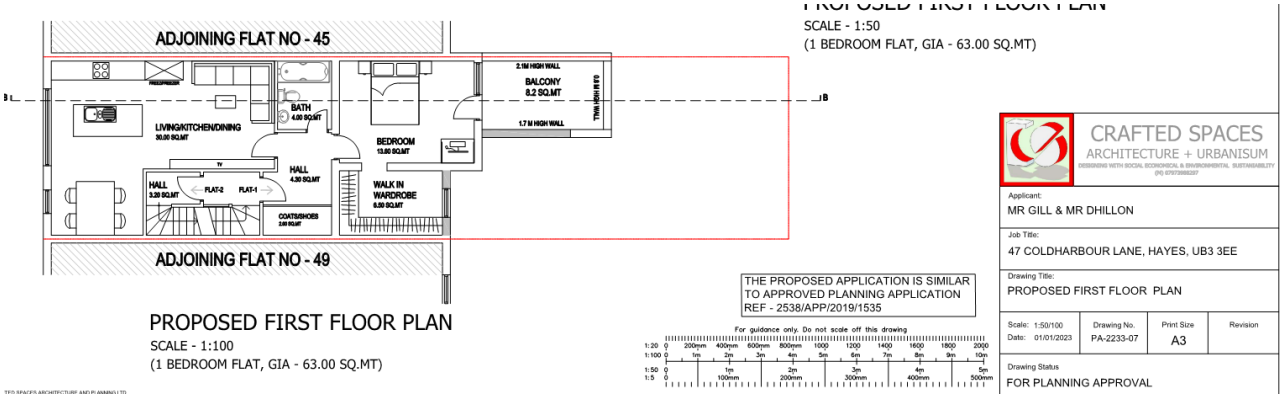
To comply with the internal noise level criteria given in BS8233:2014, a suitable glazing system should be installed on all facades of the building that match or exceed the sound reduction values provided in Table 7.2 above.

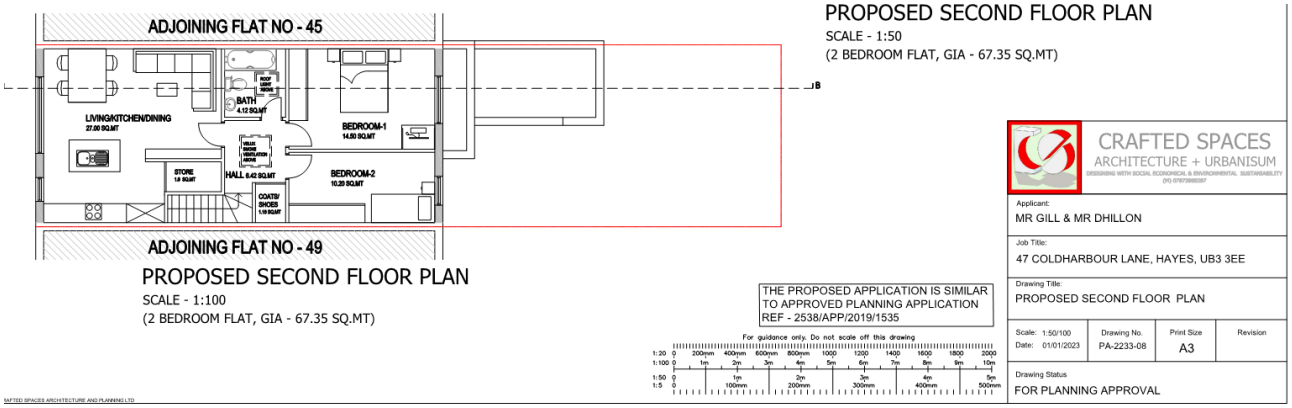
Based on the measured results it is seen that external noise levels exceed BS8233 criteria for openable windows therefore alternative means of ventilation should be provided. Background ventilation to habitable rooms can be provided using acoustic trickle vents which match or exceed the sound reduction values within Table 7.4.

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

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47 Coldharbour Rd : F.02 - KLD (Day)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			66.3	63.5	61.6	62.6	59.2	51.8	66.3
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									
Trafiic 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			69.3	66.5	64.6	65.6	62.2	54.8	69.3
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	67.5 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	
FAÇADE Elements									
Total Façade Area 1	14.3 m2								
Glazing Area, Sg - Façade 1	5.1 m2								
4mm Glass / 12mm Air Cavity / 8mm Glass		SRI	30	25	35	43	40	54	
		Sg/Sf	-34	-29	-39	-47	-44	-58	
Predicted noise level in building from glazing 1			36.0	38.2	26.3	19.3	18.9	-2.5	31.4
Solid Area, Sw - Façade 1	9.2 m2								
300mm Brick/Block		SRI	44	43	47	56	67	77	
		Sw/Sf	-46	-45	-49	-58	-69	-79	
Predicted noise level through solid façade 1			24.5	22.7	16.8	8.8	-5.6	-23.0	18.0
Roof/Floor Area, Sc - Façade 1	27.0 m2								
18mm Ply / 200mm Joist / 100mm Mineral Wool / Resbar / 12.5mm SoundBloc		SRI	30	44	51	56	58	62	
		Sc/Sf	-27	-41	-48	-53	-55	-59	
Predicted noise level through solid façade 3 / Roof			43.2	26.4	17.5	13.5	8.1	-3.3	28.0
Trickle Vent(s) - Façade 1	1 Vent								
Simon Acoustic EHAS with AEA851		Dne	44	40	38	39	48	44	
		Ao/S	-46	-42	-39	-41	-49	-46	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			24.8	26.0	26.3	25.9	13.9	10.0	28.4
Combined Internal Noise Level - L_{eq}			**44.0**	**38.8**	**29.8**	**27.0**	**20.5**	**11.8**	**34**
Target Internal Noise Level (dBA)									35
									Pass

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47 Coldharbour Rd : F.02 - Bed 1 (Night)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			64.3	60.2	59.1	61.2	57.0	48.1	64.3
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									
Trafiic 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	-10.0 dB		-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	
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			57.3	53.2	52.1	54.2	50.0	41.1	57.3
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	36.3 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			-1.7	-1.7	-1.7	-1.7	-1.7	-1.7	
FAÇADE Elements									
Total Façade Area 1	7.9 m2								
Glazing Area, Sg - Façade 1	1.4 m2								
4mm Glass / 12mm Air Cavity / 4mm Glass		SRI	23	18	26	38	44	38	
		Sg/Sf	-31	-26	-34	-46	-52	-46	
Predicted noise level in building from glazing 1			28.0	28.9	19.8	9.9	-0.3	-3.2	22.6
Solid Area, Sw - Façade 1	6.5 m2								
300mm Brick/Block		SRI	44	43	47	56	67	77	
		Sw/Sf	-45	-44	-48	-57	-68	-78	
Predicted noise level through solid façade 1			13.7	10.6	5.5	-1.4	-16.6	-35.5	6.6
Roof/Floor Area, Sc - Façade 1	14.5 m2								
18mm Ply / 200mm Joist / 100mm Mineral Wool / 2 x 12.5mm SoundBloc		SRI	30	44	51	56	58	62	
		Sc/Sf	-27	-41	-48	-53	-55	-59	
Predicted noise level through solid façade 3 / Roof			31.2	13.1	5.0	2.1	-4.1	-17.0	15.9
Trickle Vent(s) - Façade 1	1 Vent								
Simon Acoustic SL		Dne	39	35	35	32	34	36	
		Ao/S	-38	-34	-34	-31	-33	-35	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			20.7	20.8	19.3	24.8	18.6	7.7	26.7
Combined Internal Noise Level - L_{eq}			**33.2**	**29.7**	**22.8**	**25.0**	**18.9**	**10.2**	**28**
Target Internal Noise Level (dBA)									**30**
									Pass

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47 Coldharbour Rd : F.02 - Bed 2 (Night)

BS8233 Facade Noise Break In Calculation			125	250	500	1000	2000	4000	dBA
Average External Noise Level - L_{eq}			64.3	60.2	59.1	61.2	57.0	48.1	64.3
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									
Trafiic 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	-10.0 dB		-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	
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			57.3	53.2	52.1	54.2	50.0	41.1	57.3
Calculation of environmental noise break-in to residential rooms									
L2 = L1 - R + 10*log(S/A) + 3dB (Freefield version)									
Room Volume =	25.5 m3								
Reverberation Time =	0.5 s		0.5	0.5	0.5	0.5	0.5	0.5	
10*log(S/A)			-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	
FAÇADE Elements									
Total Façade Area 1	5.8 m2								
Glazing Area, Sg - Façade 1	0.9 m2								
4mm Glass / 12mm Air Cavity / 4mm Glass		SRI	23	18	26	38	44	38	
		Sg/Sf	-31	-26	-34	-46	-52	-46	
Predicted noise level in building from glazing 1			27.6	28.5	19.4	9.5	-0.7	-3.6	22.2
Solid Area, Sw - Façade 1	4.9 m2								
300mm Brick/Block		SRI	44	43	47	56	67	77	
		Sw/Sf	-45	-44	-48	-57	-68	-78	
Predicted noise level through solid façade 1			14.0	10.9	5.8	-1.1	-16.3	-35.2	6.9
Roof/Floor Area, Sc - Façade 1	10.2 m2								
18mm Ply / 200mm Joist / 100mm Mineral Wool / 2 x 12.5mm SoundBloc		SRI	30	44	51	56	58	62	
		Sc/Sf	-28	-42	-49	-54	-56	-60	
Predicted noise level through solid façade 3 / Roof			31.2	13.1	5.0	2.1	-4.1	-17.0	15.9
Trickle Vent(s) - Façade 1	1 Vent								
Simon Acoustic SL		Dne	39	35	35	32	34	36	
		Ao/S	-36	-32	-33	-29	-31	-33	
Predicted noise level through trickle vents ` Lff-Dne+10log(A0/A)+K			22.2	22.3	20.8	26.3	20.1	9.2	28.2
Combined Internal Noise Level - L_{eq}			**33.2**	**29.6**	**23.4**	**26.5**	**20.3**	**11.1**	**29**
Target Internal Noise Level (dBA)									**30**
									Pass

APPENDIX D – INSUL DATA SHEETS

Sound Insulation Prediction (v8.0.0)

Aran Acoustics - Key No. 1548

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

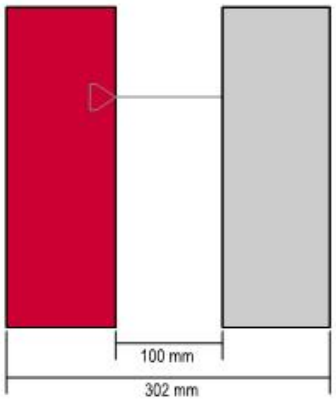
Job Name:

Job No.: Page No.:

Date: 13 Mar 23 Initials:Damien

File Name: insul

Notes:



Rw 53 dB
C -1 dB
C_{tr} -4 dB
D_{nTw} 55 dB [V:50m3] [A:11m2]

System description

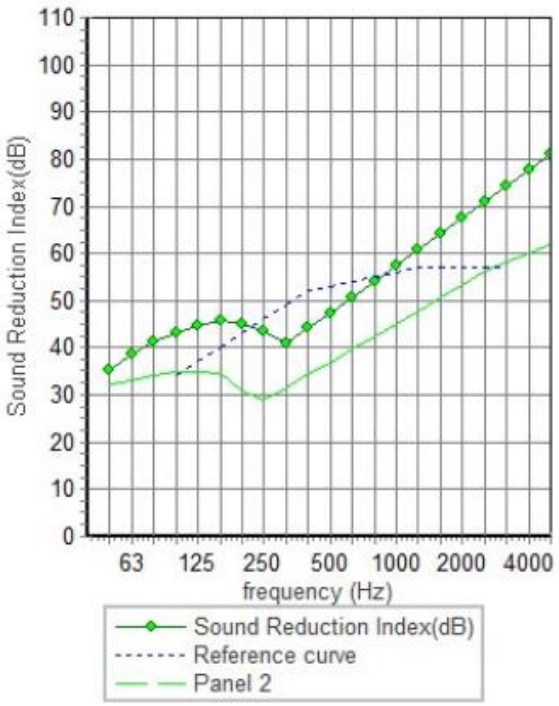
Panel 1 : 1 x 102.0 mm Brick (102.5) (?:1600 kg/m3,E:8.9GPa,?:0.02)

Cavity: Butterfly Tie ,Stud spacing 600 mm (?:0 kg/m3, Rf:100 Pa.s/m2)
Panel 2 + 1 x 100.0 mm mm Concrete Block (?:1250 kg/m3,E:8.3GPa,?:0.02)

Mass-air-mass resonant frequency =22 Hz

frequency (Hz)	R(dB)	R(dB)
50	35	
63	39	38
80	41	
100	43	
125	45	44
160	46	
200	45	
250	43	43
315	41	
400	44	
500	47	47
630	51	
800	54	
1000	57	56
1250	61	
1600	64	
2000	67	67
2500	71	
3150	74	
4000	78	77
5000	81	

Panel Size 2.7x4 m



Sound Insulation Prediction (v8.0.0)

Aran Acoustics - Key No. 1548

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

Job Name:

Job No.: Page No.: Notes:

Date: 13 Mar 23 Initials:

File Name: insul

Rw	53 dB
C	-3 dB
C_{tr}	-9 dB
D_{nTw}	55 dB [V:50m3] [A:11m2]

System description

Panel 1 : 1 x 4.0 mm Rubber (?:920 kg/m3,E:0.03GPa,?:0.20) + 1 x 18.0 mm Plywood (?:560 kg/m3,E:4.4GPa,?:0.01)

Cavity: Resilient clip or channel @ 600 mm , Infill Fibreglass (10kg/m3) Thickness 100 mm
Panel 2 + 1 x 12.5 mm Gyproc SoundBloc 12.5mm (?:848 kg/m3,E:3.8GPa,?:0.01)

Mass-air-mass resonant frequency =48 Hz

frequency (Hz)	R(dB)	R(dB)
50	7	
63	10	10
80	19	
100	26	
125	32	30
160	37	
200	41	
250	45	44
315	47	
400	49	
500	52	51
630	54	
800	55	
1000	57	56
1250	57	
1600	58	
2000	60	58
2500	57	
3150	59	
4000	63	62
5000	67	

Panel Size 2.7x4 m