



Acoustic Survey and Assessment for Proposed Residential development at 216 Yorkshire Street, Rochdale, OL16 2DW.

Prepared for:

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OL11 5EU.

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1. Introduction

- 1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic survey and assessment to support a planning application for the conversion of the upper floors to residential apartments at 216 Yorkshire Street, Rochdale, OL16 2DW.

Site Location and Context

- 1.2. The development site is situated to the south of the busy Yorkshire Street. The road is lined by terrace properties with commercial units to the ground floors and a mixture of residential and commercial units to the upper floors. To the rear and south of the site is an alleyway, with a dead end and access to the a solicitors office and the rear of the terrace properties on Yorkshire Street.
- 1.3. An aerial Photograph is enclosed in Figure 1.
- 1.4. Concerns have been raised over the potential impact on the future residents of the development hence the request for this report.



2. Policy and Guidance

- 2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals, or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).
- 2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in September 2023, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution.
- 2.3. The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.
- 2.4. The NPSE introduces the following terms, although no sound levels are given to represent these, many authorities have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:
- NOEL – No Observed Effect Level (<30dB(A) inside <50dB(A) outside, 10dB below background)
- LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
- SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)
- 2.5. The sound levels within the brackets of the previous paragraph are those determined as appropriate levels to indicate the relevant effect levels represented by the NPSE.



- 2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.
- 2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance' or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.
- 2.8. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night-time period.
- 2.9. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.
- 2.10. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.
- 2.11. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night-time a level of 30dB $L_{Aeq,8hr}$ is recommended. Criteria for external areas mirrors that within the WHO guidance.
- 2.12. Another commonly used standard is British Standard 4142:2014 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels.
- 2.13. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.



- 2.14. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".
- 2.15. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact.
- 2.16. In addition, the 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.
- 2.17. The first stage consists of an initial noise risk assessment, based on indicative day and night-time *noise* levels. Simply put, the higher the ambient noise in an area the greater the impact. The levels given are shown below although it should be noted that these are in excess of both the WHO and BS 8233: 2014 guidance.

Noise Risk Category*	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq,16hr} < 50dB$ $L_{Aeq,8hr} < 40dB$	May be noticeable but no adverse effect on health and quality of life	In this category the development is likely to be acceptable from a noise perspective, nevertheless a good acoustic design process is encouraged to improve the existing environment and/or safeguard against possible future deterioration and to protect any designated tranquil areas. A noise assessment may be requested to demonstrate no adverse impact from noise. Application need not normally be delayed on noise grounds.
1 – Low $L_{Aeq,16hr} 50-63dB$ $L_{Aeq,8hr} 40-55dB$	Adverse effect on health and quality of life	In this category the development may be refused unless a good acoustic design process is followed and is demonstrated via a Level 1 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised and that a significant adverse impact will not arise in the finished development. Planning conditions and other measures to control noise may be required.
2 – Medium $L_{Aeq,16hr} 63-69dB$ $L_{Aeq,8hr} 55-60dB$ $L_{AFmax} > 80dB^{**}$	Significant adverse effect on health and quality of life	In this category the development is likely to be refused unless good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised, and clearly demonstrates that a significant adverse noise impact will not arise in the finished development. Planning conditions and other measures to control noise will normally be required.
3 – High $L_{Aeq,16hr} > 69dB$ $L_{Aeq,8hr} > 60dB$ $L_{AFmax} > 80dB^{**}$	Unacceptable adverse effect of health and quality of life	In this category the development is very likely to be refused on noise grounds, even if a good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement. Applicants are advised to seek expert advice on possible mitigation measures. Advice on the circumstances when the refusal of a new housing on noise grounds should normally be anticipated is included in the ProPG.

2.18. Stage 2, consists of a full assessment of the prevailing ambient noise and requires 4 elements to be considered:

- I. Element 1 – Good Acoustic Design
- II. Element 2 – Internal Noise Level Guidelines
- III. Element 3 – External Amenity Area Noise Assessment
- IV. Element 4 – Assessment of Other Relevant Issues

2.19. A good acoustic design is implicit in meeting the requirements of the NPPF and can help to resolve many potential acoustic issues.

2.20. Details of the criteria considered suitable are provided above for both internal and external sound levels. Element 4 includes such issues as local and national policy, likely occupants, wider planning objectives.



3. The Assessment

- 3.1 In order to obtain representative background sound levels for the area on site monitoring was undertaken over the 18th-20th March 2024.
- 3.2 Two Cirrus Optimus Green sound level meters were utilised for the monitoring. The meters were placed at least 1m from the façade of the property. One at the front of the property overlooking the main road at a first-floor level and the other at the rear overlooking the extraction system at a second-floor window.
- 3.3 The meters were field calibrated at the start and end of the monitoring period with no significant variation and full laboratory calibration certificates are available on request.
- 3.4 The weather during the monitoring was dry with little to no wind <3m/s.
- 3.5 The full results are shown in Appendix A, with a summary in the tables below.

Front

Start Time	End Time	Duration	L _{Aeq}	L _{A90}	L _{AMax}
18/02/2024 20:00	18/02/2024 23:00	02:59:58	73.8	60.5	105.9
18/02/2024 23:00	19/02/2024 07:00	08:00:00	70.5	45.1	91.2
19/02/2024 07:00	19/02/2024 23:00	16:00:00	74.6	65.4	107.5
19/02/2024 23:00	20/02/2024 07:00	08:00:00	69.7	44.7	91.6
20/02/2024 07:00	20/02/2024 10:00	03:00:01	75.3	66.1	94.2

Rear

Start Time	End Time	Duration	L _{Aeq}	L _{A90}	L _{AMax}
18/02/2024 20:00	18/02/2024 23:00	02:59:59	62.7	60.8	85.9
18/02/2024 23:00	19/02/2024 07:00	08:00:00	55.1	37.9	77.6
19/02/2024 07:00	19/02/2024 23:00	16:00:00	59.7	52.7	98.6
19/02/2024 23:00	20/02/2024 07:00	08:00:00	53.9	40.2	79.1
20/02/2024 07:00	20/02/2024 10:00	03:00:01	55.9	45.8	89.9

- 3.6 Background sound levels were dominated by passing traffic to the front and the extraction system or passing traffic to the rear when this was not switched on. At night the maximum sound levels regularly exceeded were due to passing traffic with levels of 86.2dB(A) identified to the front and 69.8dB(A) to the rear.



- 3.7 Given a 15dB attenuation¹ for an open window the sound levels to be experienced by the future occupants are above those identified within the guidance documents detailed in section 2 of the report. Therefore, further mitigation measures are required.
- 3.8 A detailed calculation has been undertaken in accordance with Annex G of BS8233:2014 – ‘More Rigorous Calculation’ to account for the full structure of the second-floor bedroom. This has identified that a standard 6/12/6 double glazing unit providing a sound reduction, $R_w(C;C_{tr})$, of 33(-1;-3) will be sufficient, when closed, to ensure suitable internal sound levels are maintained through both the day and night-time periods, with resulting internal sound levels substantially below the guideline levels, See Appendix B.
- 3.9 On both floors the rear room will be a kitchen, typically a non-habitable room while to the rear and living room and bedroom over-looking the main road to the front.
- 3.10 During the monitoring the meter to the rear of the site was moved back by members of staff so they could access the sink area in the room. This resulted in a drop of ~10dB(A) in recorded sound levels and as such the first 1-hours measurements have been used within the detailed calculation as these represent the highest measurements on this façade and a period when the extraction system was switched on. These levels were still below those identified at the front of the property and so are considered to be representative of the rear façade.
- 3.11 In order to be able to keep windows closed additional ventilation provision must be made for the property. As such it is recommended that a ventilation system is used incorporating acoustic trickle ventilators for all windows to habitable rooms to the proposed properties. The ventilators must achieve a similar or better performance to the windows when open and a number of suitable models are available from suppliers including the Greenwood DN Vent providing 34dB (C_{tr}) attenuation or the Titon, Trimvent Select S13 Ventilator providing 33dB (C_{tr}) attenuation. Other models and manufacturers area available.

¹ BS8233: 2014; Guidance on sound insulation and noise reduction for buildings



3.12 Care must be taken to ensure that windows are well fitted and gaps between the window frame and the brick work are minimised. Where gaps do occur, these should be filled with a suitable acoustic material, not expandable foam. The window frame should be sealed across the full depth of the frame and not just around the edges. This will ensure that sound does not 'leak' around the edge of the frame.

3.13 As mentioned above the sound level to the rear of the site were dominated by plant noise from the ground floor extraction system. This was continuous throughout opening hours of the site, i.e. no cycling on/off was identified. A review of the 1/3 octave frequency monitoring data showed no tonal noise associated with the plant. However, the extraction system is distinctive and as such a 3dB correction has been applied. As such a BS4142:2014 assessment has been undertaken for the rear.

3.14

	Day	Night	
Measured Ambient sound level	$L_{Aeq} = 74.4\text{dB}$	69.7dB(A)	Measured on site for daytime, no recordings in evening
Residual Sound level	$L_{Aeq} = 69.4\text{dB}$	$L_{Aeq} = 60.0\text{dB}$	Taken from the 1-hr average with no extraction, and 15-minute night-time average level (+10dB as described above), no plant operational
Background Sound Level	$L_{A90} = 54.0\text{dB}$	$L_{A90} = 51.1\text{dB}$	Background taken from the 09:00-10:00, and 15 minute night-time average level (+10dB as described above).
Reference period	60 minutes	15 minutes	Normal ref period,
Specific sound Level	$L_{Aeq} = (10 \cdot \log(74.4 - 69.7)) = 72.0\text{dB}$	$L_{Aeq} = 72.0\text{dB}$	Calculated
Acoustic feature	3+dB	+3dB	Distinctive sound



Rating level	75dB	75dB	
Background sound level	$L_{A90} = 54.4\text{dB}$	$L_{A90} = 51.1\text{dB}$	
Excess of Rating level over background level	$(72-54.0)\text{ dB} = \mathbf{+18.0\text{dB}}$ indicates significant adverse impact	$(72-51.1)\text{ dB} = \mathbf{+20.9\text{dB}}$ indicates significant adverse impact	
Internal sound level with mitigation in place	28.5dB indicates no significant adverse impact	28.5dB indicates no significant adverse impact	Following inclusion of 6/12/6 double glazed windows and alternative ventilation based on BS8233:2014, annex G more rigorous calculation
Uncertainty			Sound levels have been corrected by 10dB to account for movement of microphone away from window opening based on initial measurements.

3.15 The assessment, without the mitigation measures suggests an adverse impact on the proposed kitchens of the apartments. However, with mitigation in place the rating level from the extraction system is still below the recommended night-time sound level of 30dB(A) at 28.5dB(A), suggesting to adverse impact on the kitchen area.

Internal sound transfer

3.16 It is also important to ensure that sound transfer between the flats is minimised to prevent any adverse impact. As such a design specification form the separating floor/ceilings between the units has been developed and is included within Appendix C.

3.17 This specification will ensure that a suitable sound level is achieved between the floors even when an excessively high sound level is generated in the adjacent room, exceeding the current building regulations requirements.



4 Conclusion

- 4.1 On-site monitoring has identified existing background sound levels will result in an adverse impact on the proposed development. As such additional mitigation measures are required.
- 4.2 These have been identified as standard double-glazing units with trickle window vents to ensure a suitable level of ventilation is achieved.
- 4.3 The inclusion of the above mitigation measures to all habitable rooms will ensure that the internal and external sound levels are acceptable and will result in a No Observe Effect on the future residents in line with the Noise Policy Statement for England.
- 4.4 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Figure 1 – Aerial Photograph

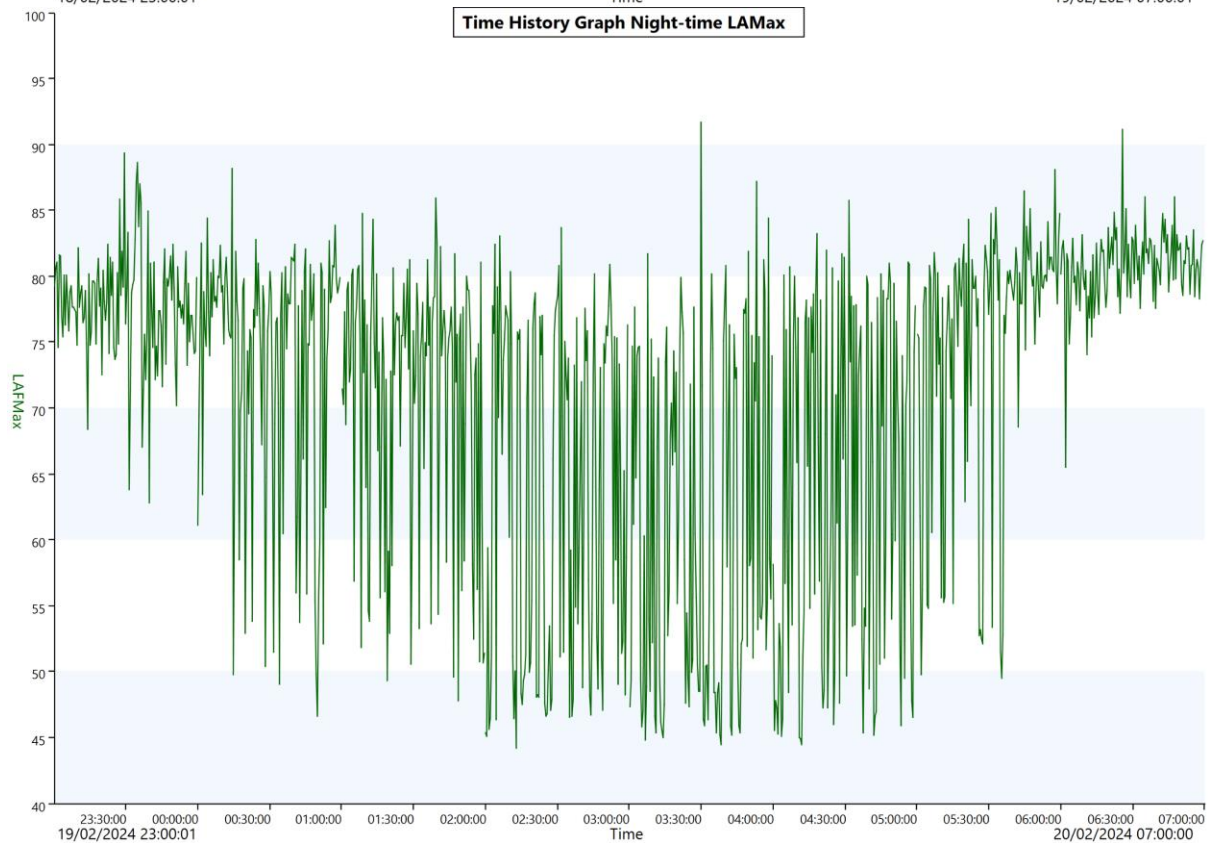
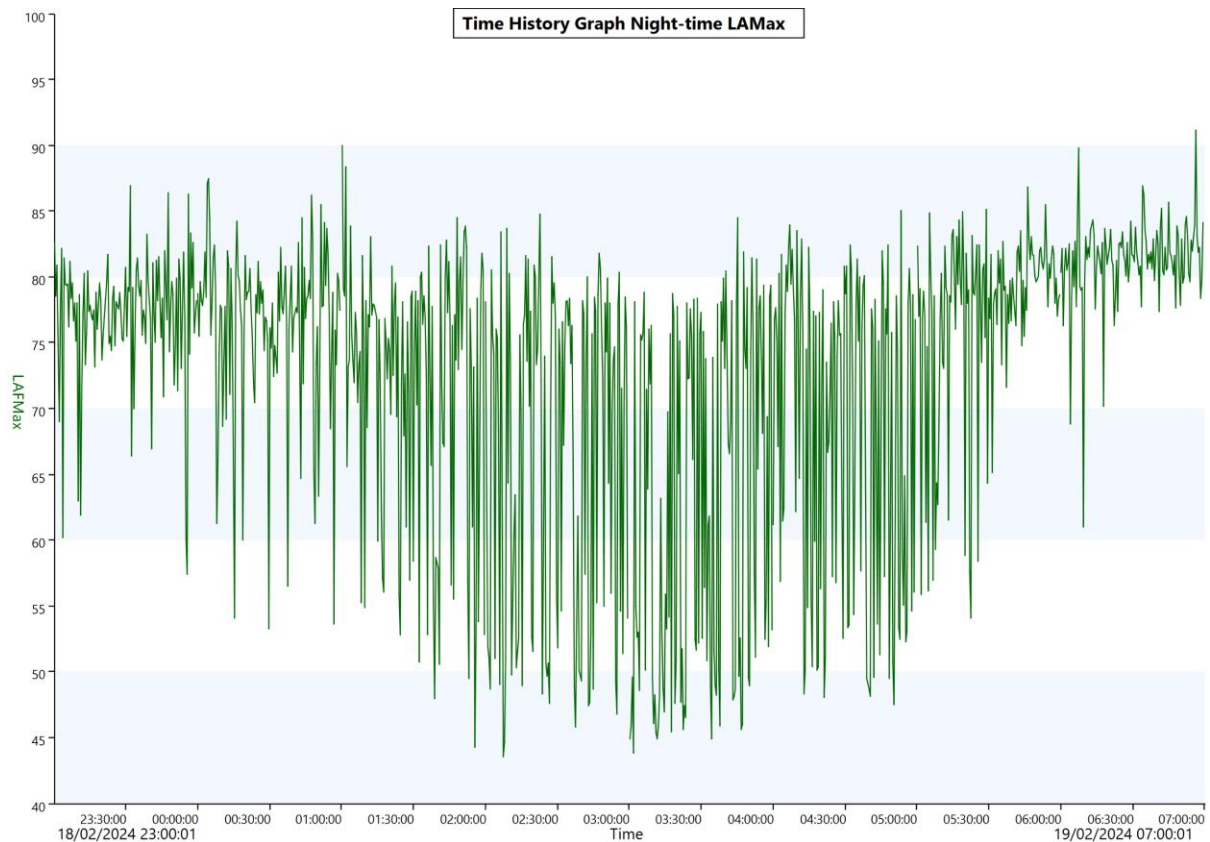




Appendix A – Full Monitoring Results

Front

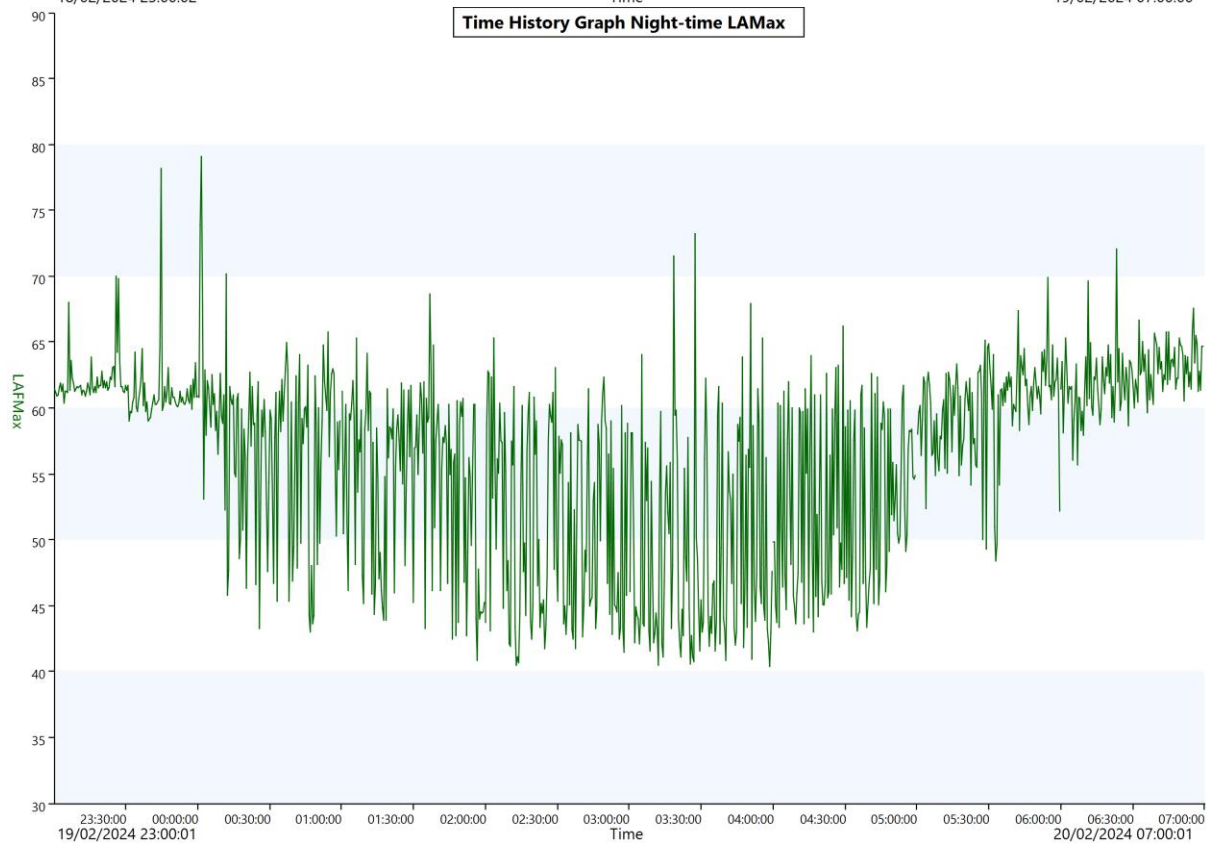
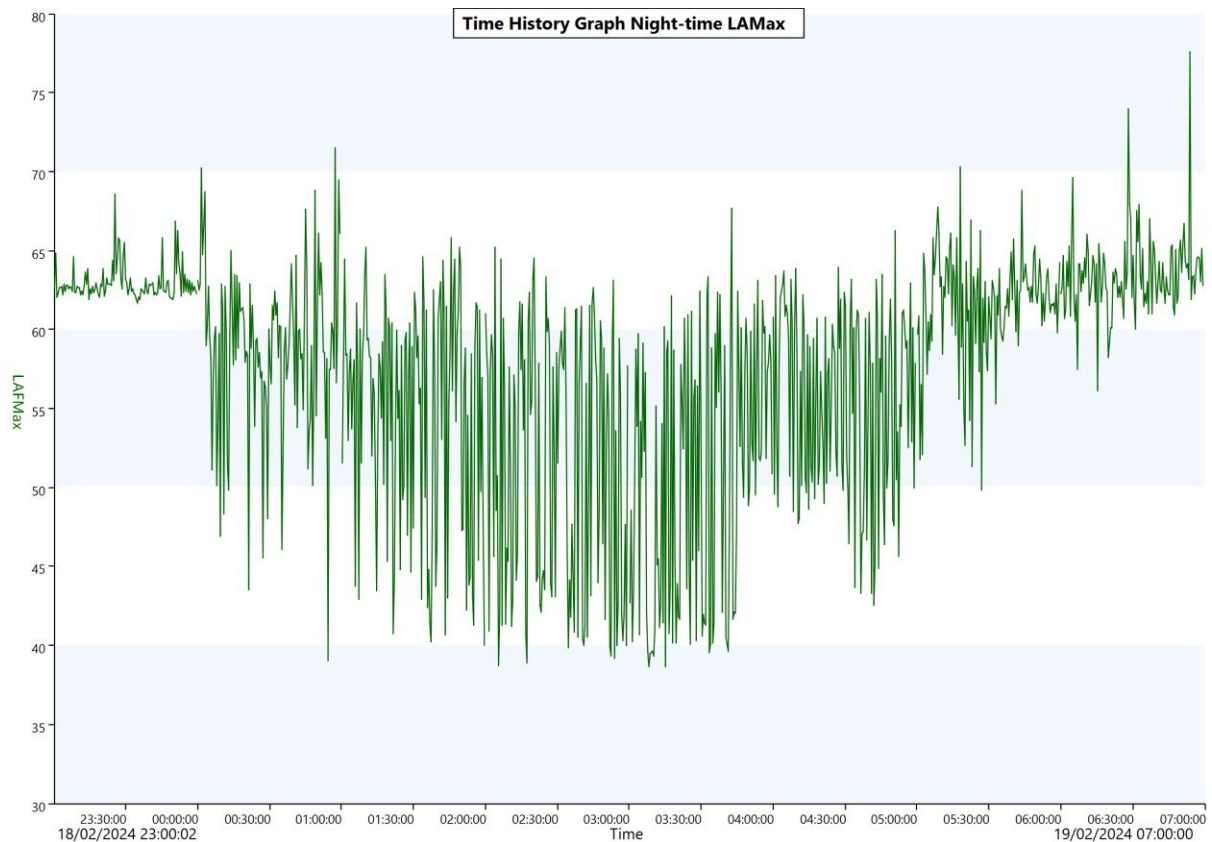
Time	L _{Aeq} (dB)	L _{AMax} (dB)	L _{A90} (dB)
18/02/2024 20:00	75.4	106.0	62.4
18/02/2024 21:00	73.1	95.8	61.2
18/02/2024 22:00	72.1	87.3	58.3
18/02/2024 23:00	71.0	86.9	55.1
19/02/2024 00:00	69.7	87.4	50.1
19/02/2024 01:00	67.5	90.0	44.8
19/02/2024 02:00	65.7	84.7	43.5
19/02/2024 03:00	63.5	84.4	43.4
19/02/2024 04:00	66.6	85.0	45.0
19/02/2024 05:00	71.9	86.8	52.1
19/02/2024 06:00	75.6	91.2	60.7
19/02/2024 07:00	76.8	89.9	67.6
19/02/2024 08:00	76.6	101.2	66.6
19/02/2024 09:00	75.5	86.3	66.2
19/02/2024 10:00	74.9	95.1	66.5
19/02/2024 11:00	74.0	85.7	66.7
19/02/2024 12:00	75.3	101.0	66.4
19/02/2024 13:00	75.1	102.2	66.8
19/02/2024 14:00	73.2	94.6	66.0
19/02/2024 15:00	73.0	90.8	66.0
19/02/2024 16:00	73.2	97.2	66.9
19/02/2024 17:00	76.5	107.5	65.6
19/02/2024 18:00	73.3	98.4	65.4
19/02/2024 19:00	73.9	99.0	65.4
19/02/2024 20:00	72.8	91.2	64.3
19/02/2024 21:00	73.6	98.5	62.3
19/02/2024 22:00	73.1	97.4	56.9
19/02/2024 23:00	70.8	89.4	53.3
20/02/2024 00:00	69.1	88.1	47.7
20/02/2024 01:00	67.0	85.9	46.0
20/02/2024 02:00	64.4	83.6	43.9
20/02/2024 03:00	63.8	91.7	43.6
20/02/2024 04:00	65.4	85.8	43.9
20/02/2024 05:00	70.9	88.1	48.0
20/02/2024 06:00	74.4	91.2	58.4
20/02/2024 07:00	76.0	94.2	66.3
20/02/2024 08:00	75.3	87.3	65.4
20/02/2024 09:00	74.5	88.7	66.2





Rear

Date	L _{Aeq} (dB)	L _{AMax} (dB)	L _{A90} (dB)
18/02/2024	64.7	85.9	60.8
18/02/2024	61.2	77.2	60.6
18/02/2024	61.4	64.6	60.8
18/02/2024	61.4	68.6	60.7
19/02/2024	51.8	71.5	39.5
19/02/2024	48.2	65.8	37.1
19/02/2024	46.6	65.2	36.8
19/02/2024	45.6	67.7	36.7
19/02/2024	48.1	66.2	38.7
19/02/2024	54.4	70.3	45.4
19/02/2024	57.4	77.6	49.9
19/02/2024	57.7	71.3	50.8
19/02/2024	56.4	70.4	44.5
19/02/2024	59.7	98.6	36.5
19/02/2024	60.2	90.8	58.2
19/02/2024	61.0	93.8	58.5
19/02/2024	59.7	82.6	58.2
19/02/2024	59.2	74.8	57.9
19/02/2024	60.7	69.9	59.3
19/02/2024	59.7	67.0	58.5
19/02/2024	59.7	72.3	58.1
19/02/2024	59.7	85.3	58.2
19/02/2024	59.5	72.7	58.2
19/02/2024	60.4	75.2	59.4
19/02/2024	60.1	65.4	58.9
19/02/2024	60.0	67.5	59.3
19/02/2024	59.9	67.2	58.0
19/02/2024	59.7	78.2	58.1
20/02/2024	51.5	79.1	41.4
20/02/2024	48.3	68.6	40.1
20/02/2024	46.8	65.3	39.3
20/02/2024	46.0	73.2	39.1
20/02/2024	47.9	66.2	40.8
20/02/2024	53.2	69.9	45.7
20/02/2024	56.5	72.1	49.6
20/02/2024	58.5	89.9	52.5
20/02/2024	55.4	82.1	45.9
20/02/2024	50.3	68.4	44.0





Appendix B – Sound Break-in Calculations

Front First Floor Living Room

	Description	Value
Sf	Total Façade area (m2)	6.83
Swi	Window Area (M2)	2.2
Sew	External wall area (m2)	4.63
Srr	Area of ceiling (m2)	15.444
S	Total area of elements (sf + Srr)	22.28
V	Volume of receiving room (m3)	35.52
A0	Reference absorption area (m2)	10
	Number of ventilators in façade	1
A		68.47

Daytime

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	74.6	74.9	68.6	67.8	67.5	71.9	68.2	59.6
Lff		70.1	70.4	64.1	63.3	63	67.4	63.7	55.1
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			50.2	30.0	30.8	22.9	17.8	16.9	6.7
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		28.2	24.0	13.9	22.2	19.7	17.8	18.1	7.7

Night

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	70.5	67.2	61.1	62.8	63.3	67.8	64.2	55.8
Lff		66	62.7	56.6	58.3	58.8	63.3	59.7	51.3
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			42.5	22.5	25.8	18.7	13.7	12.9	2.9
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		22.7	16.3	6.4	17.2	15.5	13.7	14.1	3.9



Night-time LAMax

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	86.2	74	71.3	72.3	77.8	83.2	76.3	64.1
Lff		81.7	69.5	66.8	67.8	73.3	78.7	71.8	59.6
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			49.3	32.7	35.3	33.2	29.1	25.0	11.2
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		34.7	23.1	16.6	26.7	30.0	29.1	26.2	12.2

First Floor Front Bedroom

	Description	Value
Sf	Total Façade area (m2)	6.83
Swi	Window Area (M2)	2.2
Sew	External wall area (m2)	4.63
Srr	Area of ceiling (m2)	15.444
S	Total area of elements (sf + Srr)	22.28
V	Volume of receiving room (m3)	35.52
A0	Reference absorption area (m2)	10
	Number of ventilators in façade	1
A		68.47

Daytime

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	86.2	74	71.3	72.3	77.8	83.2	76.3	64.1
Lff		81.7	69.5	66.8	67.8	73.3	78.7	71.8	59.6
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			49.3	32.7	35.3	33.2	29.1	25.0	11.2
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		34.7	23.1	16.6	26.7	30.0	29.1	26.2	12.2



Nighttime

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	70.5	67.2	61.1	62.8	63.3	67.8	64.2	55.8
Lff		66	62.7	56.6	58.3	58.8	63.3	59.7	51.3
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			42.6	22.4	25.5	18.5	13.5	12.6	2.6
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		22.5	16.4	6.3	16.9	15.3	13.5	13.8	3.6

Night-time LAMax

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	86.2	74	71.3	72.3	77.8	83.2	76.3	64.1
Lff		81.7	69.5	66.8	67.8	73.3	78.7	71.8	59.6
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			49.4	32.6	35.0	33.0	28.9	24.7	10.9
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		34.5	23.2	16.5	26.4	29.8	28.9	25.9	11.9

First floor rear Kitchen

	Description	Value
Sf	Total Façade area (m2)	8.69
Swi	Window Area (M2)	1.6
Sew	External wall area (m2)	6.49
Srr	Area of ceiling (m2)	13.797
S	Total area of elements (sf + Srr)	22.49
V	Volume of receiving room (m3)	31.73
A0	Reference absorption area (m2)	10
	Number of ventilators in façade	1
A		61.772



Daytime

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	74.4	67.6	67.8	64.3	61.4	69	70.6	64.9
Lff		69.9	63.1	63.3	59.8	56.9	64.5	66.1	60.4
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			42.9	29.5	27.7	17.2	15.3	19.7	12.4
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		25.5	16.7	13.4	19.1	14.0	15.3	20.9	13.4

Second floor front living room

	Description	Value
Sf	Total Façade area (m2)	6.83
Swi	Window Area (M2)	1.56
Sew	External wall area (m2)	5.27
Srr	Area of ceiling (m2)	15.444
S	Total area of elements (sf + Srr)	22.28
V	Volume of receiving room (m3)	35.52
A0	Reference absorption area (m2)	10
	Number of ventilators in façade	1
A		68.47

Front

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	74.6	74.9	68.6	67.8	67.5	71.9	68.2	59.6
Lff		70.1	70.4	64.1	63.3	63	67.4	63.7	55.1
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			50.2	29.3	29.4	22.6	17.3	16.5	6.1
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		27.8	24.0	13.2	20.8	19.4	17.3	17.7	7.1

Night-time

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	70.5	67.2	61.1	62.8	63.3	67.8	64.2	55.8
Lff		66	62.7	56.6	58.3	58.8	63.3	59.7	51.3
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			42.5	21.8	24.4	18.4	13.2	12.5	2.3
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		22.2	16.3	5.7	15.8	15.2	13.2	13.7	3.3

Night-time LAMax

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	86.2	74	71.3	72.3	77.8	83.2	76.3	64.1
Lff		81.7	69.5	66.8	67.8	73.3	78.7	71.8	59.6
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			49.3	32.0	33.9	32.9	28.6	24.6	10.6
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		34.2	23.1	15.9	25.3	29.7	28.6	25.8	11.6

Second floor front bedroom

	Description	Value
Sf	Total Façade area (m2)	7.43
Swi	Window Area (M2)	1.56
Sew	External wall area (m2)	5.87
Srr	Area of ceiling (m2)	16.796
S	Total area of elements (sf + Srr)	24.23
V	Volume of receiving room (m3)	38.63
A0	Reference absorption area (m2)	10
	Number of ventilators in façade	1
A		72.37



Daytime

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	74.6	74.9	68.6	67.8	67.5	71.9	68.2	59.6
Lff		70.1	70.4	64.1	63.3	63	67.4	63.7	55.1
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			50.3	29.2	29.2	22.4	17.1	16.3	5.8
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		27.7	24.1	13.1	20.6	19.2	17.1	17.5	6.8

Night-time

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	70.5	67.2	61.1	62.8	63.3	67.8	64.2	55.8
Lff		66	62.7	56.6	58.3	58.8	63.3	59.7	51.3
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			42.6	21.7	24.2	18.2	13.0	12.3	2.0
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		22.0	16.4	5.6	15.6	15.0	13.0	13.5	3.0

Night-time LMax

	Description	Single figure rating	Octave band frequency Hz						
			63	125	250	500	1000	2000	4000
LAeq	LAeq daytime	86.2	74	71.3	72.3	77.8	83.2	76.3	64.1
Lff		81.7	69.5	66.8	67.8	73.3	78.7	71.8	59.6
Dn,e	2500EAW.AC1 - Greenwood	45	30	41	40	36	47	43	46
Rwi	6/12/6 glazing	35	23	25	21	35	42	41	40
Rew	Solid 9inch brick	55	41	39	44	52	59	63	68
Rrr	Slate, 100mm insulation, 15mm pl	54	17	35	45	52	57	57	59
internal level			49.4	31.9	33.7	32.7	28.4	24.4	10.3
A-weighting			-26.2	-16.1	-8.6	-3.2	0	1.2	1
Internal A-weight		34.0	23.2	15.8	25.1	29.5	28.4	25.6	11.3

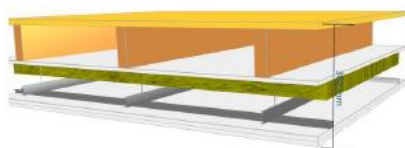
Appendix C – Design Specification for dividing floor/ceilings

Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within $R_w \pm 3$ dB
Martin Environmental Solutions Ltd - Key No. 2594
Job Name:
Job No.: Initials/info
Date: 21/03/2024
File Name: insul



Notes:



R_w 52 dB
C -1 dB
Ctr -6 dB

Mass-air-mass resonant frequency = 38 Hz, 95 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 48.6 kg/m²

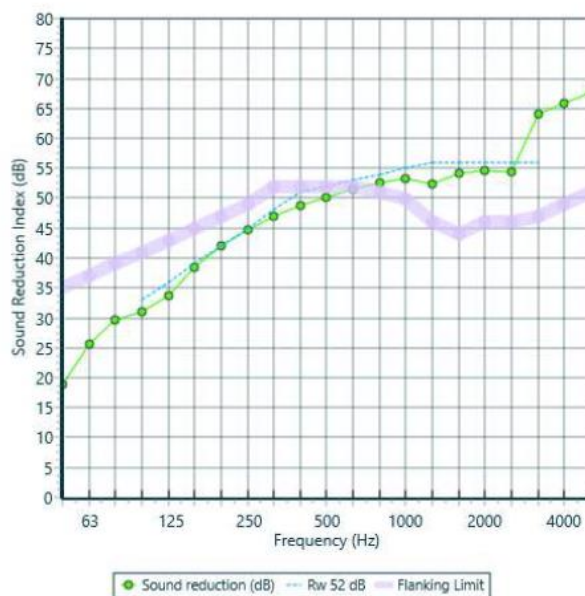
System description

Panel 1 : 1 x 20 mm Flooring Particle Board

Frame: Timber stud (1.5E2 mm x 45 mm), Stud spacing 600 mm; Cavity Width 150 mm
Panel 2 : 1 x 12.5 mm Gyproc Wallboard 12.5mm

Frame: Suspended Light Steel Grid (1.5E2 mm x 45 mm), Stud spacing 600 mm; Cavity Width 150 mm, 1 x Fibreglass (10kg/m³) Thickness 60 mm
Panel 3 : 2 x 15 mm Gyproc SoundBloc 15mm

freq.(Hz)	R(dB)	R(dB)
50	19	
63	26	22
80	30	
100	31	
125	34	33
160	38	
200	42	
250	45	44
315	47	
400	49	
500	50	50
630	52	
800	53	
1000	53	53
1250	52	
1600	54	
2000	55	54
2500	54	
3150	64	
4000	66	66
5000	68	





Appendix D - Report Author Details

This report has been produced by Neil Martin, BSc (Hons), PGDip, CEnvH MCIEH, MIOA.

Neil is the principal acoustic consultant at Martin Environmental Solutions Ltd, a consultancy company specialising in Environmental Health disciplines including environmental noise assessment and control. He holds a Bachelor's degree in Environmental Health and Diploma in Acoustics. He is a Chartered Member of the Chartered Institute of Environmental Health and a Full member of the Institute of Acoustics.

Neil has over 20 years' experience working within a Local Authority Environmental Health setting, principally in the Environmental Protection and Public Health areas and has been working as an acoustic consultant since 2011.

Since its formation, Martin Environmental Solutions has advised and assisted many groups including residents, developers and local authorities about the problems of noise and vibration in the environment and the possible solutions. Neil also acts as an expert witness in the area of acoustics.