

ACOUSTIC SOLUTIONS

Consultant in Noise and Vibration

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ASSESSMENT OF THE NOISE ATTENUATION PERFORMANCE OF EXTERNAL GLAZING:

1 Heyrod Street, Manchester M1 2GN

Prepared for:

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Report Number: AS26-06V2



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1.00 INTRODUCTION

1.1

Acoustic Solutions has been commissioned to conduct an assessment of the noise attenuation performance of external glazing at 1 Heyrod Street, Manchester. The purpose of the assessment is to verify the glazing's ability to achieve the internal amenity of the future occupiers of 1 Heyrod Street.

1.2

The objectives for the assessment were as follows:

- Establish the daytime, evening and night time ambient and background sound levels at rooms within the application site;
- Establish the daytime and night time noise impact arising from the noise sources identified in the course of the assessment.

1.3

This report has been prepared for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult the client and Acoustic Solutions as to the extent to which the findings may be appropriate for their use.

2.0 ASSESSMENT CRITERIA

2.1

Acoustic Solutions' noise and planning related criteria is based upon the principles of the National Planning Policy Framework (NPPF) 2018. The document states that planning policies and decisions should contribute to and enhance the natural local environment by *'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.'*

2.2

Planning Practice Guidance specifically dealing with noise was uploaded to the Government's Planning Portal in March 2014 as an accompaniment to the National Planning Policy Framework. This guidance is summarised herein.

2.3

The guidance states that noise needs to be considered when new developments may create additional noise. Whilst noise can override other planning concerns, neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement for England) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development.

2.4

In order to determine noise impact, local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur, and;
- Whether or not a good standard of amenity can be achieved.

2.5

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

2.6

In terms of Observed Effect Levels:

- No Observed Adverse Effect Level (NOAEL) – This is the level of noise exposure below which no effect at all on health or quality of life can be detected;
- Lowest Observed Adverse Effect Level (LOAEL) – This is the level of noise exposure above which adverse effects on health and quality of life can be detected, and;
- Significant Observed Adverse Effect Level (SOAEL) – This is the level of noise exposure above which significant adverse effects on health and quality of life occur.

2.7

At the lowest extreme, when noise is not noticeable, there is by definition no effect. As the noise exposure increases, it will cross the ‘no observed’ effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. The noise can slightly affect the acoustic character of an area but not to the extent there is a perceived change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

2.8

As the exposure increases further, it crosses the lowest observed adverse effect level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

2.9

Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.

2.10

At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.

2.11

Table 2.1 summarises noise exposure hierarchy, based on likely average response.

Table 2.1 LOAEL and SOAEL Values

Noise Source	Assessment Location	LOAEL	SOAEL	Time
	Outdoor living space	55 dB $L_{Aeq, 1 \text{ hour}}$ (A)	56-60 dB $L_{Aeq, 1 \text{ hour}}$ (A)	Day (07:00-23:00)
	Façade	50 dB $L_{Aeq, 1 \text{ hour}}$ (A)	72 dB $L_{Aeq, 16 \text{ hour}}$ (A)	Day (07:00-23:00)
General environmental noise: Road/Rail	Façade	45 dB $L_{Aeq, 8 \text{ hour}}$ (B)	67 dB $L_{Aeq, 8 \text{ hour}}$ (A)	Night (23:00-07:00)
	Habitable Room	30 dB $L_{Aeq, 8 \text{ hour}}$ (B)	40 dB $L_{Aeq, 8 \text{ hour}}$ (A)	Night (23:00-07:00)
	Habitable Room	35 dB $L_{Aeq, 16 \text{ hour}}$ (A)	45 dB $L_{Aeq, 16 \text{ hour}}$ (A)	Day (07:00-23:00)

A: World Health Organisation: Guideline for Community Noise (1999) B: World Health Organisation: Noise Guidance for Europe (2009)

2.12

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:

- The source and absolute level of the noise together with the time of day it occurs;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features);
- The local acoustic character of the area.

2.13

In addition, further useful contextual guidance is provided in:

- British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (BS 8233);
- World Health Organisation (WHO) Guidelines for Community Noise (1999)

2.14

British Standard 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ sets indoor ambient noise levels from residential dwellings (see table below).

Table 2.2 – Indoor Ambient Noise Levels in Dwellings (BS 8233): 2019

Action	Location	Good Indoor Ambient Sound Level, dB
Resting	Living room	35 dB, L_{Aeq} (07:00-23:00 hours)
Sleeping	Bedroom	30 dB, L_{Aeq} (23:00-07:00 hours)
Sleeping	Bedroom	45 dB, L_{AMax} (23:00-07:00 hours)

2.15

With regard to sound attenuation through the building envelope, the ‘weak points’ in the building façade are generally considered to be the windows. The worked example (G.1) at Annex G of BS 8233 suggests that a partially opened window would provide sound attenuation of approximately 15 dB R_w . The Standard also suggests that “..standard insulating glass units have an insulation value of approximately 30 dB R_w ” when closed.

2.16

With respect to noise affecting external areas, i.e. gardens, BS 8233 states that “.. it is desirable that the steady noise level does not exceed 50 dB L_{Aeq} , and 55 dB L_{Aeq} should be regarded as the upper limit”.

2.17

The World Health Organisation's Guidelines for Community Noise (1999) sets indoor ambient noise levels from residential dwellings (see table below).

Table 2.3 – Indoor Ambient Noise Levels in Dwellings (WHO 1999)

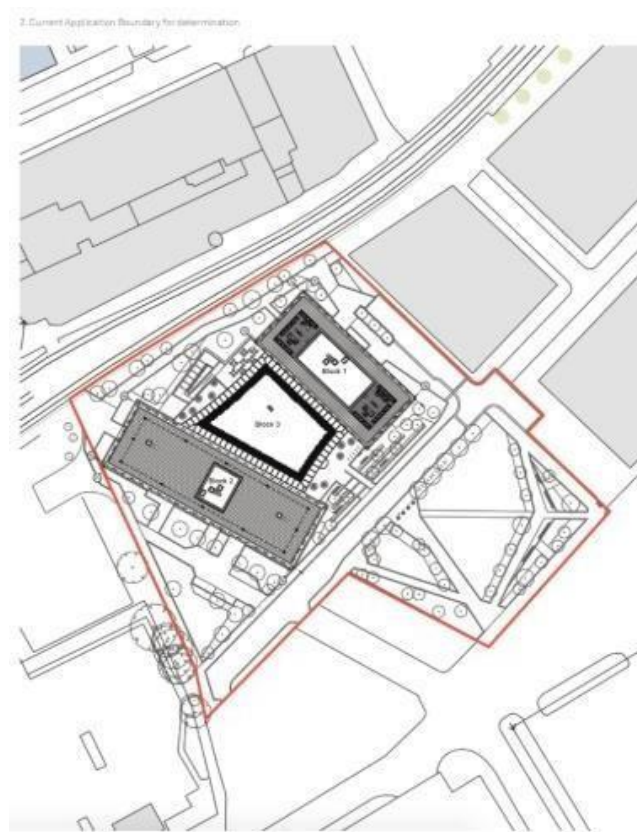
Action	Location	Good Indoor Ambient Sound Level, dB
Resting	Living room	35 dB, L_{Aeq} (07:00-23:00 hours)
Sleeping	Bedroom	30 dB, L_{Aeq} (23:00-07:00 hours)

3.0 BASELINE NOISE SURVEY

3.1 Site Setting

1 Heyrod Street consists of multistorey residential dwellings over 2 x towers (Block 1 and Block 2) (Plan 3.1). There is a requirement that, prior to occupation, a post completion assessment be conducted to verify that all of the recommended sound mitigation measures have been achieved. This must be done by demonstrating that environmental noise in habitable rooms, as influenced by external noise break-in, does not exceed 35 dB, $L_{Aeq, 16hr}$ between the hours of 0700 and 2300 (daytime/evening); and 30 dB, $L_{Aeq, 8hr}$ between 2300 and 0700 (nighttime).

Plan 3.1. 1 Heyrod Street, Manchester



3.2 Site Description

The premise is located in the busy Manchester city centre. The surrounding area comprises a mixture of existing residential dwellings, the Leonardo Hotel, Manchester Piccadilly Railway Station and miscellaneous commercial sites.

Local infrastructure consists of highways, a tramline to the north and railway line to the west.

Ventilation to the premises is provided by MVHR.

3.3 Noise Sources

Table 3.1 summarises the identified noise sources that have the potential to adversely impact future occupiers of the development.

Table 3.2 – Noise Sources in the vicinity of 1 Heyrod Street

Source	Distance at its closest point, m				Notes
	North	South	East	West	
Road traffic, Fair Street / Baird Street	17	N/A	N/A	N/A	Private and commercial vehicles
Tramline	17	N/A	N/A	N/A	Mon-Thurs: 06:00-00:00; Fri-Sat: 06:00-01:00; Sun: 07:00-00:00
Lorry park	N/A	N/A	N/A	100	Lorries exit onto Sheffield Street
Railway line	N/A	N/A	N/A	145	24 hours

3.4

An internal noise survey was undertaken on Thursday 5 and Friday 6 February 2026, between 07:00 and 23:00 hours (daytime/evening) and 23:00-07:00 hours (night time).

3.5

For the purpose of the assessment, 18 x noise monitoring positions, MP1-MP18 were adopted, as summarised in Table 3.2.

Table 3.2 Noise Monitoring Positions

Measurement Position, MP	Room
MP1	202A
MP2	203A
MP3	208A
MP4	206A
MP5	407A
MP6	406A
MP7	402A
MP8	403A
MP9	602A
MP10	603A
MP11	211B
MP12	212B
MP13	127B
MP14	128B
MP15	417B
MP16	418A
MP17	411B
MP18	412B

3.6

At all microphone positions a series of hourly 15-minute noise measurements were undertaken using a Type 1 integrating sound level meter. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end. Measurements consisted of A-weighted parameters: L_{Aeq} . Tables 3.3 and 3.4 summarise internal measurement values.

Table 3.3 Measured internal noise levels, MP1-MP9

Measurement Time	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8	MP9
07:00	33.4	32.1	33.4	33.7	33.6	33.8	34.0	34.2	33.9
08:00	34.5	31.9	33.3	33.7	33.5	33.7	33.4	34.1	33.8
09:00	34.1	32.1	34.0	33.8	33.5	34.2	33.5	33.5	33.5
10:00	34.8	31.5	34.7	34.5	35.0	35.7	35.5	35.7	33.5
11:00	34.6	33.3	34.4	35.2	36.2	35.3	35.6	35.2	33.5
12:00	35.6	34.5	35.7	34.4	34.4	34.6	35.6	34.7	34.0
13:00	36.0	34.8	34.9	36.1	35.0	35.1	34.3	34.9	33.3
14:00	34.9	33.8	35.0	35.7	35.4	34.9	34.5	34.5	33.3
15:00	35.0	34.7	34.4	35.4	35.1	34.6	35.2	35.8	33.9
16:00	34.7	35.1	35.1	34.5	35.1	35.0	34.7	35.9	33.6
17:00	34.1	33.4	33.8	33.7	34.1	34.1	33.4	33.8	34.1
18:00	33.7	33.5	33.7	33.9	33.9	33.7	33.5	34.2	33.5
Daytime Average	35	33	34	35	35	35	34	35	34
19:00	34.5	32.5	34.5	34.3	34.3	34.2	34.3	33.7	34.5
20:00	34.1	32.2	33.7	33.7	33.9	33.6	34.1	34.2	34.1
21:00	33.6	30.1	33.8	33.7	34.4	33.7	34.2	33.8	33.7
22:00	32.1	31.6	32.1	32.1	31.9	34.2	34.1	34.5	34.3
Evening Average	34	32	34	33	34	34	34	34	34
Daytime/Evening Average	34	33	34	34	34	34	34	34	33
23:00	29.5	29.0	30.0	29.5	29.3	30.9	29.2	29.1	28.7
00:00	29.3	27.2	28.7	26.8	27.3	29.3	28.8	28.9	29.5
01:00	28.9	26.7	27.0	26.7	27.4	29.5	29.3	29.1	28.9
02:00	29.2	27.3	27.0	27.3	27.2	29.3	29.2	28.9	28.9
03:00	28.9	27.3	26.6	26.7	26.8	28.6	29.3	28.9	29.0
04:00	28.8	26.9	26.6	27.5	27.3	29.3	28.9	28.9	29.0
05:00	29.2	27.4	26.7	27.5	27.2	28.6	29.3	29.4	29.2
06:00	29.2	26.9	26.6	27.2	27.5	29.5	28.9	28.9	28.9
Nighttime Average	29	27	27	27	27	29	29	29	29

Table 3.4 Measured internal noise levels, MP10-MP18

Measurement Time	MP10	MP11	MP12	MP13	MP14	MP15	MP16	MP17	MP18
07:00	34.6	34.6	34.4	34.4	34.7	34.5	34.6	34.5	35.0
08:00	35.1	35.2	35.1	35.1	35.1	35.1	34.6	34.8	34.6
09:00	35.3	34.8	34.9	34.6	34.7	35.2	34.9	34.8	34.8
10:00	34.5	34.4	34.5	34.8	35.1	35.0	34.6	34.4	34.5
11:00	35.1	34.8	35.0	34.8	35.2	35.0	34.7	35.2	35.1
12:00	35.0	34.7	34.3	34.8	35.2	35.2	34.7	35.0	34.4
13:00	34.3	34.6	34.4	34.9	35.0	34.6	35.1	34.4	34.3
14:00	34.9	35.0	35.0	35.0	35.2	35.2	34.4	35.2	34.7
15:00	35.1	35.2	34.4	34.4	34.7	35.0	35.0	34.9	35.2
16:00	35.2	34.8	35.1	34.8	35.0	34.9	35.0	35.2	34.8
17:00	34.3	34.5	35.2	34.6	35.1	35.0	34.8	34.5	34.4
18:00	35.3	34.9	34.6	34.8	34.3	34.7	34.6	35.2	35.0
Daytime Average	35	35	35	35	35	35	35	35	35
19:00	33.0	32.2	33.0	32.2	33.1	32.6	32.8	33.0	32.5
20:00	33.1	33.1	33.0	32.9	32.7	32.3	32.8	33.1	32.8
21:00	32.9	33.0	33.0	32.1	32.2	32.2	32.9	32.4	32.4
22:00	32.1	32.7	32.6	33.1	32.1	32.9	32.6	32.5	32.7
Evening Average	33	33	33	33	33	32	33	33	33
Daytime/Evening Average	34	34	34	34	34	34	34	34	34
23:00	29.7	29.6	29.4	29.0	29.6	29.0	29.2	29.5	29.2
00:00	29.1	29.5	29.7	29.3	29.5	29.2	29.3	29.5	29.7
01:00	26.7	28.5	29.7	27.0	29.1	29.3	29.7	29.2	29.2
02:00	26.3	28.7	29.8	27.7	29.7	29.4	29.7	29.1	29.7
03:00	26.3	28.2	29.4	27.3	29.1	29.6	29.3	29.8	29.3
04:00	26.9	28.2	29.5	29.6	29.5	29.8	29.6	29.8	29.0
05:00	29.2	29.8	29.2	29.5	29.6	29.2	29.4	29.1	29.3
06:00	29.8	29.2	29.7	29.1	29.1	29.3	29.6	29.5	29.1
Nighttime Average	28	29	30	29	29	29	29	29	29

4.0 DISCUSSION

4.1 Internal Noise Levels

4.1.1 World Health Organisation: 1999 and BS8233: 2014 (Internal)

Measured daytime/evening and night time internal values can be compared against maximum noise criteria (L_{Aeq}), as set out in the World Health Organisation's 'Guidelines for Community Noise (1999) and BS8233: 2014. Table 4.1 summarises the measured internal noise levels compared to these criteria. They indicate that daytime/evening and night time noise levels all satisfy the L_{Aeq} criteria.

Table 4.1: Measured Internal Sound Pressure Levels (L_{Aeq}) at 1 Heyrod Street

Time	Location	Average Measured Internal SPL, dB	WHO & BS8233 35/30 dB Criteria met?
Daytime/Evening	MP1	34	Yes
Night	MP1	29	Yes
Daytime/Evening	MP2	33	Yes
Night	MP2	27	Yes
Daytime/Evening	MP3	34	Yes
Night	MP3	28	Yes
Daytime/Evening	MP4	34	Yes
Night	MP4	27	Yes
Daytime/Evening	MP5	34	Yes
Night	MP5	27	Yes
Daytime/Evening	MP6	34	Yes
Night	MP6	29	Yes
Daytime/Evening	MP7	34	Yes
Night	MP7	29	Yes
Daytime/Evening	MP8	34	Yes
Night	MP8	29	Yes
Daytime/Evening	MP9	33	Yes
Night	MP9	29	Yes
Daytime/Evening	MP10	34	Yes
Night	MP10	28	Yes
Daytime/Evening	MP11	34	Yes
Night	MP11	29	Yes
Daytime/Evening	MP12	34	Yes
Night	MP12	29	Yes
Daytime/Evening	MP13	34	Yes
Night	MP13	29	Yes
Daytime/Evening	MP14	34	Yes
Night	MP14	30	Yes
Daytime/Evening	MP15	34	Yes
Night	MP15	29	Yes
Daytime/Evening	MP16	34	Yes
Night	MP16	29	Yes
Daytime/Evening	MP17	34	Yes
Night	MP17	29	Yes
Daytime/Evening	MP18	34	Yes
Night	MP18	30	Yes

5.0 CONCLUSIONS

Acoustic Solutions
Consultant in Noise & Vibration
AS26-06V2

Assessment of the sound attenuation of external glazing at 1 Heyrod Street, Manchester M1 2GN

5.1

Acoustic Solutions has undertaken an assessment of the noise attenuation performance of external glazing (closed units) at second, fourth and sixth storey at Blocks 1 & 2 of 1 Heyrod Street, Manchester during daytime, evening and night time.

5.2

The assessment has shown that measured daytime, evening and nighttime internal noise levels arising from external noise sources all meet or fall below WHO: 1999 and BS8233: 2014 criteria.

5.4

As such, the internal daytime, evening and night time noise levels satisfy Manchester City Council's requirements.

Appendix 1

Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified period of time. In other words, L_{Aeq} is the level if a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. L_{Aeq} is increasingly being used as the preferred parameter for all forms of environmental noise.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

L_A max

The maximum A-weighted noise level recorded during the measurement period.

Hz

The unit of frequency. The number of cycles (in the context of acoustics, the number of complete sound waves generated) per second.

Appendix 3

References

BSI Group (2014) British Standard 8233:2014 “*Guidance on sound insulation and noise reduction for buildings*” [Online]. Available at:
https://images.reading.gov.uk/2021/10/CD-6.25-BS8233_2014-Guidance-on-Sound-Insulation-and-Noise-Reduction-for-Buildings.pdf [Accessed 5 February 2026]