



PEAK acoustics

Noise Assessment Report

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Environmental Noise Assessment

Report Ref: NM3006206NR

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Site: 820 – 822 Hyde Road, Gorton, Manchester, M18 7JZ

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1. Summary

1.1. Proposal

A change of use to form residential apartments is proposed at 820 – 822 Hyde Road, Gorton, Manchester, M18 7JZ.

1.2. Reason for Assessment

The Local Authority has conditioned the requirement of a noise assessment to ensure desirable internal noise levels are met within habitable rooms of the proposed development.

1.3. Planning Conditions & Criteria

Manchester City Council issued the following planning condition:

“7) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Hyde Road shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise insulation scheme shall be completed before any of the dwelling units are occupied. Noise survey data must include measurements taken during a rush-hour period and night-time period to determine the appropriate sound insulation measures necessary.

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance, pursuant to policies SP1, H1 and DM1 of the Core Strategy.”

Comment from Sharon McAndrew of the Environmental Heath team at Manchester City Council regarding internal noise levels and ventilation are detailed below:

“The proposals for the noise survey are OK. The report will need to demonstrate that the below MCC noise criteria are met:

Bedrooms (night time - 23.00 - 07.00) 30 dB L_{Aeq} (individual noise events shall not exceed 45 dB $L_{Amax,F}$ by more than 15 times)

Living Rooms (daytime - 07.00 - 23.00) 35 dB L_{Aeq}

Gardens and terraces (daytime) 55 dB L_{Aeq}

Mechanical ventilation will be needed for this site as it is noisy (and it is unlikely the above criteria will not be met with the windows open) and it is in the Air Quality Management Area.”

Desirable internal noise levels are to be maintained as given in BS8233:2014:

- *<35dB $L_{Aeq, 16hr}$ within living areas during the day (07:00 – 23:00)*
- *<30dB $L_{Aeq, 8hr}$ within bedrooms at night (23:00 – 07:00).*
- *45dB L_{Amax} should not be regularly exceeded within bedrooms at night (23:00 – 07:00).*

WHO Guidelines help to define the L_{Amax} parameter requirements:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times a night (Vallet & Vernet 1991)”.

1.4. Assessment Standards & Justification

‘BS8233:2014 – Guidance on sound insulation and noise reduction for buildings’ is a recognised standard for assessing and mitigating environmental noise levels upon a proposed noise sensitive development. The standard gives a rigorous calculation method for determining interior noise levels based on measured environmental noise levels.

‘World Health Organisation Guidelines for Community Noise (1999)’ details suitable noise levels for various activities within residential and commercial buildings

1.5. Environmental Noise Measurements

In order to assess environmental noise levels, a noise survey was undertaken at the site from Thursday 27th – Friday 28th August 2020. The results from these measurements are tabulated below.

Table 1. – Environmental Measurement Summary

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical L _{AFmax} (dB)
M1 (Front – Overlooking Hyde Road)	27 th & 28 th Aug 2020	Day (16hr Aggregate Periods)	66.1	-
	27 th – 28 th Aug 2020	Night (8hr)	62.8	80.5

The full measured sound levels are shown graphically in **Appendix E**.

1.6. Noise Assessment Outcome

It is determined that by using mitigation as specified in section 1.7 for the building facades, the outcome summarised in the following table is achieved.

Table 2. – Noise Assessment Outcome

Internal Space	Noise Parameter	Internal Noise Level (dB)	Within Desirable Limit (BS8233)
<i>Rooms to the Front</i>			
Front Living/Kitchens	Daytime L _{Aeq} , 16hr	33.3	Yes
Front Bedrooms	Night-time L _{Aeq} , 8hr	26.0	Yes
Front Bedrooms	Night-time L _{AFmax}	44.7	Yes
<i>Rooms to the rear</i>			
Rear Living/Kitchens	Daytime L _{Aeq} , 16hr	23.3	Yes
Rear Bedrooms	Night-time L _{Aeq} , 8hr	19.3	Yes
Rear Bedrooms	Night-time L _{AFmax}	38.2	Yes

1.7. Mitigation Recommendations

1.7.1. Glazing & Ventilation Scheme

The recommended glazing and ventilation scheme for respective façades are given below.

Table 3. – Glazing and Ventilation Scheme

Internal Space	Glazing		Ventilation*	
	Minimum Performance $R_w (+C_{tr})$	Example Specification	Minimum Performance $D_{ne,W,+C_{tr}} (Open)$	Example Specification
Front Façade				
Living / Kitchens	34 (29)	4 / 16 / 6mm	-	Mechanical Ventilation
Bedrooms	37 (31)	4 / 16 / 10mm	-	Mechanical Ventilation
Rear Façade				
Living / Kitchens	30 (29)	4 / 16 / 4mm	-	Mechanical Ventilation
Bedrooms	30 (29)	4 / 16 / 4mm	-	Mechanical Ventilation

N.B: The sound insulation value of the glazing should take into account the glass as well as the frame and perimeter seal.

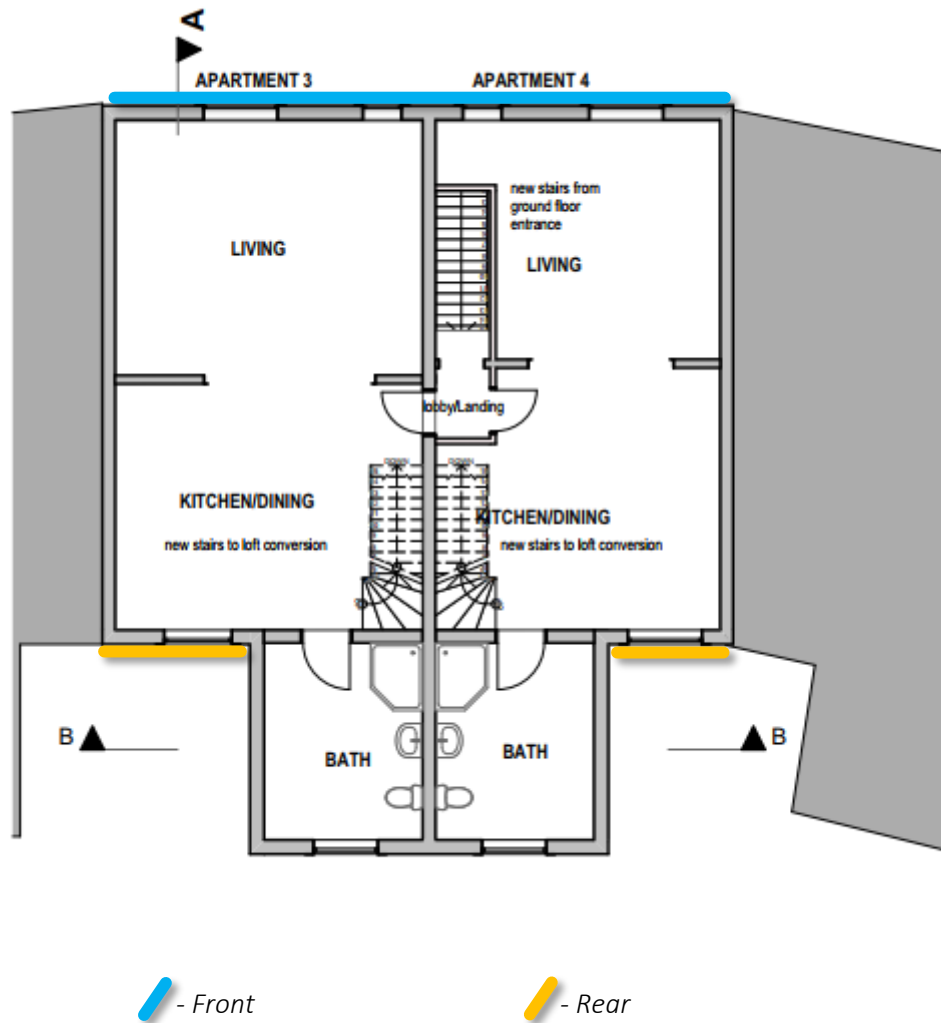
*Further Guidance on Ventilation is provided in Section 4.5.

The specific designation of façade areas is indicated below in Figure 1 and has been determined based on the measured noise exposure in these areas.

1.8. Zone Designation

N.B: The indicated façade Zones apply to all floors.

Figure 1. – Façade Zone Designation

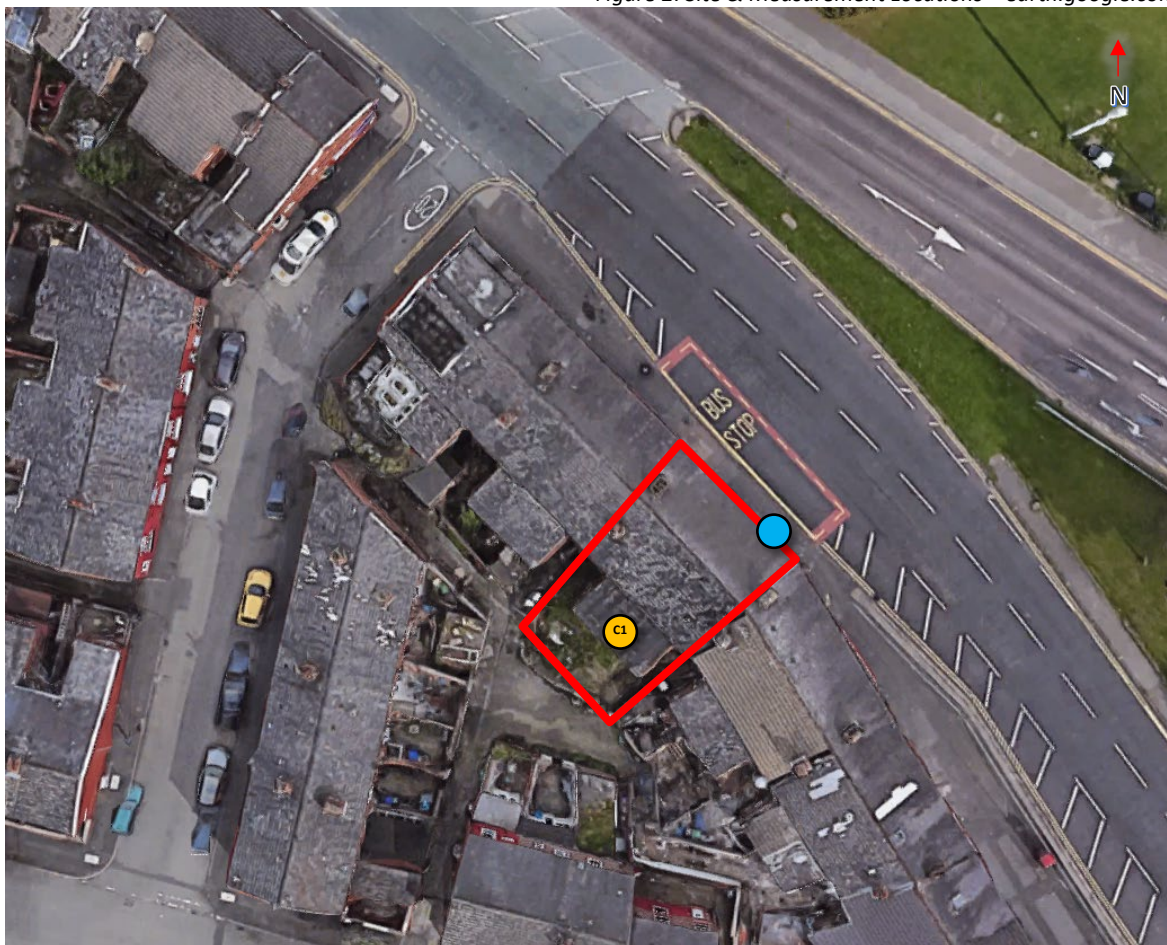


1.9. Site & Measurement Location

The site is situated on Hyde Road, a main access route through the Greater Manchester area which sees high levels of continuous traffic throughout the day and night. The surrounding properties are predominantly residential with a few retail units on Hyde Road southeast and northwest of the site location. Approximately 600m south of the site passes Reddish Norton to Belle Vue stretch of railway networking; to the north approximately 225m lies the Gorton Reservoir.

The site and measurement locations are shown on Figure 2 below.

Figure 2: Site & Measurement Locations – earth.google.com



- Unattended Environmental Monitoring Location (M1)
- Comparative Monitoring Location (C1)
- ▬ Site Boundary (Approx.)

2. Environmental Noise Survey

2.1. Sources Under Investigation

The primary noise source identified on site was passing traffic on High Road, whereby vehicles accelerating from the nearby traffic light system was most dominant, inclusive of buses and HGVs. Passing conversing pedestrians was noted as a secondary source.

The prevailing noise climate is typical of areas dominated by road traffic, characterised by a decrease in noise levels during the night, when use of the nearby road network is reduced.

3. Survey Measurements

Day and night-time environmental noise measurements have been carried out over a 24-hour period from Thursday 28th – Friday 29th August 2020.

Measurements of $L_{Aeq,T}$ and L_{AFmax} were logged in 5-minute intervals.

3.1. Measurement Location

At position M1, the microphone was positioned through an open window on the front facing façade, directly overlooking Hyde Road, and fully exposed to passing traffic, a nearby bus stop and other activity. Please note that during the consultant's attendance on site, construction work was present and a dominant noise source; therefore, noise levels are considered worst-case.

To provide a further indication of noise levels at the rear of the property, a comparative measurement was conducted free field on a first-floor flat roof. Further description of this measurement is given in Section 3.4.

3.2. Weather Conditions

Some precipitation occurred during the survey, however wind speeds remained low with speeds of 2 – 6 m/s throughout. Any noise level increase in the measured data from the precipitation can therefore be considered representative of worst-case scenario. Detailed meteorological information can be found in **Appendix C**.

3.3. Measurement Equipment

Measurement equipment complies with accuracy requirements for common environmental noise measurement standards. A detailed equipment list is given in **Appendix B** with calibration information in **Appendix D**.

3.4. External Noise Levels

The measurement intervals from measurements M1 are summarised in the table below. M1 measurement data is subject to a -3 dB façade correction due to the microphone being within 1m of a reflective surface, namely, the building façade.

The full measured sound levels are shown graphically in **Appendix E**.

Table 4. – Measurement Results

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical L _{AFmax} (dB)
M1 (Front – Overlooking Hyde Road)	27 th & 28 th Aug 2020	Day (16hr Aggregate Periods)	66.1	-
	27 th – 28 th Aug 2020	Night (8hr)	62.8	80.5*

*The selected L_{AFmax} corrected noise level spectra, is an average of the spectra of the noisiest 10 events of the night-time period; the maxima levels selected would not ordinarily be exceeded more than 10 times within the night-time, in accordance with the guidance.

To determine the difference in environmental noise levels between the front and rear façade, comparative measurements were undertaken on Thursday 27th August 2020. Measurement data from C1 has been utilised to represent conditions at the rear. The exact same measurement intervals from measurement M1 and measurement C1 have been compared below.

Table 5. – Comparative Measurement Results

Period	Measurement	Location	L _{Aeq,T=5min} (dB)	Difference, dB
10:45 – 10:50	M1	Front (Overlooking Hyde Road)	68.0	15.3
10:45 – 10:50	C1	Rear	52.7	

The comparative measurement intervals shown in Table 5 demonstrate that there is an approximate 15 dB difference in noise levels between the front and rear of site, in the interest of a robust assessment, a 10 dB correction will be applied to M1 noise data to represent noise levels at the rear of the property.

The resultant external noise levels for each area are summarised in the table below.

Table 6. – Zone Noise Levels

Zone(s)	Period	L _{Aeq,T} (dB)	Typical L _{AFmax} (dB)
Front	Daytime (16hr)	66.1	-
	Night (8hr)	62.8	80.5
Rear	Daytime (16hr)	56.1	-
	Night (8hr)	52.8	70.5

4. BS8233:2014 Environmental Noise Assessment

4.1. Criteria

Desirable internal noise levels are to be maintained as given in BS8233:2014:

- $<35\text{dB } L_{Aeq, 16hr}$ within living areas during the day (07:00 – 23:00)
- $<30\text{dB } L_{Aeq, 8hr}$ within bedrooms at night (23:00 – 07:00).
- $45\text{dB } L_{Amax}$ should not be regularly exceeded within bedrooms at night (23:00 – 07:00).

WHO Guidelines help to define the L_{Amax} parameter requirements:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately $45\text{dB } L_{Amax}$ more than 10-15 times a night (Vallet & Vernet 1991)”.

4.2. Internal Noise Levels – Proposed Insulation

Internal noise levels have been calculated to demonstrate that the proposed apartments can achieve suitable internal noise levels when appropriate glazing and ventilation systems are utilised.

Room dimensions and glazed areas have been approximated based on the drawings supplied to Peak Acoustics and drawn by ‘Gonshaw Associates’. Note that assessment is not required for each individual room. The selection of habitable rooms has been chosen as representative of the most noise sensitive areas, which have been selected on account of room and windows sizes. Construction details and calculations are provided within **Appendix F**.

4.3. Assessment Outcome – Internal Noise Levels

Internal noise levels have been calculated to demonstrate that the proposed residential apartments can achieve suitable noise levels inside habitable rooms when appropriate glazing and ventilation systems are used. The recommended mitigation and corresponding internal noise levels are summarised in table 7 below.

Table 7. – Assessment Outcome

Internal Space	Glazing Minimum Performance $R_w (+C_{tr})$	Ventilation	Internal Noise Level, dB
Front Façade			
Living / Kitchens		Mechanical Ventilation	33 $L_{Aeq, 16hr}$
Bedrooms		Mechanical Ventilation	26 $L_{Aeq, 8hr}$
			45 L_{AFmax}
Rear Façade			
Living / Kitchens		Mechanical Ventilation	23 $L_{Aeq, 16hr}$
Bedrooms		Mechanical Ventilation	19 $L_{Aeq, 8hr}$
			38 L_{AFmax}

N.B: The sound insulation value of the glazing should consider the glass as well as the frame and perimeter seal.

For the daytime assessment for living areas, the desirable limit of BS8233:2014 suggests a guideline of 35 dB $L_{Aeq, 16hr}$ for resting conditions, and up to 40 dB is considered acceptable for necessary developments.

All results, with the proposed construction, would place the internal levels in kitchen/living areas as below 35 dB, therefore within the desirable category.

For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 30 dB $L_{Aeq, 8hr}$ for sleeping conditions, with an acceptable limit of 35 dB $L_{Aeq, 8hr}$. Individual noise events (Measured with fast time-weighted Maximum) should not normally exceed 45 dB L_{AFmax} (as in BS8233:1999).

The proposed construction would place the internal continuous levels in bedrooms as below 30 dB and the maximum noise events as typically below 45 dB L_{AFmax} , therefore within the desirable category.

4.4. Assessment Outcome – External Noise Levels

BS8233:2014 provides a desirable guideline of 50 dB $L_{Aeq, 16hr}$ for external amenity spaces and an acceptable guideline of 55 dB $L_{Aeq, 16hr}$ for noisier environments. It is proposed to include one private and also a communal enclosed external amenity space.

External daytime noise levels were measured at the rear during the comparison measurement. A corrected external noise level at the rear was calculated to be between 53 – 57 dB $L_{Aeq, 16hr}$.

The measured noise levels are between the upper value limit and exceedance of the limit value. When considering the comparative measurement noise level, noise levels conform to BS8233 guidelines. Furthermore, it is proposed to install a 1.8m boundary wall which can provide up to 10 dB worth of attenuation. It is predicted that external noise levels within the rear external amenity area conforms with BS8233:2014 and MCC guidelines.

4.5. Ventilation

Due to comments made by the local authority regarding dominant noise sources, it is recommended that a Mechanically Assisted ventilation system is incorporated, allowing occupants to fully close their windows whilst still maintaining thermal comfort and providing respite from the nearby external activity.

The following guidance should be followed to control self-generated noise from the system:

- Noise from the mechanical ventilation system, inclusive of fan case breakout and internal grilles should not exceed 35 dB L_{Aeq} / NR35 and 30 dB L_{Aeq} / NR25 within living rooms and bedrooms, respectively.
- Where required, silencers should be installed at the fan inlet and / or outlet.
- Rooms which share supply and / or extract terminations from the same main duct should have cross talk attenuators implemented within at least one of the corresponding branch ducts to minimise cross talk between the rooms.
- Ventilation fans should be located within non-habitable rooms or within built-in cupboards. If located in a built-in cupboard, ensure that the access door provides a tight seal to prevent flanking transmission to habitable rooms.
- Fans and ductwork should be fitted using resilient mountings to mitigate vibration and re-radiated structural noise.
- All windows should not include trickle ventilators and walls should not contain passive through-wall vents. As ventilation is to be provided via mechanical means, the passive ventilators will introduce an unnecessary weakness to the building envelope.
- Façade penetrations for inlets / outlets should be routed to the rear façade as to benefit from the quieter noise climate and reduce noise transfer through the ductwork.

APPENDIX A – Measurement Details

Measurement(s)	Kit	Start Date	Start Time	End Date	End Time
M1	A1	27/08/20	10:45	28/08/20	10:50
C1	STK3	27/08/20	10:45	27/08/20	10:50

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A1	Sound Meter	Svantek	958	1	34525
A1	Pre-Amp	Svantek	SV12L	1	32484
A1	Microphone	Microtech Gefell	MK255	1	11561
STK 3	Sound Meter	Svantek	977	1	36815
STK 3	Pre-Amp	Svantek	SV12L	1	47589
SKT 3	Microphone	ACO	7052E	1	63891
A1/STK3	Calibrator	Svantek	SV33A	1	83715

APPENDIX C - Meteorology Details

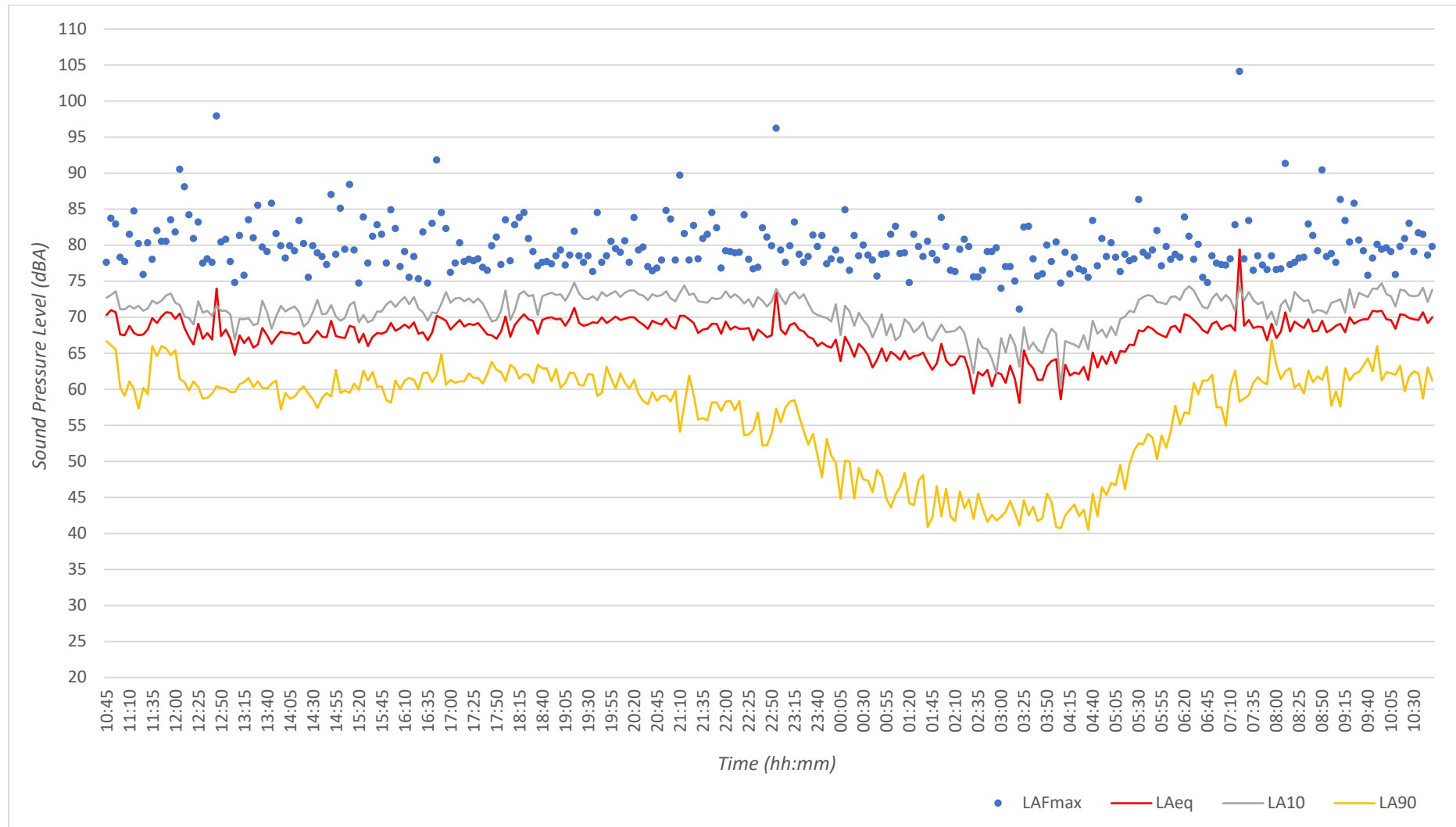
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
27/08/20 (Start of Survey)	17	2 – 3	S	81	1.0	8/8
28/08/20 (End of Survey)	14	5 – 6	NNE	86	1.1	7/8

APPENDIX D - Calibration Details

Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
A1	114.0	-0.2	-0.4
STK3	113.9	-0.25	-0.28

APPENDIX E – Noise Survey Results

Environmental Noise Measurement (M1), 27th – 28th August 2020

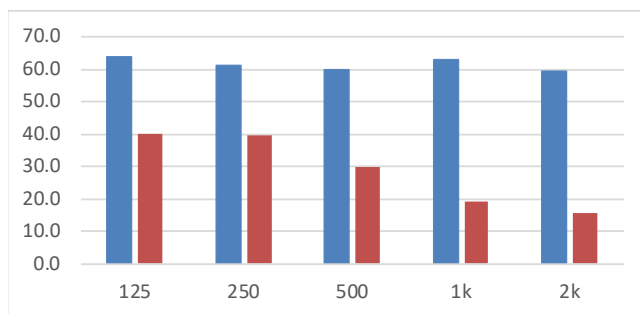


APPENDIX F – BS8233 Rigorous Design Calculations

Front Living/Kitchen (Daytime LAeq: 07:00 - 23:00)

Room Properties		Sound Insulation Properties					
Room Width (m)	5.4	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	9.0	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.4	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	6.1	Glazing, dB R _{w+Ctr}	24	21	29	43	43
Is dwelling within roof?	☒	Vents, D _{n,e,w+Ctr}	41	45	45	54	58

Noise Levels, dB



External Level	66.1 dB LAeq
Internal Level	33.3 dB LAeq
Insertion Loss	32.8 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	34(29) dB R _{w(+Ctr)}		Double Glazing 4 / 16 / 6
Ventilation	-	D _{n,e,w+Ctr}	Heat recovery system Multi-room Heat Recovery System

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	6.129E-05	2.4E-05	2.4E-05	3.1E-06	1.22E-06
Term 2	0.0018677	0.00373	0.00059	2.4E-05	2.35E-05
Term 3	4.217E-05	1.7E-05	1.7E-05	2.1E-06	8.41E-07
Term 4	0	0	0	0	0
Internal, dB L _{eq}	40.3	39.7	29.8	19.4	15.6
Internal, dB LAeq	24.2	31.1	26.6	19.4	16.8

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Heat recovery system

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{ext}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_n}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Front Bedroom (Night-Time LAeq: 23:00 - 07:00)

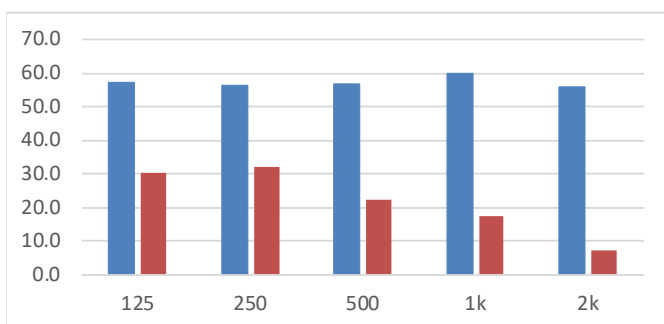
Room Properties

Room Width (m)	2.7
Room Depth (m)	2.0
Room Height (m)	2.4
Glazed Area (m ²)	5.3
Is dwelling within roof?	☒

Sound Insulation Properties

Freq. Hz	125	250	500	1k	2k
Wall, dB R _{w+Ctr}	41	45	45	54	58
Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazing, dB R _{w+Ctr}	27	23	33	41	48
Vents, D _{n,e,w+Ctr}	41	45	45	54	58

Noise Levels, dB



External Level	62.8 dB LAeq
Internal Level	26.0 dB LAeq
Insertion Loss	36.8 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	37(31)	dB R _{w(+Ctr)}	Double Glazing <i>4 / 16 / 10</i>
Ventilation	-	D _{n,e,w+Ctr}	Heat recovery system <i>Multi-room Heat Recovery System</i>

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	0.0001226	4.9E-05	4.9E-05	6.1E-06	2.45E-06
Term 2	0.0016212	0.00407	0.00041	6.5E-05	1.29E-05
Term 3	1.489E-05	5.9E-06	5.9E-06	7.5E-07	2.97E-07
Term 4	0	0	0	0	0
Internal, dB L _{eq}	30.4	32.2	22.3	17.4	7.2
Internal, dB LAeq	14.3	23.6	19.1	17.4	8.4

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Heat recovery system

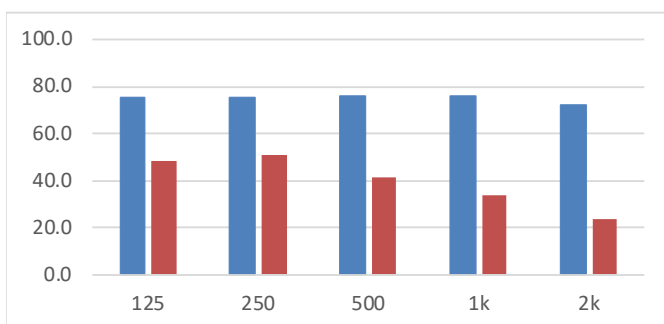
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{sa}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Front Bedroom (Night L_{Amax})

Room Properties		Sound Insulation Properties					
Room Width (m)	2.7	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	2.0	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.4	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	5.3	Glazing, dB R _{w+Ctr}	27	23	33	41	48
Is dwelling within roof?	☒	Vents, D _{n,e,w+Ctr}	41	45	45	54	58

Noise Levels, dB



External Level	80.5 dB L _{Amax}
Internal Level	44.7 dB L _{Amax}
Insertion Loss	35.8 dB L _{Amax}

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	37(31)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 10
Ventilation	-	D _{n,e,w+Ctr}	Heat recovery system Multi-room Heat Recovery System

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	0.0001226	4.9E-05	4.9E-05	6.1E-06	2.45E-06
Term 2	0.0016212	0.00407	0.00041	6.5E-05	1.29E-05
Term 3	1.489E-05	5.9E-06	5.9E-06	7.5E-07	2.97E-07
Term 4	0	0	0	0	0
Internal, dB L _{eq}	48.3	51.2	41.6	33.8	23.6
Internal, dB L _{Aeq}	32.2	42.6	38.4	33.8	24.8

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Heat recovery system

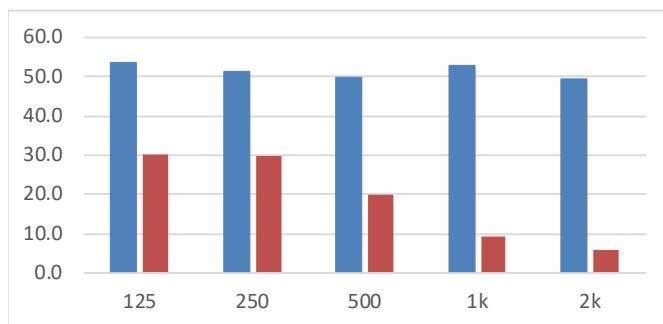
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{0,2}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Rear Living/Kitchen (Daytime LAeq: 07:00 - 23:00)

Room Properties		Sound Insulation Properties					
Room Width (m)	5.4	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	9.0	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.4	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	6.1	Glazing, dB R _{w+Ctr}	24	21	29	43	43
Is dwelling within roof?	☒	Vents, D _{n,e,w+Ctr}	41	45	45	54	58

Noise Levels, dB



External Level	56.1 dB LAeq
Internal Level	23.3 dB LAeq
Insertion Loss	32.8 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	34(29)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 6
Ventilation	-	D _{n,e,w+Ctr}	Heat recovery system Multi-room Heat Recovery System

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	6.129E-05	2.4E-05	2.4E-05	3.1E-06	1.22E-06
Term 2	0.0018677	0.00373	0.00059	2.4E-05	2.35E-05
Term 3	4.217E-05	1.7E-05	1.7E-05	2.1E-06	8.41E-07
Term 4	0	0	0	0	0
Internal, dB L _{eq}	30.3	29.7	19.8	9.4	5.6
Internal, dB LAeq	14.2	21.1	16.6	9.4	6.8

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Heat recovery system

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{0,2}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Rear Bedroom (Night-Time LAeq: 23:00 - 07:00)

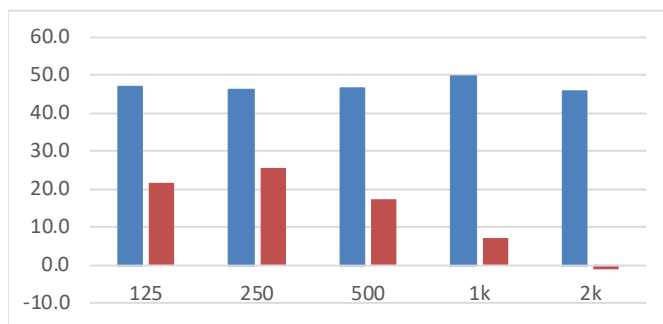
Room Properties

Room Width (m)	5.4
Room Depth (m)	4.0
Room Height (m)	2.4
Glazed Area (m ²)	3.6
Is dwelling within roof?	☒

Sound Insulation Properties

Freq. Hz	125	250	500	1k	2k
Wall, dB R _{w+Ctr}	41	45	45	54	58
Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazing, dB R _{w+Ctr}	24	18	26	40	45
Vents, D _{n,e,w+Ctr}	41	45	45	54	58

Noise Levels, dB



External Level	52.8 dB LAeq
Internal Level	19.3 dB LAeq
Insertion Loss	33.5 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing <i>4 / 16 / 4</i>
Ventilation	-	D _{n,e,w+Ctr}	Heat recovery system <i>Multi-room Heat Recovery System</i>

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	6.129E-05	2.4E-05	2.4E-05	3.1E-06	1.22E-06
Term 2	0.0010966	0.00437	0.00069	2.8E-05	8.71E-06
Term 3	5.755E-05	2.3E-05	2.3E-05	2.9E-06	1.15E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	21.8	25.5	17.4	7.1	-1.3
Internal, dB LAeq	5.7	16.9	14.2	7.1	-0.1

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Heat recovery system

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{0,2}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_n}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Rear Bedroom (Night LAmax)

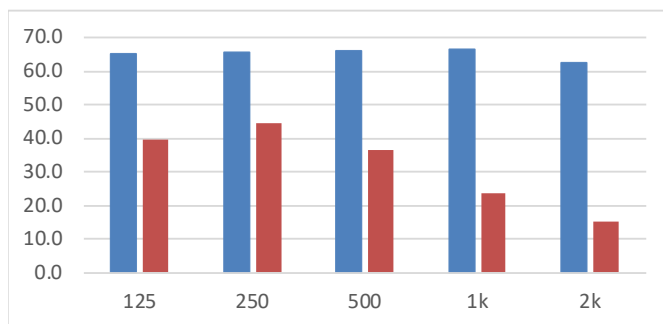
Room Properties

Room Width (m)	5.4
Room Depth (m)	4.0
Room Height (m)	2.4
Glazed Area (m ²)	3.6
Is dwelling within roof?	☒

Sound Insulation Properties

Freq. Hz	125	250	500	1k	2k
Wall, dB R _{w+Ctr}	41	45	45	54	58
Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazing, dB R _{w+Ctr}	24	18	26	40	45
Vents, D _{n,e,w+Ctr}	41	45	45	54	58

Noise Levels, dB



External Level	70.5 dB LAmax
Internal Level	38.2 dB LAmax
Insertion Loss	32.3 dB LAmax

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing <i>4 / 16 / 4</i>
Ventilation	-	D _{n,e,w+Ctr}	Heat recovery system <i>Multi-room Heat Recovery System</i>

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	6.129E-05	2.4E-05	2.4E-05	3.1E-06	1.22E-06
Term 2	0.0010966	0.00437	0.00069	2.8E-05	8.71E-06
Term 3	5.755E-05	2.3E-05	2.3E-05	2.9E-06	1.15E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	39.7	44.5	36.6	23.6	15.1
Internal, dB LAeq	23.6	35.9	33.4	23.6	16.3

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Heat recovery system

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{0,2}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

APPENDIX G – Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples common environments and their typical noise levels.

Noise Level	Environment
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a moving car
60 to 70 dB(A)	Typical high street
100 to 110 dB(A)	Fire alarm at 1 metre away
140 dB(A)	Threshold of pain

Terminology

dB (decibel) – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level (2×10^{-5} Pa – threshold of hearing).

$L_{Aeq, T}$ – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level in which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

L_{Amax} – the maximum RMS A-weighted sound pressure level occurring within a specified time period; the time weighting is typically either Fast or Slow.

R_w – The Weighted Sound Reduction Index (R_w) is a number used to rate the effectiveness of a soundproofing system or material.

$D_{n,e,w}$ – The Weighted Sound Reduction Index specifically for ventilators.

C_{tr} – C_{tr} is a spectrum adaptation term which method is defined in BS EN ISO 717. The standard uses a reference curve to determine the weighted value of airborne sound insulation. The spectrum adaptation terms C and C_{tr} may be used to take into account different source spectra. ' C_{tr} ' is the A-weighted urban traffic noise spectrum.



Let us introduce ourselves

Peak Acoustics formed in 2011, we are a fully accredited specialist consultancy and testing organisation.

We are a diverse team of Acoustic Consultants, Specialist Engineers and Building Compliance Technicians, with a network spanning the UK. We are proud to offer our services nationally, with no job too big or small.

We provide Acoustic Consultancy, Building Compliance Testing and Energy Services.

Additional Services

We offer an extensive range of services in the sectors of Acoustic Consultancy, Building Compliance & Energy Efficiency. We are able to put together custom packages combining multiple services which saves both time and money for you.

Building Compliance

- Sound Insulation Testing
- Air Tightness Testing
- Ventilation Testing
- Water Efficiency Calculations
- Sound Insulation Specification

Energy Efficiency

- SAP Calculations
- EPC's
- SBEM Calculations
- Energy Statements
- Sustainability Statements
- MEES Regulations
- Commercial EPC's

Acoustic Consultancy

- Noise Assessment for planning conditions
- Construction site noise monitoring
- Noise at work assessments
- Noise & Vibration Impact Assessments

Peace of mind

We are accredited and registered by all the relevant major UK authorities to provide the services we offer. Peak Acoustics is UKAS accredited for sound insulation testing, ATTMA registered for Air Leakage Testing. and our Energy team are all Domestic On-Completion Energy Assessors.

Our Added Value

We combine our detailed knowledge of building regulations with our technical understanding of building physics, acoustics and environmental sciences to maximise development quality. Our work ensures appropriate strategies and studies are prepared to demonstrate to local authorities how proposed developments will be of high quality and generate acceptable impact on the surrounding environment.

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