



PEAK acoustics

Noise Assessment Report

Email: sales@acousticsurveys.co.uk | **Office:** 0330 043 1764

Web: www.acousticsurveys.co.uk

Peak Acoustics Ltd, Fernbank House, Springwood Way, Macclesfield, SK10 2XA



Environmental Noise Assessment

Report Ref: JP1708219NR

Issue Date: Monday 13th September 2021

Site: Mill House, Cheadle, Staffordshire, ST10 1NX

Project Consultant

J. Parrott BEng (Hons)

Acoustic Consultant

jack@acousticsurveys.co.uk

Proofing Consultant

T. Williams MSc

Acoustic Consultant

tomos@acousticsurveys.co.uk



Executive Summary

An environmental noise assessment has been undertaken at Mill House, Oak Street, Cheadle, Staffordshire, ST10 1NX, where it has been proposed to convert the existing store/workshop building into 2no. semidetached dwellings.

Environmental noise monitoring was undertaken at the site from 1st September – 3rd September 2021. Noise affecting the development was determined to be primarily road noise from the adjacent road (A521).

A glazing and ventilation scheme has been given to ensure conditions in habitable rooms remain within the desired design criteria of BS8233:2014. The derived scheme is summarised below.

Glazing & Ventilation Scheme

Internal Space	Glazing		Ventilation	
	Minimum Performance $R_w (+C_{tr})$	Example Specification	Minimum Performance $D_{ne,W} (+C_{tr} \text{ (Open)})$	Example Specification
Living / Kitchen Areas	30 (26)	4 / 16 / 4mm	32	Passive Trickle Vents
Bedrooms	41 (35)	6 / 16 / 8.8SCmm	45	Passive Thru-wall Vents

All habitable rooms should be provided with attenuated passive ventilation systems that provide an open area equivalent to an open window to negate the need for open windows for the purpose of ventilation.

It is noted that BS 8233 section 7.2.2 states 'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level'. This statement implies that the use of closed windows and an alternative means of ventilation is acceptable. All habitable rooms should be provided with proprietary wall or window mounted trickle vents to achieve background ventilation in accordance with the Building Regulations requirement.

Contents

Executive Summary	3
1. Introduction	5
1.1. Proposal	5
1.2. Reason for Assessment	5
1.3. Local & National Planning Policy.....	5
1.4. Design Criteria & Assessment Standards	6
2. Site Description	7
2.1. Site Description	7
3. Environmental Noise Survey	8
3.1. Survey Measurement.....	8
3.2. Measurement Location	8
3.3. Weather Conditions	8
3.4. Measurement Equipment	8
3.5. Monitoring Locations	9
3.6. Noise Affecting the Development.....	10
3.7. Environmental Noise Levels	10
4. Internal Noise Level Assessment	10
4.1. Design Criteria.....	10
4.2. Assessment Noise Levels.....	11
4.3. Internal Noise Level Calculations	11
5. Sound Insulation Scheme.....	11
5.1. Glazing and Ventilation	12
6. Internal Noise Levels.....	13
7. Conclusions	13
APPENDIX A – Measurement Details	14
APPENDIX B - Equipment Details	14
APPENDIX C - Meteorology Details	14
APPENDIX D - Calibration Details	14
APPENDIX E – Noise Survey Time History	15
APPENDIX F – BS8233 Rigorous Design Calculations	17
APPENDIX G – Acoustic Terminology	21

1. Introduction

1.1. Proposal

It is proposed to convert the existing store/workshop building at Mill House, Oak Street, Cheadle, Staffordshire, ST10 1NX into 2 no. residential dwellings.

1.2. Reason for Assessment

A noise assessment is to be submitted as part of the planning application to ensure desirable noise levels are met within habitable rooms of the proposed development and external amenity areas. The assessment aims to provide a sound insulation scheme for the development.

1.3. Local & National Planning Policy

Guidance for the assessment of noise affecting new residential development is given in the National Policy Framework (NPPF). Section 109 of the NPPF states.

"The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of...noise pollution."

Section 123 states the following aims:

- *"avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of a new development;*
- *mitigate and reduce to a minimum other adverse impacts 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; 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."*

The NPPF seeks to limit the exposure of new development to unacceptable levels of noise, although the policy does not seek to prescribe what constitutes an unacceptable level of noise.

To avoid and mitigate adverse noise effects on health arising from and impacting on new development, the NPPF makes reference to NPSE. The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise.

The Noise Policy Statement for England (NPSE) states the following aims in paragraph 2.2.

NOEL – No Observed Effect Level.

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level.

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level.

This is the level above which significant adverse effects on health and quality of life occur.

The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

“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 is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the “NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”

There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

1.4. Design Criteria & Assessment Standards

Guidance on the assessment and design criteria will be drawn from BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings*. Table 4 in Section 7.7.2 of this standard suggests indoor ambient noise levels for dwellings. A summary of this criteria is given below.

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)*
- *<35dB $L_{Aeq, 16hr}$ within bedrooms during the day (07:00 – 23:00)*
- *<40dB $L_{Aeq, 16hr}$ within dining areas during the day (07:00 – 23:00)*
- *<30dB $L_{Aeq, 8hr}$ within bedrooms at night (23:00 – 07:00)*

Additional guidance will be drawn from ‘ProPG: Planning & Noise’ which was published “to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.”

2. Site Description

2.1. Site Description

The site is located on a busy A-road (A528) in a heavily commercial and residential area of Cheadle, with the main commercial high street to the north of the site.

The site is flanked by a currently unused commercial garage on the east side and The Royal Oak Car Park on the west side.

The site and locations described above are shown in Figure 1 below.

Figure 1: Site and Area – earth.google.com



3. Environmental Noise Survey

3.1. Survey Measurement

To assess the environmental noise levels affecting the proposed development, an unattended noise survey was undertaken at the site from Wednesday 1st September – Friday 3rd September 2021. This period was selected to capture events and noise levels from typical day/night-time road noise and activity associated with the nearby commercial properties.

Measurements of $L_{Aeq,T}$ and L_{AFmax} were logged in 5 - minute intervals in accordance with the provisions of BS7445 - '*Description and Measurement of Environmental Noise*'.

3.2. Measurement Location

Monitoring position M1 saw the microphone being positioned out of a 1st floor window on the east façade, facing towards the currently unoccupied commercial garage.

Monitoring position M2 saw the microphone being positioned out of a 1st floor window on the west façade, facing towards The Royal Oak Car Park.

The monitoring location is shown in **Figure 2** in Section 3.5.

3.3. Weather Conditions

A daytime temperature of 14°C was noted during the survey with negligible winds. Detailed weather conditions are given in **Appendix C**.

3.4. Measurement Equipment

Measurement equipment complies with accuracy requirements for common environmental noise measurement standards. Equipment was calibrated before and after use and no significant drift occurred during measurements. Up to date calibration certification can be provided upon request. A detailed equipment list is given in **Appendix B** with calibration information in **Appendix D**.

3.5. Monitoring Locations

The site and unattended noise monitoring location are shown on Figure 2 below.

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



 Monitoring Location (M1)

 Monitoring Location (M2)

 Site Boundary (Approx.)

3.6. Noise Affecting the Development

The primary noise source affecting the development was identified to be the road adjacent to the proposed site (A528) being one of the main roads into the town centre and a busy bus route.

3.7. Environmental Noise Levels

The results from the noise monitoring at M1 and M2 is summarised below.

The full-time history of the noise monitoring data is given in **Appendix E**.

Table 1. – Environmental Measurement Summary

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical* L _{AFmax} (dB)
M1	1 st – 2 nd September 2021	Day (16hr Aggregate Period)	61	-
	1 st – 2 nd September 2021	Night (8hr)	53	77
	2 nd September 2021	Daytime (16hr)	62	-
	2 nd – 3 rd September 2021	Night (8hr)	53	79
M2	1 st – 2 nd September 2021	Day (16hr Aggregate Period)	61	-
	1 st – 2 nd September 2021	Night (8hr)	52	-
	2 nd September 2021	Daytime (16hr)	61	-
	2 nd – 3 rd September 2021	Night (8hr)	52	-

* The given 'Typical' L_{AFmax} levels above are an average of the spectra of the noisiest 10 events of the night-time period.

4. Internal Noise Level Assessment

4.1. Design Criteria

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

Table 2. – Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Areas	35 dB L _{Aeq,16hour}	-
Sleeping	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}
Sleeping	Bedroom	-	45 dB L _{AFmax}

BS8233 states that the guideline values given above are for 'noise without character', further stating:

"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

“NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) 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. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB L_{Amax,F} more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.”

“NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

In considering the noise climate affecting the proposed development, as discussed in Section 3.6, it is deemed appropriate to consider the guideline values provided in BS8233.

4.2. Assessment Noise Levels

In the interest of a robust assessment, the loudest of the measurement intervals, subject to irregular events, are to be considered in the assessment of internal noise levels and determining the sound insulation scheme.

Due to the similarity of measurements between measurements M1 and M2, only the loudest noise levels measured at position M1 will be utilised within the assessment.

The resultant external noise levels for the assessment of internal ambient noise levels are summarised in the table below.

Table 3. – Assessment Noise Levels

Period	L _{Aeq,T} (dB)	L _{AFmax} (dB)
Daytime (16hr)	62	-
Night (8hr)	53	79

4.3. Internal Noise Level Calculations

Internal noise levels have been calculated to demonstrate that the proposed dwellings can achieve the desired design criteria 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 ‘Dawes 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.

The noise levels that will exist within the habitable areas of the finished development have been predicted based on the existing noise environment at the site and outline details for the design of the development. The predicted noise levels have been compared with appropriate design criteria. Where the criteria have been predicted to be exceeded, suitable mitigation measures have been identified.

Calculations of internal ambient noise levels have been undertaken using the ‘rigorous calculation’ method given in Annex G2 of BS8232:2014. Full details of the calculations are provided in **Appendix F**.

5. Sound Insulation Scheme

5.1. Glazing and Ventilation

The following glazing and ventilation scheme for the development has been derived with a view of achieving the internal noise level criteria given in Table 2.

Table 4. – Glazing & Ventilation Scheme

Internal Space	Glazing		Ventilation	
	Minimum Performance $R_w (+C_{tr})$ ^[1]	Example Specification ^[2]	Minimum Performance $D_{ne,W} + C_{tr}$ (Open)	Example Specification
Living / Kitchen Areas	30 (26)	4 / 16 / 4mm	32	Hit & miss Trickle Vent ^[3]
Bedrooms	41 (35)	6 / 16 / 8.8SC* mm	45	Passive thru-wall Vent ^[3]

N.B. Note that other glazing configurations and ventilators can achieve the given minimum performance requirements.

*SC denotes as a laminated pane.

[1] The sound insulation value of the glazing should take into account the glass as well as the frame and perimeter seal.

[2] Example glazing specification format given as ‘XXmm Float / 16mm Air gap / XXmm Float’

[3] A mixed passive ventilation strategy has been proposed due to the levels and character of noise affecting the development. This strategy permits occupants to fully close their windows whilst still maintaining thermal comfort and respite from the external noise.

6. Internal Noise Levels

It is determined that by using mitigation as specified in **Table 4** for the building façades, the outcome summarised in the following table is achieved.

Table 5. – Internal Noise Levels

Internal Space	Noise Parameter	Internal Noise Level (dB)	Within Design Criteria?
Living / Kitchen Areas	Daytime $L_{Aeq, 16hr}$	35	Yes
	Daytime $L_{Aeq, 16hr}$	25	Yes
Bedrooms	Night-time $L_{Aeq, 8hr}$	15	Yes
	Night-time $L_{Amax,F}$	45	Yes

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 implementation of the derived sound insulation scheme given in **Table 4**, would place the internal daytime noise levels as below 35 dB, therefore within the desired limit.

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 $L_{Aeq, 8hr}$ and not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. Implementation of the derived sound insulation scheme given in **Table 4** would place the internal continuous night-time noise levels as below 30 dB, therefore within the desirable category.

7. Conclusions

An environmental noise assessment has been undertaken at Mill House, Oak Street, Cheadle, Staffordshire, ST10 1NX, where it has been proposed to convert the existing store/workshop building into 2no. semidetached residential dwellings.

Environmental noise monitoring was undertaken at the site from 1st September – 3rd September 2021. Noise affecting the development was determined to be primarily road noise from the adjacent road (A521).

A glazing and ventilation scheme has been given to ensure conditions in habitable rooms remain within the desired design criteria of BS8233:2014.

APPENDIX A – Measurement Details

Measurement(s)	Kit	Start Date	Start Time	End Date	End Time
M1	A2	01/09/2021	11:00	03/09/2021	10:25
M2	A1	01/09/2021	11:00	03/09/2021	10:25

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A2	Sound Meter	Svantek	971	1	40305
A2	Pre-Amp	Svantek	SV18	1	32484
A1	Sound Meter	Svantek	958	1	34525
A1	Pre-Amp	Svantek	SV12L	1	32484
A1	Microphone	Microtech Gefell	MK255	1	11561
A1	Calibrator	Svantek	SV33A	1	90273

APPENDIX C - Meteorology Details

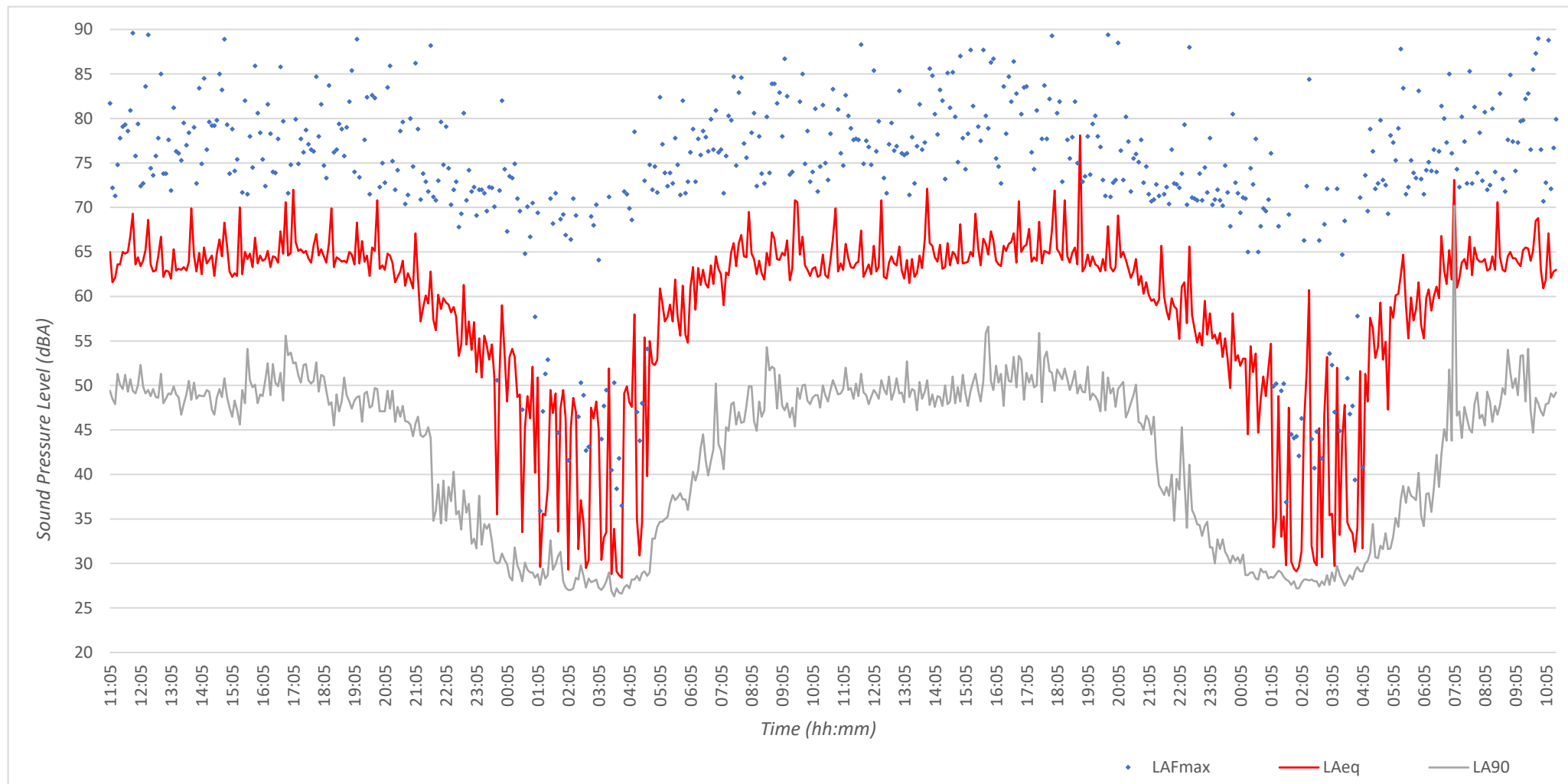
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
01/09/2021	14	3	NE	82	0.1	7/8
03/09/2021	14	4	ENE	90	0.1	7/8

APPENDIX D - Calibration Details

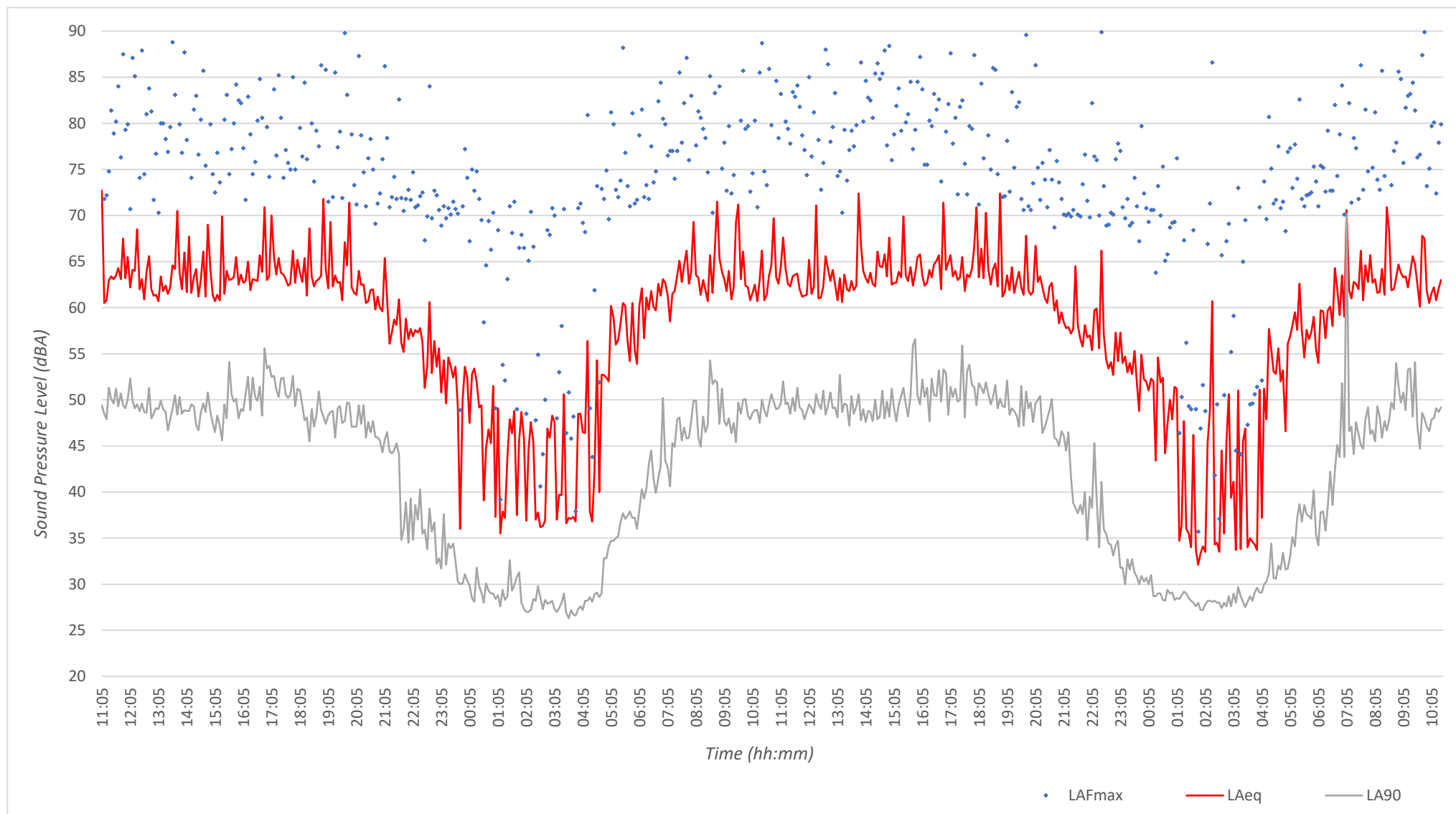
Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
A2	113.80	1.84	1.99
A1	114.0	0.00	0.3

APPENDIX E – Noise Survey Time History

Environmental Noise Measurement M1 Time History: 1st September – 3rd September 2021



Environmental Noise Measurement M2 Time History: 1st September – 3rd September 2021

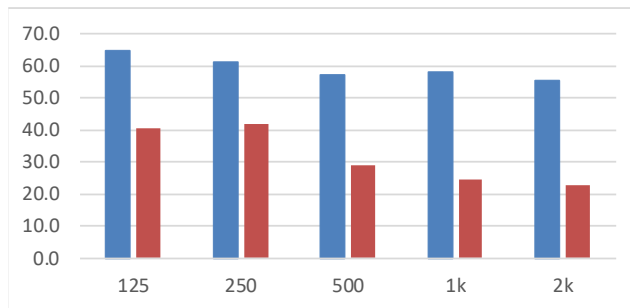


APPENDIX F – BS8233 Rigorous Design Calculations

Unit 1 - Living Room Day Laeq

Room Properties		Sound Insulation Properties					
Room Width (m)	5.1	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	3.5	Wall, dB R_{w+Ctr}	41	45	45	54	58
Room Height (m)	2.6	Roof, dB R_{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	4.2	Glazing, dB R_{w+Ctr}	24	18	26	40	45
Is dwelling within roof?	☒	Vents, $D_{n,e,w+Ctr}$	34	27	37	35	34

Noise Levels, dB



External Level	62.3 dB LAeq
Internal Levels	35.3 dB LAeq
Insertion Loss	27.0 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	32	$D_{n,e,w+Ctr}$	Hit & miss trickle vent <i>Titon Trimvent XS13 4400EA</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	0.0003002	0.0015	0.00015	0.00024	0.0003
Term 2	0.001249	0.00497	0.00079	3.1E-05	9.92E-06
Term 3	5.451E-05	2.2E-05	2.2E-05	2.7E-06	1.09E-06
Term 4	0	0	0	0	0
Internal, dB L_{eq}	40.5	42.0	29.0	24.6	22.7
Internal, dB LAeq	24.4	33.4	25.8	24.6	23.9

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Hit & miss trickle vent

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{0,2}}{10}} + \frac{S_{w1}}{S} 10^{\frac{-R_{w1}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{fl}}{S} 10^{\frac{-R_{fl}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Unit 1 - Bedroom 1 Day Laeq

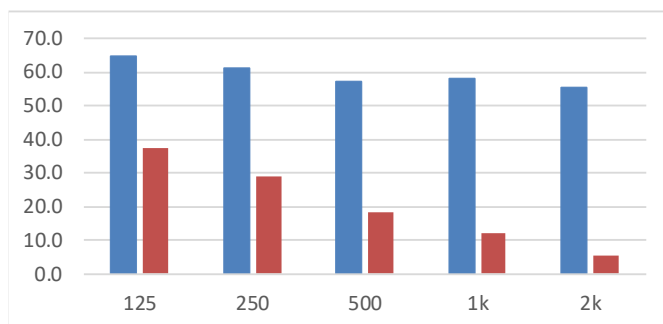
Room Properties

Room Width (m)	4.5
Room Depth (m)	2.5
Room Height (m)	2.8
Glazed Area (m ²)	2.2
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	28	39	48	46
Vents, D _{n,e,w+Ctr}	42	43	43	49	64

Noise Levels, dB



External Level	62.3 dB LAeq
Internal Levels	24.7 dB LAeq
Insertion Loss	37.6 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	41(35)	dB R _{w(+Ctr)}	Laminated Double Glazing <i>6 / 16 / 8.8SC</i>
Ventilation	45	D _{n,e,w+Ctr}	Passive thru-wall vent <i>Passivent Fresh 80dB</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	5.008E-05	4E-05	4E-05	1E-05	3.16E-07
Term 2	0.0006951	0.00028	2.2E-05	2.8E-06	4.39E-06
Term 3	6.556E-05	2.6E-05	2.6E-05	3.3E-06	1.31E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	37.3	29.0	18.4	12.1	5.3
Internal, dB LAeq	21.2	20.4	15.2	12.1	6.5

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Laminated Double Glazing
Vents	Passive thru-wall vent

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Unit 1 - Bedroom 1 Night Laeq

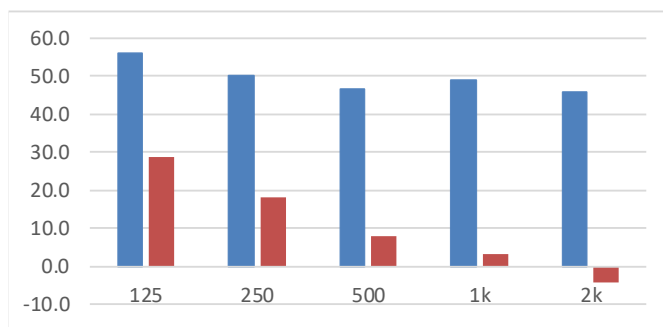
Room Properties

Room Width (m)	4.5
Room Depth (m)	2.5
Room Height (m)	2.8
Glazed Area (m ²)	2.2
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	28	39	48	46
Vents, D _{n,e,w+Ctr}	42	43	43	49	64

Noise Levels, dB



External Level	52.7 dB LAeq
Internal Levels	15.2 dB LAeq
Insertion Loss	37.5 dB LAeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	41(35)	dB R _{w(+Ctr)}	Laminated Double Glazing <i>6 / 16 / 8.8SC</i>
Ventilation	45	D _{n,e,w+Ctr}	Passive thru-wall vent <i>Passivent Fresh 80dB</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	5.008E-05	4E-05	4E-05	1E-05	3.16E-07
Term 2	0.0006951	0.00028	2.2E-05	2.8E-06	4.39E-06
Term 3	6.556E-05	2.6E-05	2.6E-05	3.3E-06	1.31E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	28.7	18.2	8.1	3.1	-4.3
Internal, dB LAeq	12.6	9.6	4.9	3.1	-3.1

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Laminated Double Glazing
Vents	Passive thru-wall vent

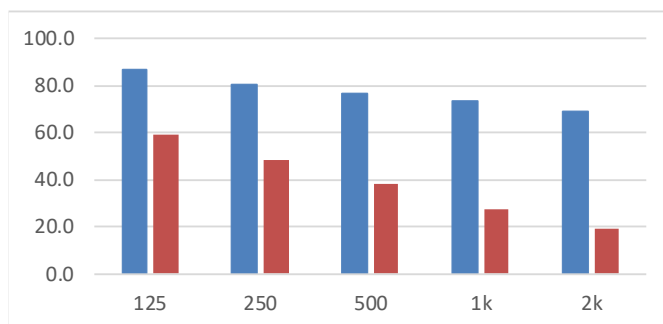
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Unit 1 - Bedroom 1 Night Lmax

Room Properties		Sound Insulation Properties					
Room Width (m)	4.5	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	2.5	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.8	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	2.2	Glazing, dB R _{w+Ctr}	24	28	39	48	46
Is dwelling within roof?	☒	Vents, D _{n,e,w+Ctr}	42	43	43	49	64

Noise Levels, dB



External Level	79.0 dB LAmax
Internal Levels	45.2 dB LAmax
Insertion Loss	33.8 dB LAmax

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	41(35)	dB R _{w(+Ctr)}	Laminated Double Glazing <i>6 / 16 / 8.8SC</i>
Ventilation	45	D _{n,e,w+Ctr}	Passive thru-wall vent <i>Passivent Fresh 80dB</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	5.008E-05	4E-05	4E-05	1E-05	3.16E-07
Term 2	0.0006983	0.00028	2.2E-05	2.8E-06	4.41E-06
Term 3	6.55E-05	2.6E-05	2.6E-05	3.3E-06	1.31E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	59.2	48.3	38.1	27.6	19.3
Internal, dB LAeq	43.1	39.7	34.9	27.6	20.5

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Laminated Double Glazing
Vents	Passive thru-wall vent

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

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.

A-Weighting – A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

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.

Contact Us

Head Office:

Peak Acoustics
Fernbank House
Springwood Way, Macclesfield, SK10 2XA

Tel: 0330 043 1764

Email: sales@acousticsurveys.co.uk

Website: acousticsurveys.co.uk

Opening hours

Mon - Fri: 8:30 - 17:00