

PEAK acoustics

A stylized graphic featuring a city skyline with various building shapes in shades of blue and purple. In the foreground, there is a sound wave graphic composed of vertical bars of varying heights, also in blue and purple tones. The entire graphic is set against a light blue background.

Noise Impact Assessment

Client: Robert McGuinness

Site: 20 Lancaster Avenue, Leek, ST13 6AX

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Executive Summary

An environmental noise assessment has been undertaken at 20 Lancaster Avenue, Leek, Staffordshire, ST13 6AX where a proposed change of use of Part Domestic Garden to Residential Building Plot for Bungalow.

Environmental noise monitoring was undertaken at the site from Wednesday 26th – Thursday 27th January 2022. Noise affecting the development was determined to be primarily light road noise from Fowlchurch Road and use of the Brough Park Leisure Centre car park opposite.

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 Areas	30 (26)	4 / 16 / 4mm	32	Hit & Miss Trickle Vent
Bedrooms	30 (26)	4 / 16 / 4mm	32	Hit & Miss Trickle Vent

Noise levels in rear garden areas of the proposed dwelling are expected to be within the upper guideline value of 55 dB $L_{Aeq,16hr}$ in accordance with BS8233:2014.

Contents

Executive Summary	2
1. Introduction	4
1.1. Proposal	4
1.2. Reason for Assessment	4
1.3. Local & National Planning Policy.....	4
1.4. Design Criteria & Assessment Standards	6
2. Site Description	6
2.1. Site Description	6
3. Environmental Noise Survey	7
3.1. Survey Measurement.....	7
3.2. Measurement Location	7
3.3. Weather Conditions	7
3.4. Measurement Equipment	7
3.5. Monitoring Locations	8
3.6. Noise Affecting the Development.....	9
3.7. Environmental Noise Levels	9
4. Internal Noise Level Assessment	9
4.1. Design Criteria.....	9
4.2. Assessment Noise Levels.....	10
4.3. Internal Noise Level Calculations	10
5. Sound Insulation Scheme.....	11
5.1. Glazing and Ventilation	11
6. Internal Noise Levels.....	12
7. External Amenity Areas.....	12
8. Conclusions	13
APPENDIX A – Measurement Details	13
APPENDIX B - Equipment Details	13
APPENDIX C - Meteorology Details	13
APPENDIX D - Calibration Details	13
APPENDIX E – Noise Survey Time History	14
APPENDIX F – BS8233 Rigorous Design Calculations	15
APPENDIX G – Site Plans	22
APPENDIX H – Acoustic Terminology	23

1. Introduction

1.1. Proposal

A proposed change of use of Part Domestic Garden to Residential Building Plot for Bungalow.

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 15 of the NPPF states:

“174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

E) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of...noise pollution.”

Section 185 further states:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- 1. Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- 2. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

Section 187 states:

“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

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.

The planning condition issued by Staffordshire Moorlands District Council is as follows:

"Development shall not commence until a site-specific scheme for protecting the proposed residential unit from noise, has been submitted to, and approved in writing by the Local Planning Authority. The submitted scheme shall have due regard for the British Standard BS8233:2014 Guidance on Sound Insulation for Buildings and The PROPG: New Residential Development. It should be designed to achieve noise levels of less than 30dB LAeq in bedrooms (night time), 35dB LAeq in bedrooms (daytime), less than 40 dBLAeq in living areas and 50dB LAeq in outside living areas. A report shall be produced containing all raw data and showing how calculations have been made. A copy of such report shall be submitted to the Local Planning Authority and approved in writing and the approved scheme shall be implemented prior to the first occupation of the development. Reason:- To protect occupiers from noise and safeguard their residential amenities."

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:

- $<35\text{dB } L_{Aeq, 16\text{hr}}$ within living areas during the day (07:00 – 23:00)
- $<35\text{dB } L_{Aeq, 16\text{hr}}$ within bedrooms during the day (07:00 – 23:00)
- $<40\text{dB } L_{Aeq, 16\text{hr}}$ within dining areas during the day (07:00 – 23:00)
- $<30\text{dB } L_{Aeq, 8\text{hr}}$ 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 the northern outskirts of Leek in a predominantly residential area. The site lies at the bottom the domestic garden of No. 20 Lancaster Avenue. To the north of the site is Leek Recycling Centre and Marling Leek Ltd. From the northeast to the southeast of the site are residential dwellings on Lancaster Avenue. On the west of the site is Fowlchurch Road followed by Brough Park Leisure Centre with adjoined car park. To the northwest is the local Scout Hut.

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 26th – Thursday 27th January 2022. This period was selected to capture events and noise levels from the local surrounding area.

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 is where the proposed Bungalow will be built. The microphone was positioned approximately 1.7 meters above ground level and away from any reflective surfaces.

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

3.3. Weather Conditions

Daytime temperatures of between 4 -8°C were 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



3.6. Noise Affecting the Development

The primary noise source affecting the development was identified to be light road traffic on Fowlchurch Road as well as use of the Leisure centre car park. Secondary sources were noted as distant construction/road works as well as birdsong. Conversations with the residents also confirmed that 5-aside football occurs outside once a week at the leisure centre and the Scout Group meets on a Thursday night.

3.7. Environmental Noise Levels

The results from the noise monitoring at M1 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	26 th – 27 th January 2022	Day (16hr Aggregate Periods)	51	-
	26 th – 27 th January 2022	Night (8hr)	46	69.5

* 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	23:00 to 07:00
Resting	Living Room	35 dB L _{Aeq,16hour}	-	
Dining	Dining room/area	40 dB L _{Aeq,16hour}	-	
Sleeping	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}	45 dB L _{Amax}

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 use the guidelines set out 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.

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 _{Amax} (dB)
Daytime (16hr)	52	-
Night (8hr)	46	69.5

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.

Internal arrangements of the dwellings have been submitted by the client and can be found in **Appendix G**.

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 Areas	30 (26)	4 / 16 / 4mm	32	Hit & Miss Trickle Vent ^[3]
Bedrooms	30 (26)	4 / 16 / 4mm	32	Hit & Miss Trickle Vent ^[3]

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

[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] It is noted that BS8233 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.

Habitable rooms should therefore be provided with passive wall or window ventilators that meet or exceed the acoustic performance given in the table above for the relevant zones whilst providing an open area equivalent to an open window in order to negate the need for open windows for the purposes of ventilative cooling. In the event this cannot be provided, a mechanical ventilation system may need to be incorporated.

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 $L_{Aeq, 16hr}$	26	Yes
Bedroom 1	Daytime $L_{Aeq, 16hr}$	24	Yes
	Night-time $L_{Aeq, 8hr}$	16	Yes
	Night-time L_{Amax}	43.6	Yes
	Daytime $L_{Aeq, 16hr}$	23	Yes
Bedroom 2	Night-time $L_{Aeq, 8hr}$	14	Yes
	Night-time L_{Amax}	42	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 $L_{Aeq, 8hr}$. 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.

BS8233:2014 also suggests a desirable guideline of 45 dB L_{AFmax} not be exceeded more than 10 times in sleeping conditions. Implementation of the derived sound insulation scheme given in **Table 4** would place the internal night-time noise levels as below 45 dB L_{AFmax} therefore within the desirable category.

7. External Amenity Areas

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.

External daytime noise levels were measured as 51 dB $L_{Aeq, 16hr}$ at position M1, this is considered acceptable as it is within the upper limit guideline of 55 dB $L_{Aeq, 16hr}$ in BS8233:2014. The proposed Bungalow will also provide shielding from the road and Leisure Centre once built and likely result in desirable external levels in the rear garden.

8. Conclusions

An environmental noise assessment has been undertaken at 20 Lancaster Avenue, Leek, Staffordshire, ST13 6AX where a proposed change of use of Part Domestic Garden to Residential Building Plot for Bungalow.

Environmental noise monitoring was undertaken at the site from Wednesday 26th – Thursday 27th January 2022.

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

APPENDIX A – Measurement Details

Measurement(s)	Kit	Start Date	Start Time	End Date	End Time
M1	A2	26/01/2022	10:20	27/01/2022	10:55

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A2	Sound Meter	Svantek	971	1	40305
A2	Pre-Amp	Svantek	SV12L	1	32484
1	Calibrator	Svantek	SV33A	1	90273

APPENDIX C - Meteorology Details

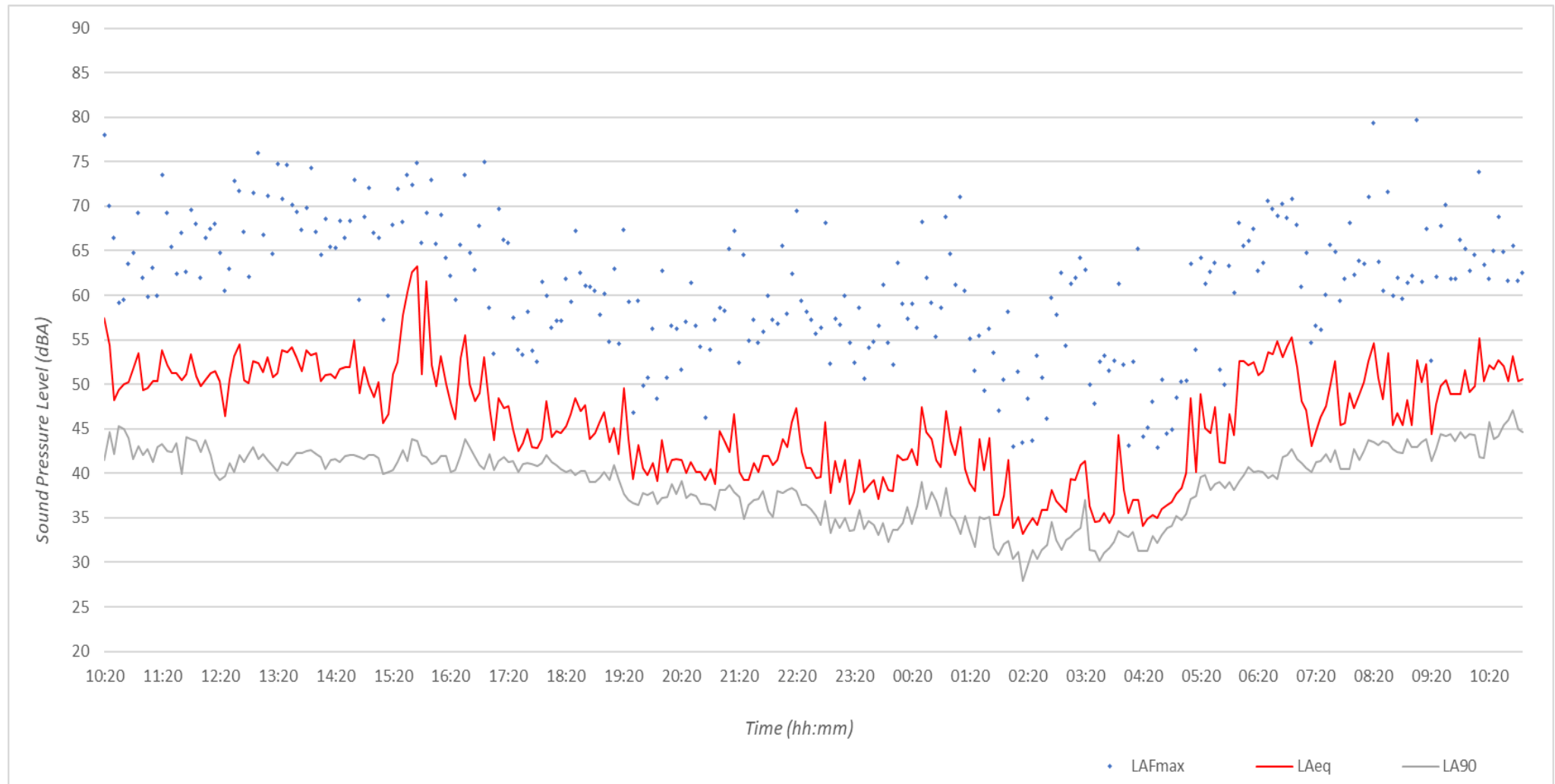
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
26/01/2022	4	2.7	WSW	90	0.0	7/8
27/01/2022	8	6.7	WNW	87	1	3/8

APPENDIX D - Calibration Details

Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
A2	113.9	1.64	1.77

APPENDIX E – Noise Survey Time History

Environmental Noise Measurement M1 Time History: 26th – 27th January 2022.

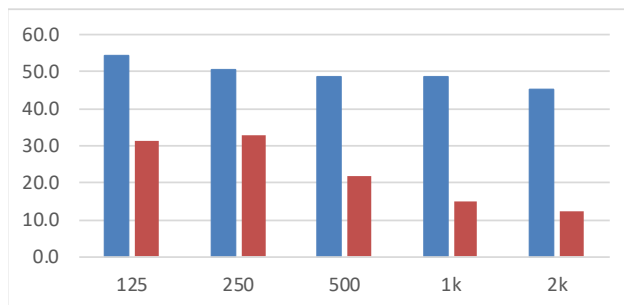


APPENDIX F – BS8233 Rigorous Design Calculations

Lounge / Dining Area (Day)

Room Properties		Sound Insulation Properties					
Room Width (m)	3.3	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	5.7	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)	6.0	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	52.0 dB Laeq
Internal Levels	26.2 dB Laeq
Insertion Loss	25.8 dB Laeq

Sound Insulation Requirement

	Minimum Sound Insulation Requirement		Suitable Systems
Glazing	30(26) dB R_{w+Ctr}		Double Glazing 4 / 16 / 4
Ventilation	32 $D_{n,e,w+Ctr}$		Hit & miss trickle vent Titon Trimvent XS13 4400EA

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	0.0005027	0.00252	0.00025	0.0004	0.000503
Term 2	0.003016	0.01201	0.0019	7.6E-05	2.4E-05
Term 3	1.926E-05	7.7E-06	7.7E-06	9.7E-07	3.84E-07
Term 4	0	0	0	0	0
Internal, dB L_{eq}	31.5	32.6	21.7	15.1	12.4
Internal, dB LAeq	15.4	24.0	18.5	15.1	13.6

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

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{-\frac{D_{0,1}}{10}} + \frac{S_{w1}}{S} 10^{-\frac{R_{w1}}{10}} + \frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}} + \frac{S_{ff}}{S} 10^{-\frac{R_{ff}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Bedroom 1 (Day)

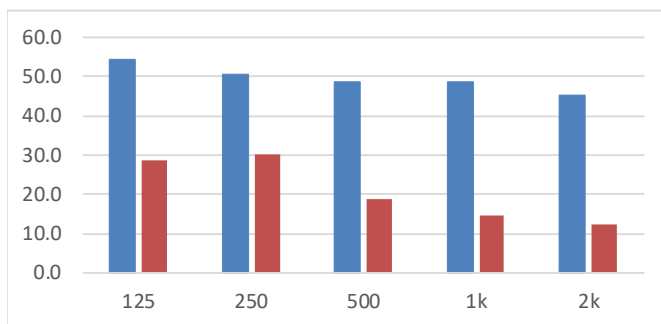
Room Properties

Room Width (m)	3.4
Room Depth (m)	3.5
Room Height (m)	2.4
Glazed Area (m ²)	2.7
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}	34	27	37	35	34

Noise Levels, dB



External Level	52.0 dB Laeq
Internal Levels	23.9 dB Laeq
Insertion Loss	28.1 dB Laeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 4
Ventilation	32	D _{n,e,w+Ctr}	Hit & miss trickle vent Titon Trimvent XS13 4400EA

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	0.0004879	0.00245	0.00024	0.00039	0.000488
Term 2	0.0013026	0.00519	0.00082	3.3E-05	1.03E-05
Term 3	5.344E-05	2.1E-05	2.1E-05	2.7E-06	1.07E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	28.8	30.0	18.8	14.7	12.3
Internal, dB LAeq	12.7	21.4	15.6	14.7	13.5

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

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

Bedroom 1 (Night)

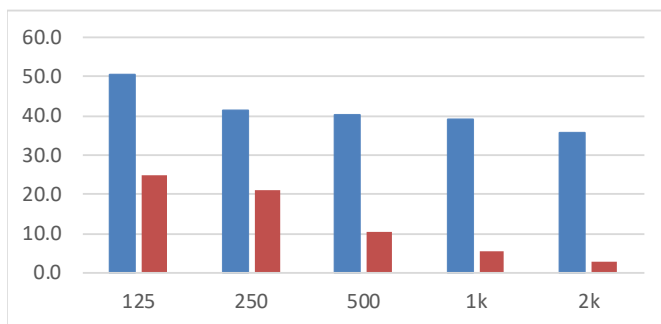
Room Properties

Room Width (m)	3.4
Room Depth (m)	3.5
Room Height (m)	2.4
Glazed Area (m ²)	2.7
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}	34	27	37	35	34

Noise Levels, dB



External Level	46.0 dB Laeq
Internal Levels	15.6 dB Laeq
Insertion Loss	30.4 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	0.0004879	0.00245	0.00024	0.00039	0.000488
Term 2	0.0013026	0.00519	0.00082	3.3E-05	1.03E-05
Term 3	5.344E-05	2.1E-05	2.1E-05	2.7E-06	1.07E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	24.8	21.0	10.5	5.3	2.9
Internal, dB LAeq	8.7	12.4	7.3	5.3	4.1

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

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

Bedroom 2 (Day)

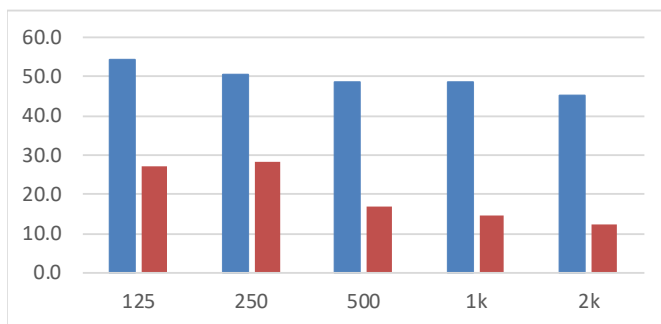
Room Properties

Room Width (m)	3.4
Room Depth (m)	2.1
Room Height (m)	2.4
Glazed Area (m ²)	1.4
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}	34	27	37	35	34

Noise Levels, dB



External Level	52.0 dB Laeq
Internal Levels	22.6 dB Laeq
Insertion Loss	29.4 dB Laeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 4
Ventilation	32	D _{n,e,w+Ctr}	Hit & miss trickle vent Titon Trimvent XS13 4400EA

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	0.0004879	0.00245	0.00024	0.00039	0.000488
Term 2	0.000683	0.00272	0.00043	1.7E-05	5.43E-06
Term 3	6.58E-05	2.6E-05	2.6E-05	3.3E-06	1.31E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	27.0	28.3	16.9	14.6	12.3
Internal, dB LAeq	10.9	19.7	13.7	14.6	13.5

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

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

Bedroom 2 (Night)

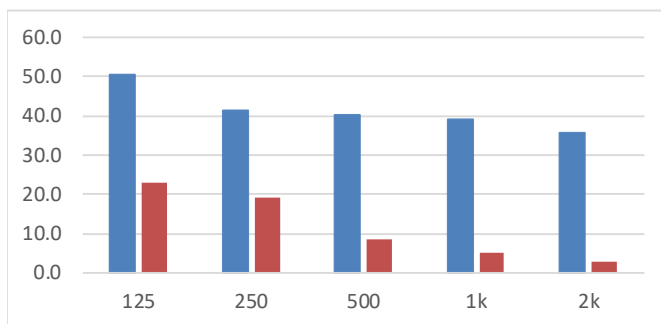
Room Properties

Room Width (m)	3.4
Room Depth (m)	2.1
Room Height (m)	2.4
Glazed Area (m ²)	1.4
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}	34	27	37	35	34

Noise Levels, dB



External Level	46.0 dB Laeq
Internal Levels	14.2 dB Laeq
Insertion Loss	31.8 dB Laeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 4
Ventilation	32	D _{n,e,w+Ctr}	Hit & miss trickle vent Titon Trimvent XS13 4400EA

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	0.0004879	0.00245	0.00024	0.00039	0.000488
Term 2	0.000683	0.00272	0.00043	1.7E-05	5.43E-06
Term 3	6.58E-05	2.6E-05	2.6E-05	3.3E-06	1.31E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	23.0	19.3	8.6	5.2	2.9
Internal, dB LAeq	6.9	10.7	5.4	5.2	4.1

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

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

Bedroom 1 (L_{Amax})

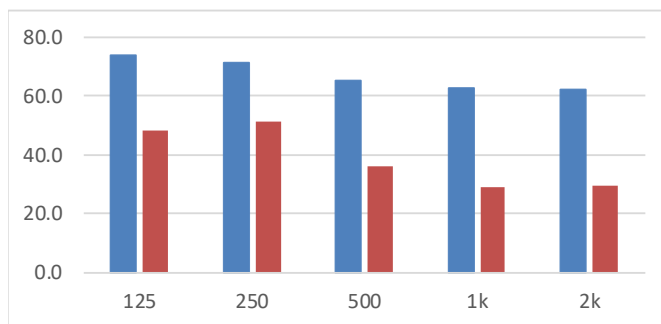
Room Properties

Room Width (m)	3.4
Room Depth (m)	3.5
Room Height (m)	2.4
Glazed Area (m ²)	2.7
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}	34	27	37	35	34

Noise Levels, dB



External Level	69.5 dB L _{Amax}
Internal Levels	43.6 dB L _{Amax}
Insertion Loss	25.9 dB L _{Amax}

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	0.0004879	0.00245	0.00024	0.00039	0.000488
Term 2	0.0013026	0.00519	0.00082	3.3E-05	1.03E-05
Term 3	5.344E-05	2.1E-05	2.1E-05	2.7E-06	1.07E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	48.1	51.1	35.9	28.9	29.3
Internal, dB L _{Aeq}	32.0	42.5	32.7	28.9	30.5

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

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

Bedroom 2 (LAm_{ax})

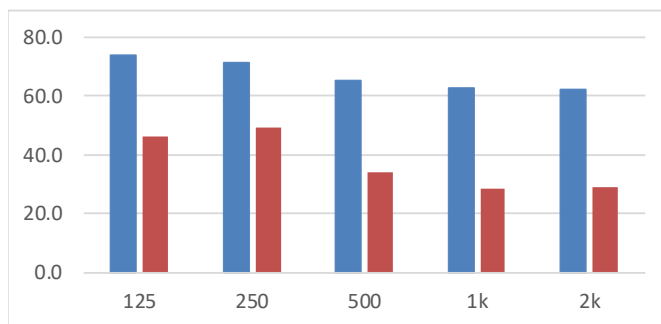
Room Properties

Room Width (m)	3.4
Room Depth (m)	2.1
Room Height (m)	2.4
Glazed Area (m ²)	1.4
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}	34	27	37	35	34

Noise Levels, dB



External Level	69.5 dB LAm _{ax}
Internal Levels	42.1 dB LAm _{ax}
Insertion Loss	27.4 dB LAm _{ax}

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	0.0004879	0.00245	0.00024	0.00039	0.000488
Term 2	0.000683	0.00272	0.00043	1.7E-05	5.43E-06
Term 3	6.58E-05	2.6E-05	2.6E-05	3.3E-06	1.31E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	46.3	49.4	34.0	28.8	29.3
Internal, dB LA _{eq}	30.2	40.8	30.8	28.8	30.5

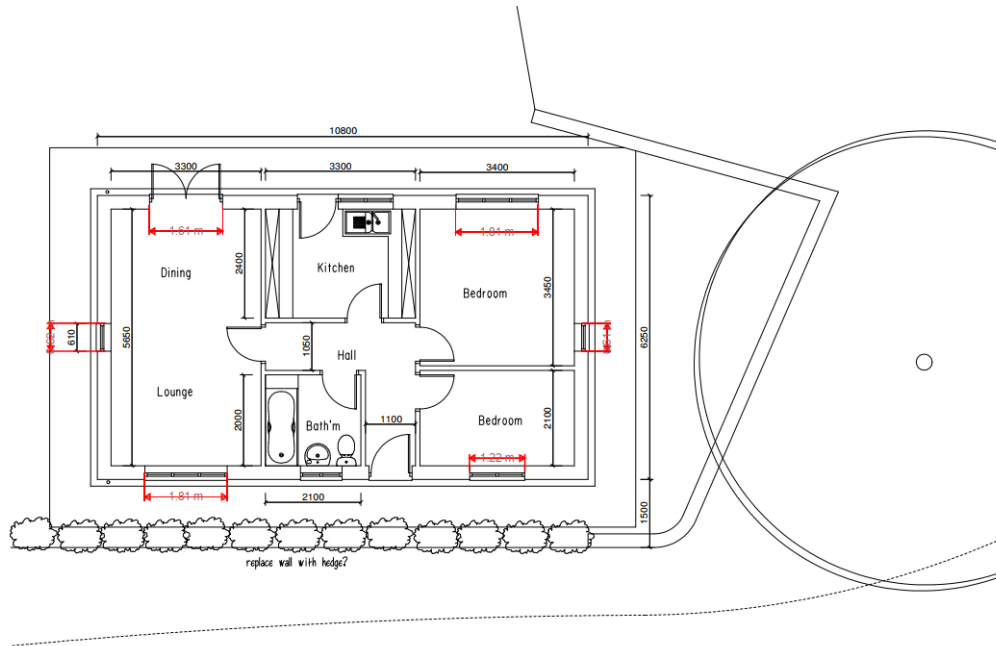
Façade Components

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

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

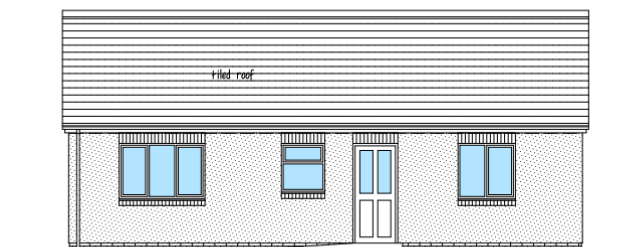
APPENDIX G – Site Plans



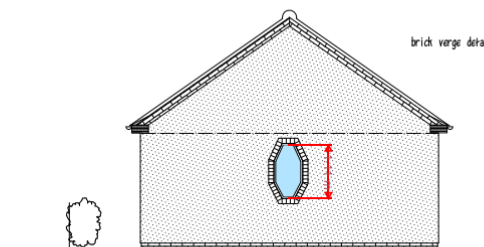
PROPOSED FLOOR PLAN



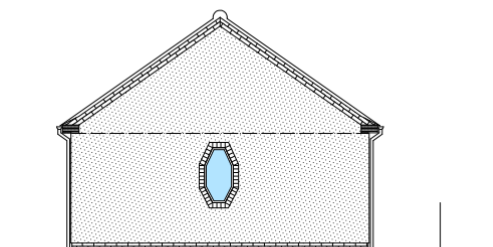
REAR GARDEN ELEVATION



FRONT ELEVATION



SIDE ELEVATION



SIDE ELEVATION TO DRIVE

APPENDIX H – 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.

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