



PEAK acoustics

Noise Assessment Report

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Environmental Noise Assessment

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Proposal: The Erection of Three Houses and a Bungalow in the Land Adjacent to The Top Pub, Brown Edge, Stoke-on-Trent, ST6 8TX

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1. Summary

1.1. Proposal

Proposed construction of 4 no. new dwellings in the land adjacent to The Top Pub, Brown Edge, Stoke-on-Trent, ST6 8TX.

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.

1.3. Planning Conditions & Criteria

Desirable 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 $L_{A_{fmax}}$ should not be regularly exceeded within bedrooms at night (23:00 – 07:00)
- 50dB $L_{Aeq, 16hr}$ within external amenity spaces during the day (07:00 – 23:00)

WHO Guidelines help to define the $L_{A_{fmax}}$ parameter requirements:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB $L_{A_{fmax}}$ 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

A noise survey was undertaken at the site from Wednesday 10th – Thursday 11th February 2021 to assess environmental noise levels. The results from these measurements are tabulated below.

Table 1. – Environmental Measurement Summary

Measurement	Date(s)	Period	L_{Aeq} (dB)	Typical $L_{A_{fmax}}$ (dB)
M1	10 th & 11 th February 2021	Day (16hr Aggregate Periods)	47.5	-
	10 th - 11 th February 2021	Night (8hr)	33.7	55.7

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)
Living Area - Bungalow	Daytime $L_{Aeq, 16hr}$	21	Yes
Bedrooms - Bungalow	Night-time $L_{Aeq, 8hr}$	19	Yes
Bedrooms - Bungalow	Night-time L_{AFMax}	29	Yes
Living Area - Houses	Daytime $L_{Aeq, 16hr}$	20	Yes
Bedrooms - Houses	Night-time $L_{Aeq, 8hr}$	14	Yes
Bedrooms - Houses	Night-time L_{AFMax}	28	Yes

1.7. Mitigation Recommendations

1.7.1. Glazing & Ventilation Scheme

Table 3. – Glazing and Ventilation Scheme

Internal Space	Glazing		Ventilation	
	Minimum Performance $R_w (+C_{tr})$	Example Specification	Minimum Performance $D_{nw,w,+C_{tr}}$ (Open)	Example Specification
Living Area - Bungalow	30 (26)	4 / 16 / 4mm	32	Titon Trimvent XS13 4400EA
Bedrooms - Bungalow	30 (26)	4 / 16 / 4mm	32	Titon Trimvent XS13 4400EA
Living Area - Houses	30 (26)	4 / 16 / 4mm	32	Titon Trimvent XS13 4400EA
Bedrooms – Houses	30 (26)	4 / 16 / 4mm	32	Titon Trimvent XS13 4400EA

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

1.8. Site & Measurement Location

The development site is situated in the land adjacent to The Top Pub, Brown Edge, Stoke-on-Trent, ST6 8TX. Hill Top road passes adjacent to the site entrance where cars and vans pass infrequently at decreasing speeds.

A public house 'The Top Pub- Brown Edge' is situated next to the site. This was closed during the noise survey due to COVID-19 restrictions and any entertainment noise was not monitored. The larger surrounding area is predominantly residential and agricultural.

The site and measurement location are shown on Figure 1 below.

Figure 1: Site & Measurement Location



 Environmental Noise Monitoring Location (M1)

 Site Boundary (Approx.)

2. Environmental Noise Survey

2.1. Sources Under Investigation

Quieter noise sources, such as slow-moving traffic along Hill Top and Hough Hill road, and birdsong were noted as primary sources. The hospitality venue 'The Top Pub- Brown Edge' lies adjacent to the site. No activity was present here due to the COVID-19 Pandemic. Once this venue is open again, entertainment noise is likely to influence the surrounding noise climate. Referenced entertainment noise levels have been utilised to try and account for this, see **Section 3.5**.

3. Survey Measurements

Day and night-time environmental noise measurements have been carried out over a 24-hour period from Wednesday 10th – Thursday 11th February 2021. Measurements of $L_{Aeq, T}$ and L_{AFmax} were logged in 5-minute intervals at 1/1 octave resolution.

3.1. Measurement Location

At position M1, the microphone was positioned to the east of the site boundary at a height of 1.7m above ground level and away from reflective surfaces. The position of the meter was deemed to accurately represent the surrounding noise climate at the proposal.

3.2. Weather Conditions

No precipitation occurred over the measurement period and temperatures ranged between 0 °C – 1 °C with wind speeds of 4 – 6 m/s; deemed suitable for conducting environmental noise measurements. Detailed weather conditions are provided 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 measurement M1 are summarised in the table below. The measured sound levels are shown graphically in **Appendix E**.

Table 4. – Selected Measurement Results

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical L _{Afmax} (dB)
M1	10 th & 11 th February 2021	Day (16hr Aggregate Periods)	47.5	-
	10 th - 11 th February 2021	Night (8hr)	33.7	55.7*

*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.

3.5. Representative External Noise Levels

External noise levels have been adjusted to account for the absence of noise sources emitted from the neighbouring hospitality venue. No activity was present here due to the COVID-19 pandemic. External noise levels have been calculated from both representative noise data, measured external noise data, distance between source and receiver and any screening provided by a 2.5m fence surrounding the beer garden of the hospitality venue. Shielding from proposed dwellings themselves have not been taken into account, meaning that calculated external noise levels will likely be lower than stated within this report.

3.5.1 Cumulative Levels at the Bungalow

Representative entertainment noise data has been utilised alongside measured data from on site to formulate a cumulative external noise level at the proposed bungalow location. Representative noise levels for 'The Top Pub-Brown Edge' have been taken from previously measured noise data on measured 18th June 2018, whereby an England World Cup football match was present.

Tables 5 & 6 below detail the representative noise levels at the proposed bungalow location:

Table 5. – Cumulative Daytime Noise Levels at the Bungalow

Source	Parameter	Octave Centre-Frequency Band, Hz (Unweighted)							Sum (dBA)
		63	125	250	500	1k	2k	4k	
Representative External Pub Level	dB L _{eq,T}	58	63	67	61	58	53	47	64
Distance Correction	dB	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-
Proposed 2.5m fencing	dB	-5.4	-5.9	-6.7	-8.1	-10.0	-12.3	-14.9	-
Atmospheric Absorption	dB	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.5	-
(M1) External Level Daytime	dB L _{eq,T}	53.8	45.9	40.5	39.6	38.0	35.5	44.4	47.3
Cumulative Noise Level	dB L_{eq,T}	54.0	48.0	47.9	42.6	39.7	36.0	44.4	48.4

A cumulative external daytime noise level is therefore considered as **48.4 dB L_{Aeq}, 16hr**.

Table 6. – Cumulative Night-time Noise Levels at the Bungalow

Source	Parameter	Octave Centre-Frequency Band, Hz (Unweighted)							Sum (dBA)
		63	125	250	500	1k	2k	4k	
Representative External Pub Level	dB L _{eq,T}	58	63	67	61	58	53	47	64
Distance Correction	dB	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-
Proposed 2.5m fencing	dB	-5.4	-5.9	-6.7	-8.1	-10.0	-12.3	-14.9	-
Atmospheric Absorption	dB	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.5	-
(M1) External Level Night-time	dB L _{eq,T}	45.0	39.4	34.9	31.1	28.9	22.7	20.6	34.0
Cumulative Noise Level	dB L_{eq,T}	46.1	45.1	47.3	40.2	35.7	28.2	22.6	42.6

A cumulative external night-time noise level is therefore considered as **42.6 dB L_{Aeq}, 8hr**.

3.5.2 Cumulative Levels at the Houses

The same entertainment noise data has been utilised with measurement data to formulate the cumulative noise levels at the proposed location of the houses. The location of the house nearest the hospitality venue has been considered as this will likely be the worst affected.

Tables 7 & 8 below detail the representative noise levels at the proposed location of the houses:

Table 7. – Cumulative Daytime Noise Levels at the Houses

Source	Parameter	Octave Centre-Frequency Band, Hz (Unweighted)							Sum (dBA)
		63	125	250	500	1k	2k	4k	
Representative External Pub Level	dB L _{eq,T}	58	63	67	61	58	53	47	64
Distance Correction	dB	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-
Proposed 2.5m fencing	dB	-5.3	-5.7	-6.5	-7.7	-9.4	-11.6	-14.1	-
Atmospheric Absorption	dB	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.9	-
(M1) External Level Daytime	dB L _{eq,T}	53.8	45.9	40.5	39.6	38.0	35.5	44.4	47.3
Cumulative Noise Level	dB L_{eq,T}	53.9	46.8	44.9	41.1	38.8	35.7	44.4	47.7

A cumulative external daytime noise level is therefore considered as **47.7 dB L_{Aeq}, 16hr**.

Table 8. – Cumulative Night-time Noise Levels at the Houses

Source	Parameter	Octave Centre-Frequency Band, Hz (Unweighted)							Sum (dBA)
		63	125	250	500	1k	2k	4k	
Representative External Pub Level	dB $L_{eq,T}$	58	63	67	61	58	53	47	64
Distance Correction	dB	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6	-
Proposed 2.5m fencing	dB	-5.3	-5.7	-6.5	-7.7	-9.4	-11.6	-14.1	-
Atmospheric Absorption	dB	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.9	-
(M1) External Level Night-time	dB $L_{eq,T}$	45.0	39.4	34.9	31.1	28.9	22.7	20.6	34.0
Cumulative Noise Level	dB $L_{eq,T}$	45.5	42.5	43.6	37.0	33.0	25.8	21.5	39.4

A cumulative external night-time noise level is therefore considered as **39.4 dB $L_{Aeq, 8hr}$** .

4. BS8233:2014 Environmental Noise Assessment

4.1. Criteria

Desirable 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)
- **55dB $L_{Aeq, 16hr}$** within external amenity spaces during the day (07:00 – 23:00)

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)”.

4.2. Internal Noise Levels – Proposed Insulation

Room dimensions and glazed areas have been approximated based on drawings supplied to Peak Acoustics and drawn by ‘Hewitt & Carr Architects’. These drawings are dated to December 2019. 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 dwellings 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 5 below.

Table 9. – Assessment Outcome

Internal Space	Glazing Minimum Performance $R_w (+C_{tr})$	Ventilation Minimum Performance $D_{nw,w,+C_{tr}} (Open)$	Internal Noise Level, dB
Living Area - Bungalow	30 (26)	32	21 $L_{Aeq, 16hr}$
Bedrooms - Bungalow	30 (26)	32	19 $L_{Aeq, 8hr}$ 29 L_{AFMax}
Living Area - Houses	30 (26)	32	20 $L_{Aeq, 16hr}$
Bedrooms - Houses	30 (26)	32	14 $L_{Aeq, 8hr}$ 28 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 of living areas in houses and the bungalow, the desirable limit of BS8233:2014 suggests a guideline of 35 dB $L_{Aeq, 16hr}$ for resting conditions, and up to 40 dB $L_{Aeq, 16hr}$ is considered acceptable for necessary developments.

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

For the night-time assessment of bedrooms in houses and the bungalow, 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 below 30 dB and the maximum noise events as typically below 45 dB L_{AFmax} , therefore within the desirable category.

5. 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. Noise levels at position M1 were measured as 47.5 dB $L_{Aeq, 16hr}$.

Cumulative noise levels, accounting for both measured and referenced noise levels, place external noise levels of the bungalow amenity space at 48.4 dB $L_{Aeq, 16hr}$. External noise levels of the amenity space at the nearest house are placed at 47.7 dB $L_{Aeq, 16hr}$. Both fall within the desirable category of BS8233:2014.

APPENDIX A – Measurement Details

Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	A2	10/02/2021	11:00	11/02/2021	12:10

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
Cal	Calibrator	Svantek	SV33A	1	90273

APPENDIX C - Meteorology Details

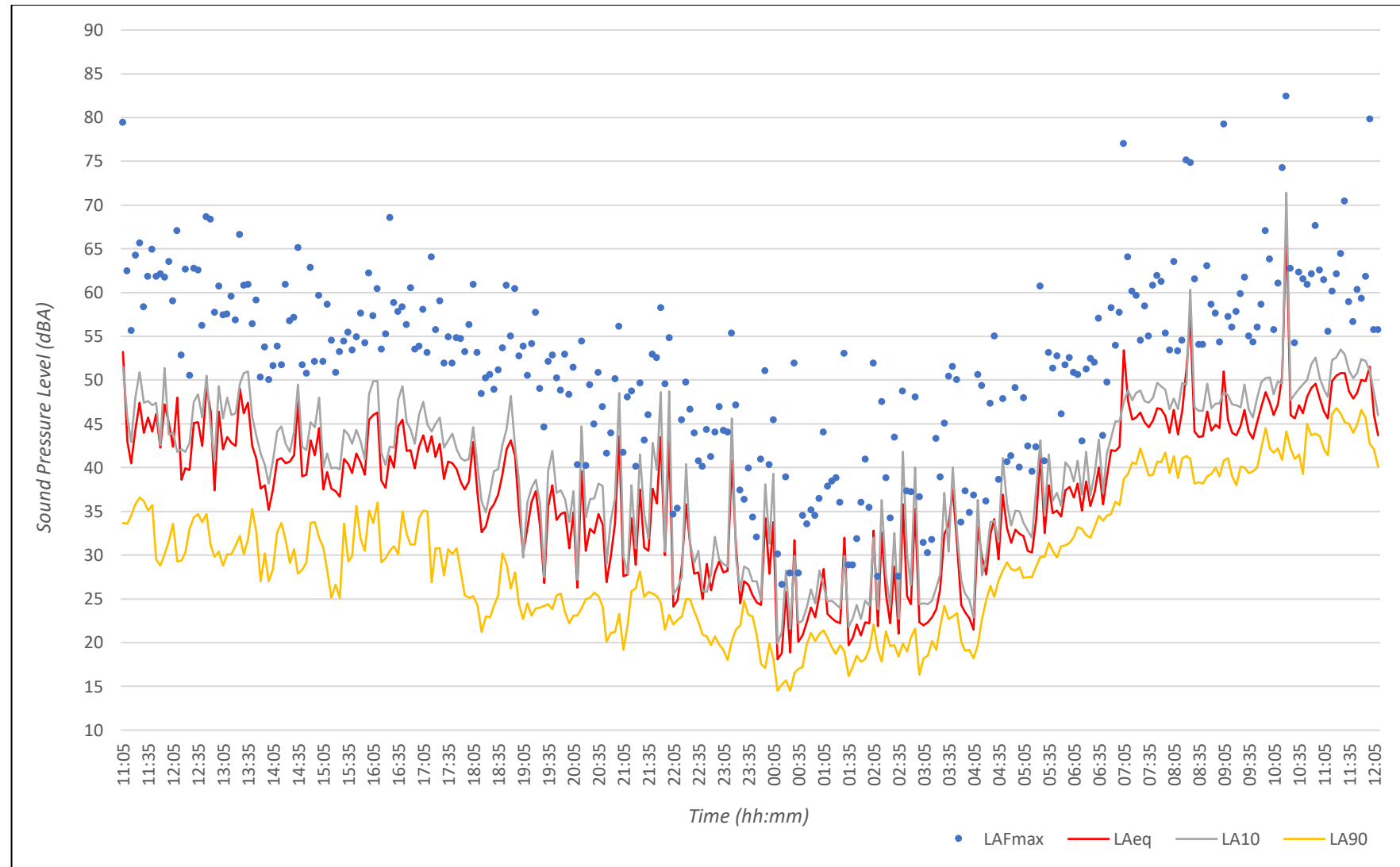
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
10/02/21 (Start of Survey)	0	2-4	NE	63	0.0	2/8
11/02/21 (End of Survey)	1	6	ESE	70	0.0	1/8

APPENDIX D - Calibration Details

Measurement	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
M1	114.0	+ 1.67	+ 1.73

APPENDIX E – Survey Results

Environmental Noise Measurement (M1), 10th – 11th February 2021

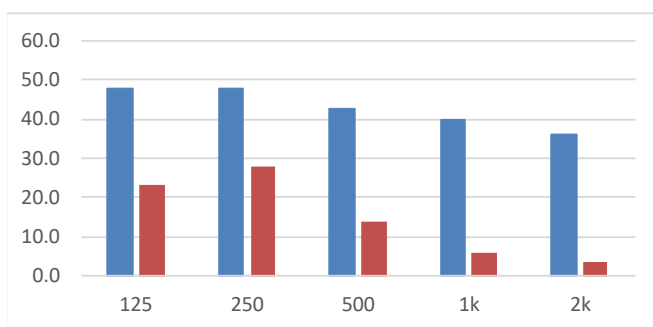


APPENDIX F – BS8233 Rigorous Design Calculations

Living Room Bungalow - LAeq

Room Properties		Sound Insulation Properties					
Room Width (m)	5.5	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	3.3	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.5	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	3.3	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	48.0 dB LAeq
Internal Level	20.5 dB LAeq
Insertion Loss	27.5 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	0.00029	0.0015	0.00015	0.0002	0.00029
Term 2	0.000941	0.0037	0.00059	2E-05	7.5E-06
Term 3	6.07E-05	2E-05	2.4E-05	3E-06	1.2E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	23.1	28.0	13.8	6.1	3.4
Internal, dB LAeq	7.0	19.4	10.6	6.1	4.6

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

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{01}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{n}}{S} 10^{\frac{-R_{n}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Bedroom Bungalow - LAeq

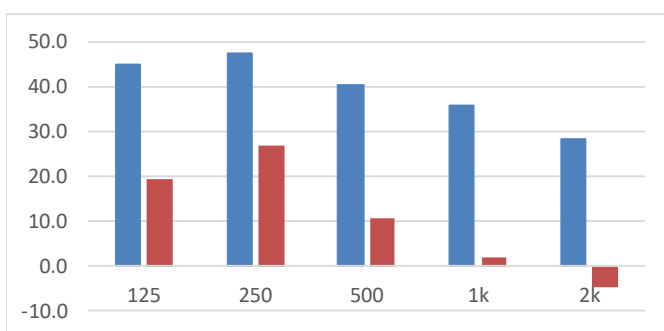
Room Properties

Room Width (m)	3.2
Room Depth (m)	2.7
Room Height (m)	2.5
Glazed Area (m ²)	2.6
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}	34	27	37	35	34

Noise Levels, dB



External Level	48.0 dB LAeq
Internal Level	18.7 dB LAeq
Insertion Loss	29.3 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	0.000498	0.0025	0.00025	0.0004	0.0005
Term 2	0.001294	0.0052	0.00082	3E-05	1E-05
Term 3	5.36E-05	2E-05	2.1E-05	3E-06	1.1E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	19.4	26.7	10.6	2.0	-4.5
Internal, dB LAeq	3.3	18.1	7.4	2.0	-3.3

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

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

Bedroom Bungalow - LAMax

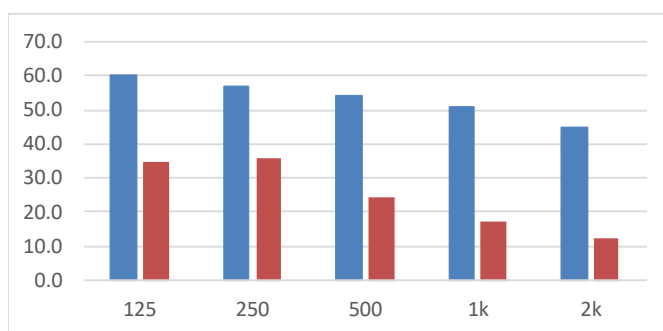
Room Properties

Room Width (m)	3.2
Room Depth (m)	2.7
Room Height (m)	2.5
Glazed Area (m ²)	2.6
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}	34	27	37	35	34

Noise Levels, dB



External Level 55.7 dB L_{Amax}

Internal Level 29.1 dB L_{Amax}

Insertion Loss 26.6 dB L_{Amax}

Sound Insulation Requirement

Minimum Sound Insulation Requirement

Glazing	30(26)	dB R _{w(+Ctr)}
Ventilation	32	D _{n,e,w+Ctr}

Suitable Systems

Double Glazing
[4/16/4](#)
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	0.000498	0.0025	0.00025	0.0004	0.0005
Term 2	0.001294	0.0052	0.00082	3E-05	1E-05
Term 3	5.36E-05	2E-05	2.1E-05	3E-06	1.1E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	34.5	36.0	24.2	17.1	12.4
Internal, dB LA _{eq}	18.4	27.4	21.0	17.1	13.6

Façade Components

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

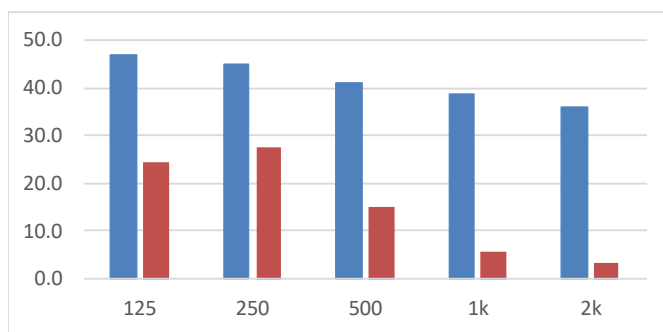
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Living Area of Houses - LAeq

Room Properties		Sound Insulation Properties					
Room Width (m)	4.6	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	4.2	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)	7.1	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	48.0 dB LAeq
Internal Level	20.4 dB LAeq
Insertion Loss	27.6 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	0.000333	0.0017	0.00017	0.0003	0.00033
Term 2	0.002377	0.0095	0.0015	6E-05	1.9E-05
Term 3	3.2E-05	1E-05	1.3E-05	2E-06	6.4E-07
Term 4	0	0	0	0	0
Internal, dB L _{eq}	24.6	27.7	15.1	5.6	3.2
Internal, dB LAeq	8.5	19.1	11.9	5.6	4.4

Façade Components

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

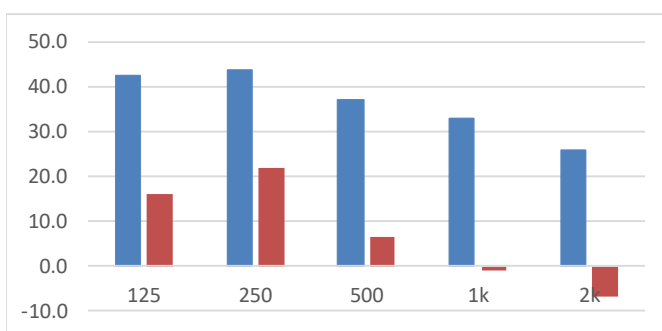
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Bedroom Houses - LAeq

Room Properties		Sound Insulation Properties					
Room Width (m)	4.6	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	2.8	Wall, dB R _{w+Ctr}	41	45	45	54	58
Room Height (m)	2.3	Roof, dB R _{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	1.9	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	33.7 dB LAeq
Internal Level	14.3 dB LAeq
Insertion Loss	19.4 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	0.000376	0.0019	0.00019	0.0003	0.00038
Term 2	0.000704	0.0028	0.00044	2E-05	5.6E-06
Term 3	6.54E-05	3E-05	2.6E-05	3E-06	1.3E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	15.9	22.1	6.4	-0.8	-6.9
Internal, dB LAeq	-0.2	13.5	3.2	-0.8	-5.7

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

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

Bedroom Houses - LAMax

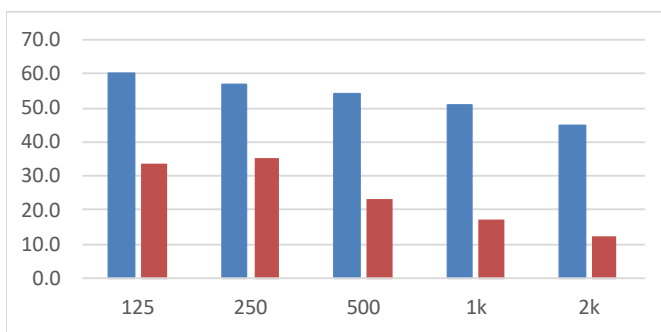
Room Properties

Room Width (m)	4.6
Room Depth (m)	2.8
Room Height (m)	2.3
Glazed Area (m ²)	1.9
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 55.7 dB LAMax

Internal Level 28.3 dB LAMax

Insertion Loss 27.4 dB LAMax

Sound Insulation Requirement

Minimum Sound Insulation Requirement

Glazing	30(26)	dB R _{w(+Ctr)}
Ventilation	32	D _{n,e,w+Ctr}

Suitable Systems

Double Glazing
[4 / 16 / 4](#)
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	0.000376	0.0019	0.00019	0.0003	0.00038
Term 2	0.000704	0.0028	0.00044	2E-05	5.6E-06
Term 3	6.54E-05	3E-05	2.6E-05	3E-06	1.3E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	33.7	35.1	23.2	17.0	12.4
Internal, dB LA _{eq}	17.6	26.5	20.0	17.0	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

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

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.

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