

PEAK acoustics



Noise Impact Assessment

Client: David Edmondson

Site: 5 – 9 Ann Street, Rochdale, OL16 1QQ

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Executive Summary

A noise assessment has been undertaken at 5 – 9 Ann Street, Rochdale, OL16 1QQ in relation to the proposed development of an HMO.

Environmental noise monitoring was undertaken at the site from the 2nd – 3rd July 2024. Noise affecting the development was determined to be primarily from road traffic and nearby commercial units.

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 $D_{ne,W,+C_{tr}} (Open)$	Example Specification
Living Areas	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vents (Open): Titon Trimvent XS13 4400EA
Bedrooms	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vents (Open): Titon Trimvent XS13 4400EA
Dining Rooms	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vents (Open): Titon Trimvent XS13 4400EA

Internal noise levels are anticipated to be within the guidelines of BS8233 with comments from ProPG.

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1. Introduction

1.1. Proposal

It is proposed to convert the site at 5 – 9 Ann Street, Rochdale into an 8 Bedroom HMO. The site is currently a disused, non-residential property.

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 the habitable rooms of the proposed development and external amenity areas. The assessment aims to provide a sound insulation scheme for the development.

1.3. Planning Conditions

No formal planning guidance or comment has been provided in relation to the assessment. It is understood that the noise assessment report will be submitted as part of an upcoming planning application.

1.4. Assessment Guidance Documentation

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.

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.*"

Where necessary, mitigation recommendations will be given to comply with the requirements of the National Planning Policy Framework (2021) and the Noise Policy Statement for England (2010). Further information on all guidance documentation can be found in **Appendix H**.

2. Environmental Noise Survey

2.1. Survey Measurement

To assess the environmental noise levels affecting the proposed development, an unattended noise survey was undertaken at the site from the 2nd – 3rd July 2024 between 12:50 and 12:05. This period was selected to capture events and noise levels on a typical weekday from surrounding roads as well as noise from other nearby residential and commercial sources.

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*'.

2.2. Measurement Location

Monitoring position M1 is located to the East side of the site. The microphone was positioned approximately 4.5 metres above ground level through a 1st floor window. A 3-dB correction is applied to measured data to account for proximity to the building façade.

The site and monitoring locations are shown below in **Figure 1**:



Figure 1: Site & Measurement Locations – [google.com/maps](https://www.google.com/maps)

- Monitoring Location (M1)
- / Site Boundary (Approx.)
- / Neighbouring MOT Centre (under construction)

2.3. Site Descriptions

The site is located at the corner of Ann Street and Great George Street in Rochdale. The surrounding area comprises a mixture of residential and commercial properties with uses including a car wash, sports bar, offices and vehicle workshops.

2.4. Noise Affecting the Development

The primary noise source affecting the development was identified as a combination of road noise and noise from nearby commercial units. Secondary sources were noted as birdsong, sirens and air traffic.

2.5. Environmental Noise Survey Results

The results from the noise monitoring location M1 are summarised below.

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

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical* L _{AFmax} (dB)
M1	2 nd & 3 rd July 2024	Day (16hr Aggregate Periods)	55	-
	2 nd – 3 rd July 2024	Night (8hr)	43	66

Table 1: Environmental Measurement Summary

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

2.6. Weather Conditions

Daytime temperatures of between 13 - 15°C were noted during the survey with winds of 4 – 5m/s. Detailed weather conditions are given in **Appendix C**.

2.7. 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. Internal Noise Level Assessment

3.1. 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.

Activity	Location	07:00 to 23:00	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}

Table 2: Indoor Ambient Noise Levels for Dwellings

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.

"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 LAmax,F more than 10 times a night."

The site has several commercial uses nearby including a recently constructed MOT centre which was not yet operational at the time of the survey.

In accordance with BS4142, the Specific Sound Levels may be corrected for characteristics that make the sound more noticeable at the NSR location such as tonality, impulsivity and intermittency. Section 9.2 of BS4142:2014 gives commentary on these characteristics and appropriate penalties:

"Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

As the primary function of the adjacent unit is to carry out MOT tests, there may be some tonality to processes which is perceptible at the site. A 2dB penalty will be applied to account for this.

Operations of the MOT centre may include sources which have impulsivity such as closing of car doors. A further penalty of 3dB will be applied to account for this.

The MOT centre is expected to be in operation throughout the day and so is not considered intermittent.

The total rating penalty applied to noise level criteria is 5dB.

The rating-adjusted assessment criteria are provided below:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	30 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	35 dB $L_{Aeq,16hour}$	-
Sleeping	Bedroom	30 dB $L_{Aeq,16hour}$	25 dB $L_{Aeq,8hour}$

Table 3: Assessment Criteria

The average night-time L_{Amax} criteria for the assessment will be 45dB $L_{Amax,F}$.

3.2. 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.

Period	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
Daytime (1hr)	60	-
Night (1hr)	46	66

Table 4: Assessment Noise Levels

3.3. Predicted Daytime Noise Level – MOT Centre

As the adjacent MOT Centre was not operational at the time of the on-site noise measurement, predicted noise output has been modelled using 'SoundPlan' noise modelling software.

Using previously measured data for a vehicle workshop and details of the MOT centre layout and construction, the noise breakout from the site has been modelled and a specific noise level of 53dB is calculated to the worst-affected windows of 5-9 Ann Street (East Façade overlooking the MOT centre).

As this level is below the measured worst-case existing noise levels from the M1 measurement, the measured data will be utilised within the assessment.

A noise map of the modelled MOT centre noise breakout is provided within **Appendix J**.

3.4. Internal Noise 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, proposed drawings by 'AM Architectural Studios' have been used to scale room and glazing dimensions and can be found in **Appendix G**.

Assessment is not required for each individual room therefore a worst-case situation will be used in which the worst affected rooms/floors will be used.

Calculations of internal ambient noise levels have been undertaken using the 'rigorous calculation' method given in Annex G2 of BS8233:2014. Full details of the calculations are provided in **Appendix F**.

4. Sound Insulation Scheme

4.1. External Building Envelope

Material build-up of the façade will significantly dictate the noise levels within the proposed dwelling. For the purposes of this report, the heavyweight construction of the façade is assumed to provide a minimum sound reduction of 49 dB R_w .

Where the roof is to be utilised as a voided loft space with thermal insulation, no further details are required. If the proposed dwelling has rooms within the roof space, the additional material build-up will be assumed at a minimum sound reduction of 39 dB R_w .

4.2. 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.

Internal Space	Glazing		Ventilation	
	Minimum Performance $R_w (+C_{tr})$ ^[1]	Example Specification ^[2]	Minimum Performance $D_{ne,W,+C_{tr}}$ (Open)	Example Specification ^[3]
Living Areas	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vents (Open): Titon Trimvent XS13 4400EA
Bedrooms	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vents (Open): Titon Trimvent XS13 4400EA
Dining Rooms	30 (26)	Double Glazing: 4/16/4	32	Hit & Miss Trickle Vents (Open): Titon Trimvent XS13 4400EA

Table 5: Glazing & Ventilation Scheme

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.

5. Internal Noise Levels

It is determined that by using mitigation as specified in **Table 5** for the building façades, the outcome summarised in the following table is achieved.

Internal Space	Noise Parameter	Internal Noise Level (dB)	Within Design Criteria?
Living Room	Daytime $L_{Aeq, 16hr}$	28	Yes
Bedroom	Daytime $L_{Aeq, 16hr}$	29	Yes
	Night-time $L_{Aeq, 8hr}$	16	Yes
	Night-time $L_{Amax, F}$	36	Yes

Table 6: Internal Noise Levels

The following statements are inclusive of the 5dB criteria penalty applied within section 3:

For the daytime assessment for living areas, the desirable limit of BS8233:2014 suggests a guideline of 30 dB $L_{Aeq, 16hr}$ for resting conditions, and up to 35 dB is considered acceptable for necessary developments.

All results, with the implementation of the derived sound insulation scheme given in **Table 5**, would place the internal daytime noise levels below 30 dB, therefore within the desired limit.

For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 25 dB $L_{Aeq, 8hr}$ for sleeping conditions, with an acceptable limit of 30 dB $L_{Aeq, 8hr}$.

Implementation of the derived sound insulation scheme given in **Table 5** would place the internal continuous night-time noise levels below 30 dB, therefore within the desirable category.

For the night-time assessment for bedrooms, ProPG suggests that individual noise events do not normally exceed 45dB $L_{Amax, F}$ more than 10 times a night.

Implementation of the derived sound insulation scheme given in **Table 5** would place the internal $L_{Amax, F}$ night-time events below 45 dB, therefore within the criteria.

6. 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 on-site at position M1 (Figure 1)

Site plans do not show any external amenity areas associated with the proposals however it is noted that the daytime external noise levels are within the ‘acceptable’ criteria of BS8233.

7. Conclusion

A noise assessment has been undertaken at 5 – 9 Ann Street, Rochdale, OL16 1QQ in relation to the proposed development of an HMO.

Environmental noise monitoring was undertaken at the site from the 2nd – 3rd July 2024. Noise affecting the development was determined to be primarily from road traffic and nearby commercial units.

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

Internal noise levels are anticipated to be within the guidelines of BS8233 with comments from ProPG.

APPENDIX A – Measurement Details

Measurement(s)	Kit	Start Date	Start Time	End Date	End Time
M1	A5	02/07/24	12:50	03/07/24	12:05

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A5	Sound Meter	RION	NL-52	1	00219828
A5	Pre-Amp	RION	NH-25	1	00344
A5	Microphone	RION	UC-59	1	18806
A5	Calibrator	RION	NL-75	1	34212936

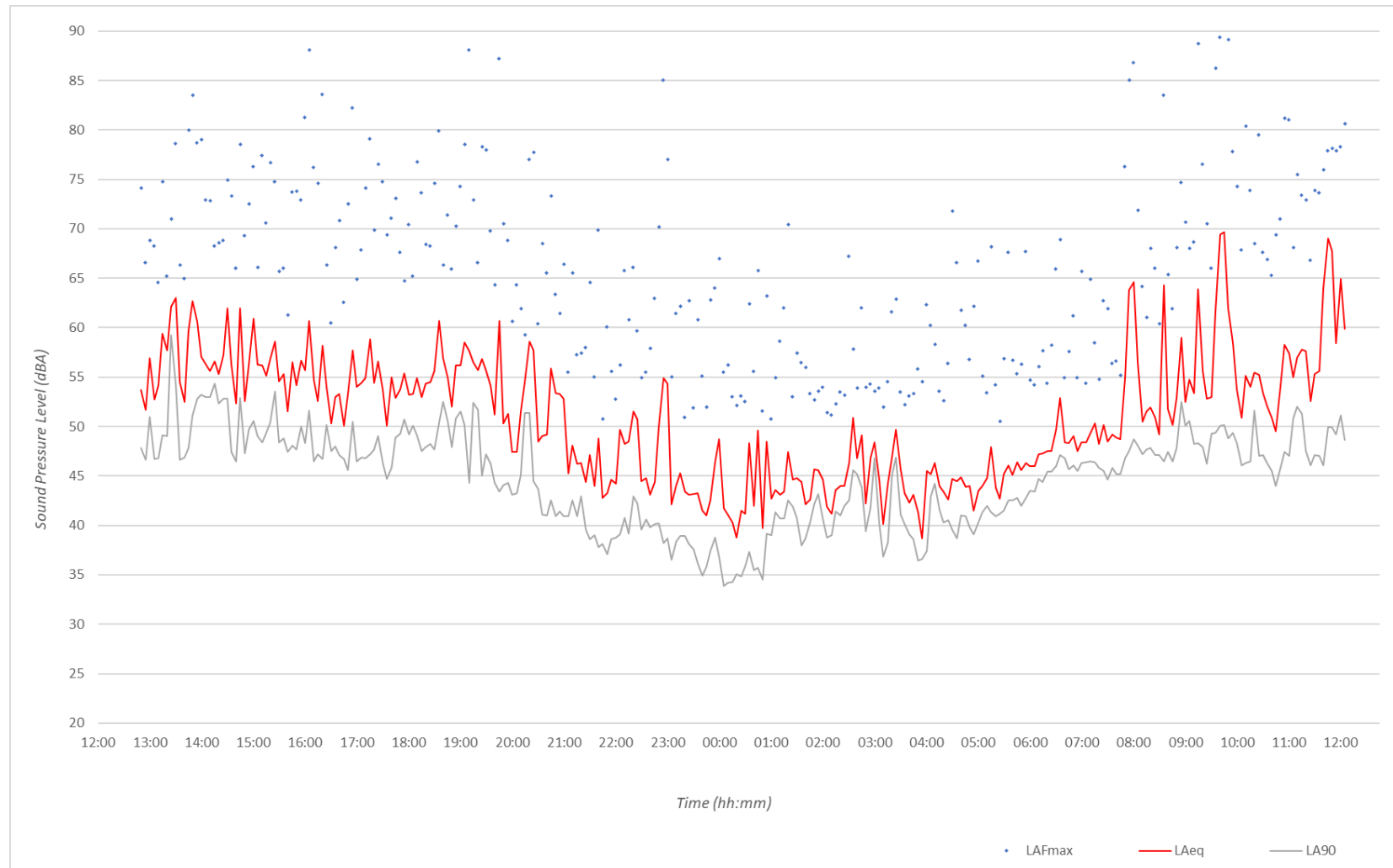
APPENDIX C - Meteorology Details

Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
02/07/24	15	5	NW	62	0	8/8
03/07/24	13	4	SW	80	0	8/8

APPENDIX D - Calibration Details

Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
A5	94.00	0.00	0.00

APPENDIX E – Noise Survey Time History



Environmental Noise Measurement M1 Time History: 2nd – 3rd July 2024

APPENDIX F – BS8233 Rigorous Design Calculations

Living Room											
BS8233:2014 Façade Noise Break In Calculator											
Daytime External Noise Level - LAeq - 1 hour						125 250 500 1k 2k dBA					
Night-time External Noise Level - LAeq - 1 hour						56.1 54.8 52.4 49.4 46.5 54					
Night-time Lmax Noise Levels - 10 times per night											
Room Properties						Room Coefficient					
Width (m)	Height (m)	Depth (m)	Glazing	Reverb Time		10	10	11	12	11	A
6	2.4	3	2.6	0.6		0.7	0.7	0.6	0.6	0.6	RT
Façade Construction						SRI (Sound Reduction Index) Rw					
Wall Construction		Brick and block, 75mm cavity, 60mm Fibreglass				31	46	43	49	56	49(44)
Roof Construction		Not Within Roof Space				0	0	0	0	0	N/A
Glazing Spec		4 / 16 / 4				24	18	26	40	45	30(26)
Ventilation Spec		Hit & Miss Trickle Vent (Open)				38.4	36.8	33.8	29.7	33.8	32
Calculation Results						125 250 500 1k 2k dBA					
Daytime Internal Noise Level - LAeq			Target Value <		30	14.9	25.5	21.8	20.9	15.1	28.4
Night-time Internal Noise Level - LAeq			Target Value <								
Internal Lmax Noise Levels			Target Value <								

Sound Insulation Requirement			
Minimum Sound Insulation Requirement			
Glazing	30(26)	dB R _{W(+Ctr)}	Suitable Systems Double Glazing 4 / 16 / 4
Ventilation	32	D _{n,e,w+Ctr}	Hit & Miss Trickle Vent (Open) Titon Trimvent XS13 4400EA
Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.			

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Dining Room											
BS8233:2014 Façade Noise Break In Calculator											
Daytime External Noise Level - LAeq - 1 hour						125	250	500	1k	2k	dBA
Night-time External Noise Level - LAeq - 1 hour						56.1	54.8	52.4	49.4	46.5	54
Night-time Lmax Noise Levels - 10 times per night											
Room Properties						Room Coefficient					
Width (m)	Height (m)	Depth (m)	Glazing	Reverb Time		8	8	9	9	9	A
3.5	2.4	4	1.5	0.6		0.7	0.7	0.6	0.6	0.6	RT
Façade Construction						SRI (Sound Reduction Index)					
Wall Construction		Brick and block, 75mm cavity, 60mm Fibreglass				31	46	43	49	56	49(44)
Roof Construction		Not Within Roof Space				0	0	0	0	0	N/A
Glazing Spec		4 / 16 / 4				24	18	26	40	45	30(26)
Ventilation Spec		Hit & Miss Trickle Vent (Open)				38.4	36.8	33.8	29.7	33.8	32
Calculation Results						125	250	500	1k	2k	dBA
Daytime Internal Noise Level - LAeq			Target Value <		35	15.5	24.3	22.0	23.0	17.2	28.5
Night-time Internal Noise Level - LAeq			Target Value <								
Internal Lmax Noise Levels			Target Value <								

Sound Insulation Requirement			
Minimum Sound Insulation Requirement			
Glazing	30(26)	dB R _{W(+Ctr)}	Suitable Systems Double Glazing 4 / 16 / 4
Ventilation	32	D _{n,e,w+Ctr}	Hit & Miss Trickle Vent (Open) Titon Trimvent XS13 4400EA
<i>Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.</i>			

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{st}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{w1}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{w2}}{10}} + \frac{S_{p1}}{S} 10^{\frac{-R_{p1}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

Bedroom					
BS8233:2014 Façade Noise Break In Calculator					
Daytime External Noise Level - LAeq - 1 hour					
Night-time External Noise Level - LAeq - 1 hour					
Night-time Lmax Noise Levels - 10 times per night					
Room Properties					
Width (m)	Height (m)	Depth (m)	Glazing	Reverb Time	
4	2.4	2	1.5	0.6	
Façade Construction					
Wall Construction	Brick and block, 75mm cavity, 60mm Fibreglass				
Roof Construction	Not Within Roof Space				
Glazing Spec	4 / 16 / 4				
Ventilation Spec	Hit & Miss Trickle Vent (Open)				
Calculation Results					
Daytime Internal Noise Level - LAeq	Target Value <	30			
Night-time Internal Noise Level - LAeq	Target Value <	25			
Internal Lmax Noise Levels	Target Value <	45			

125	250	500	1k	2k	dBA
56.1	54.8	52.4	49.4	46.5	54
41.4	40.7	40.7	38.3	33.0	42
57.1	59.0	58.9	58.0	58.5	63

Room Coefficient					
5	5	6	6	6	A
0.6	0.6	0.6	0.5	0.5	RT

SRI (Sound Reduction Index)					Rw
31	46	43	49	56	49(44)
0	0	0	0	0	N/A
24	18	26	40	45	30(26)
38.4	36.8	33.8	29.7	33.8	32

125	250	500	1k	2k	dBA
15.7	26.0	22.5	21.8	15.8	29.0
1.0	11.9	10.7	10.7	2.4	16.2
16.7	30.2	28.9	30.3	27.8	35.5

Sound Insulation Requirement		
Minimum Sound Insulation Requirement		
Glazing	30(26)	dB R _{W(+Ctr)}
Ventilation	32	D _{n,e,w+Ctr}
Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.		

Suitable Systems

Double Glazing

4 / 16 / 4

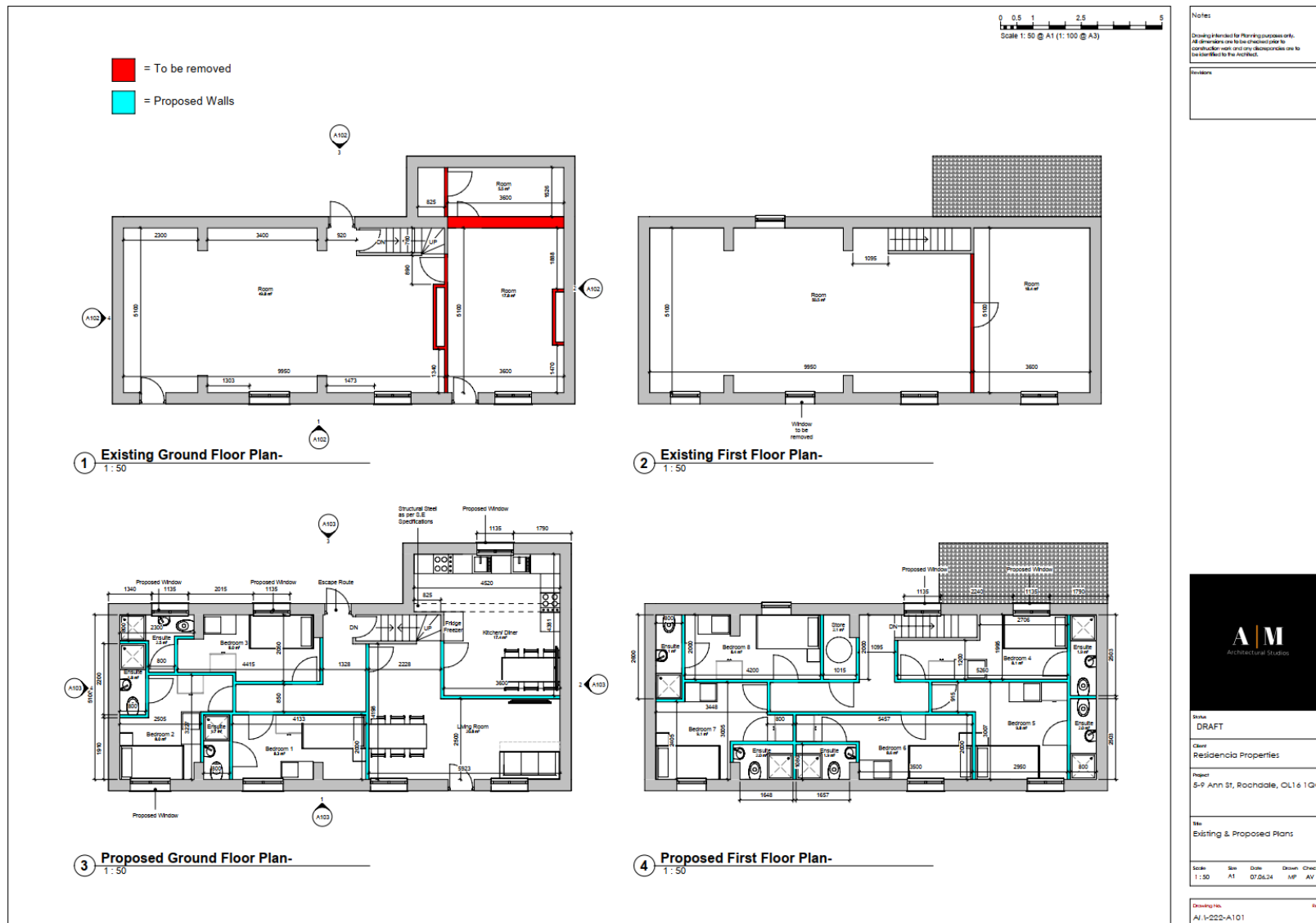
Hit & Miss Trickle Vent (Open)

Titon Trimvent XS13 4400EA

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq,2} = L_{eq,ff} + 10 \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{st}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{w1}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{w2}}{10}} + \frac{S_{tr}}{S} 10^{\frac{-R_{tr}}{10}} \right) + 10 \log_{10} \left(\frac{S}{A} \right) + 3$$

APPENDIX G – Site Plans



APPENDIX H – Legislation, Policy and Guidance

Guidance for the assessment of noise affecting new residential development is given in the National Planning 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:

A. 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;

B. 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.

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.

Activity	Location	07:00 to 23:00	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 $L_{Aeq,8hour}$

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."

APPENDIX I – 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 of 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 meter 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 over 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.

APPENDIX J – MOT Centre Noise Map

