

PEAK acoustics

A stylized graphic of a city skyline in shades of blue and purple. In the foreground, there is a grid of squares, some solid blue and some with a lighter blue outline, creating a modern architectural look. The background shows various building silhouettes and trees, all reflected in a light blue horizontal band at the bottom.

Noise Impact Assessment

Client: Care Today Children's Service

Site: 51 Marshall Road, Levenshulme, Manchester, M19 2EG.

Reference No. JP1005223NR

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Project Consultant

J. Parrott BEng (Hons) AMIOA
Acoustic Consultant
jack@acousticsurveys.co.uk

Proofing Consultant

T. Brown BSc (Hons) MIOA
Acoustic Consultant
tom@acousticsurveys.co.uk

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

Web: www.acousticsurveys.co.uk

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

Executive Summary

An Environmental Noise Assessment has been undertaken at 51 Marshall Road, where it has been proposed to construct a single-storey rear extension to form additional living accommodation.

Environmental noise monitoring was undertaken at the site from Monday 1st – Tuesday 2nd August 2022. Noise affecting the development was determined to be primarily from road and rail traffic with secondary sources of birdsong and residents/pedestrians.

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 Room / Kitchen	30 (26)	4/16/4	32	Hit & Miss Trickle Vent
Bedroom 2	30 (26)	4/16/4	40	Acoustic Trickle Vent

No assessment of the external amenity area has been undertaken due to it being part of the pre-existing accommodation.

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1. Introduction

1.1. Proposal

It is proposed to erect a single-storey extension for additional living accommodation at 51 Marshall Road, Manchester M19 2EG hereby referred to as 'the site'. The site is currently residential, and the new extension will provide a single additional flat.

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. Planning Conditions

The applicant has received conditional planning approval, 132389/FO/2021 'Erection of single-storey rear extension, to form additional living accommodation, following demolition of existing single-storey rear extension from Manchester City Council. The following planning condition requires discharging:

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

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance, pursuant to policy DM1 of the Manchester Core Strategy (2012) and saved UDP policy DC26.

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 (2019) 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 for approximately 24 hours at the site from Monday 1st till Tuesday 2nd August 2022. This period was selected to capture events and noise levels on a typical weekday from rush-hour road and rail sources 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 at the eastern boundary of the site, beside the railway line and bridge over Alma Rd. The microphone was positioned approximately 1.7 meters above ground level and away from any reflective surfaces.

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



Figure 1: Site & Measurement Locations – google.com/maps

● Monitoring Location (M1)

▬ Site Boundary (Approx.)

▬ Extension outline (Approx.)

2.3. Site Descriptions

The proposed extension location sits within the middle of the site boundary of 51 Marshall Road. The north boundary of the site joins neighbouring residential housing and back gardens. The railway line runs beyond the eastern boundary. The south site boundary is adjacent to Alma Road and the Western boundary is adjacent to Marshall Road. There is also a junction between Alma Road, Marshall Road, Preston Road and Errwood Road at the South-Western corner of the site.

2.4. Noise Affecting the Development

The primary noise source affecting the development was identified to be from road and rail traffic. Secondary sources were noted as pedestrians and birdsong.

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**.

Table 1. – Environmental Measurement Summary

Measurement	Date(s)	Period	L _{Aeq} (dB)	Typical* L _{AFmax} (dB)
M1	1 st – 2 nd August 2022	Day (16hr Aggregate Periods)	60.4	-
	1 st – 2 nd August 2022	Night (8hr)	53.9	74

* 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 20°C – 21°C were noted during the survey with winds between 2 – 6 m/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.

Table 2. – Indoor Ambient Noise Levels for Dwellings

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.

“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.”

In considering the noise climate affecting the proposed development, as discussed in Section 2.4, it is deemed appropriate to use guidelines set out in BS8233 and ProPG to ensure the internal criteria set out by the WHO for internal noise maxima L_{Amax} and internal L_{Aeq} .

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.

Table 3. – Assessment Noise Levels

Period	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)
Daytime (07:40 – 08:40)	63.6	-
Night (06:00 – 07:00)	59.4	74

3.3. 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 'SP Architectural' 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.

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 ^[3]
Living Room / Kitchen	30 (26)	4/16/4	32	Hit & Miss Trickle Vent
Bedroom 2	30 (26)	4/16/4	40	Acoustic Trickle Vent

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 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 Room / Kitchen	Daytime $L_{Aeq, 16hr}$	31.1	Yes
	Daytime $L_{Aeq, 16hr}$	28.5	Yes
Bedroom 2	Night-time $L_{Aeq, 8hr}$	25.2	Yes
	Night-time $L_{Amax, F}$	42.6	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 the implementation of the derived sound insulation scheme given in **Table 4**, would place the internal daytime noise levels 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 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 4** would place the internal $L_{Amax, F}$ night-time events as below 45 dB, therefore within the criteria.

6. Conclusions

An Environmental Noise Assessment has been undertaken at 51 Marshall Road, where it has been proposed to construct a single-storey rear extension to form additional living accommodation.

Environmental noise monitoring was undertaken at the site from Monday 1st – Tuesday 2nd August 2022. Noise affecting the development was determined to be primarily from road and rail traffic with secondary sources of birdsong and residents/pedestrians.

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.

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	A4	01/08/2022	11:40	02/08/2022	11:40

APPENDIX B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A4	Sound Meter	SvanteK	971	1	60688
A4	Pre-Amp	SvanteK	SV18	1	62781
A4	Microphone	ACO	7052E	1	66703
2	Calibrator	SvanteK	SV33B	1	83715

APPENDIX C - Meteorology Details

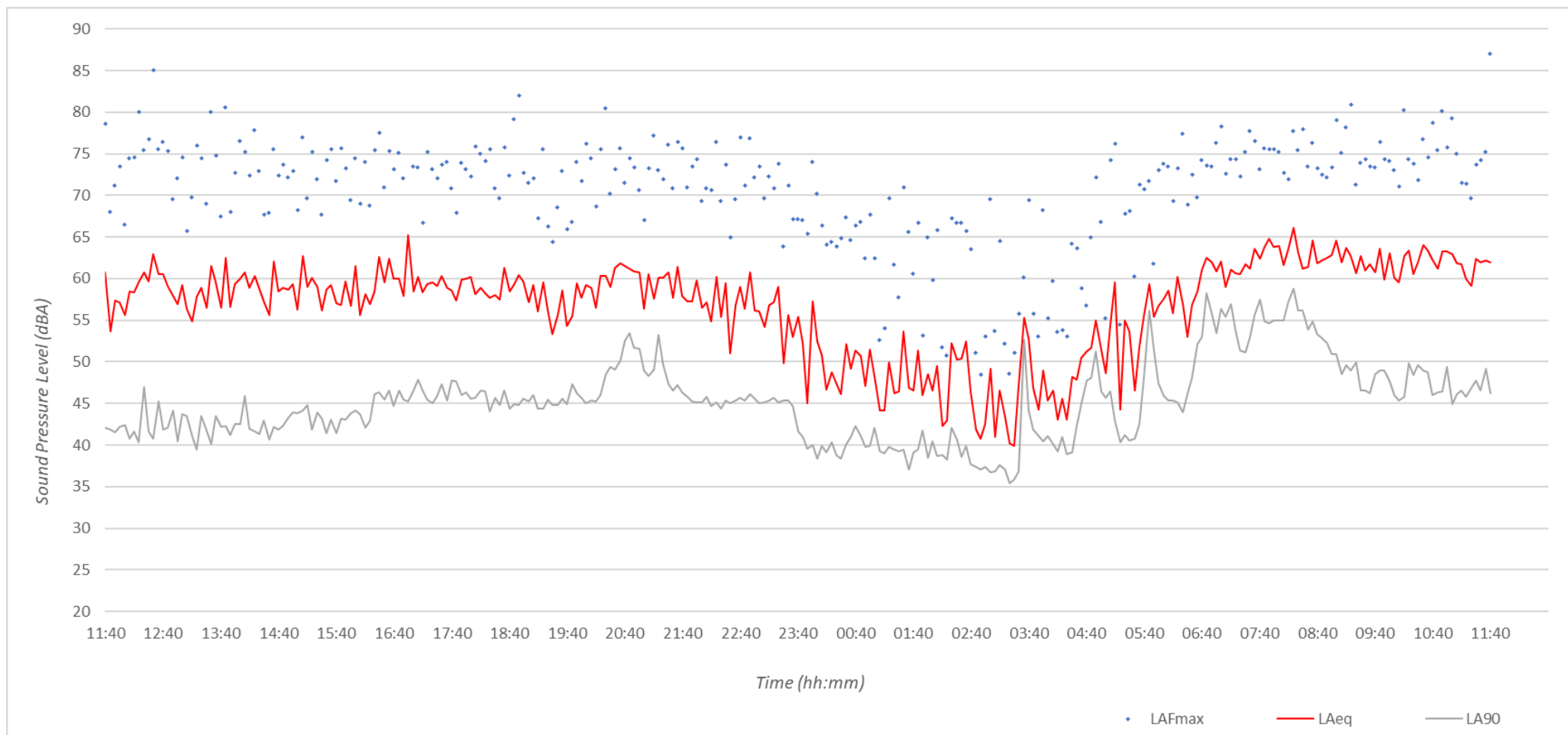
Date	Temp C°	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
01/08/2022	20	2.7	SSW	55	0.0	1/8
02/08/2022	21	6.2	SW	80	0.0	6/8

APPENDIX D - Calibration Details

Kit	Calibrator Ref Level (dB)	Deviation Before (dB)	Deviation After (dB)
A4	113.8	-1.3	-1.41

APPENDIX E – Noise Survey Time History

Environmental Noise Measurement M1 Time History: Monday 1st – Tuesday 2nd August 2022

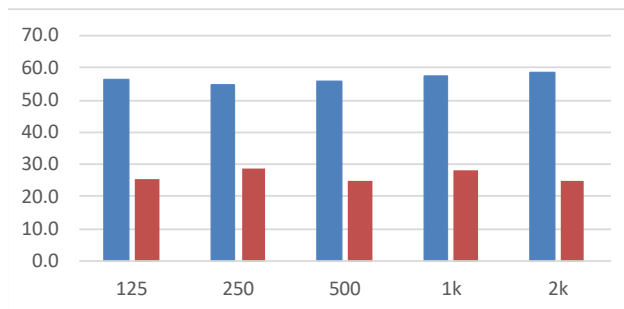


APPENDIX F – BS8233 Rigorous Design Calculations

Living Room / Kitchen (Day)

Room Properties		Sound Insulation Properties					
Room Width (m)	4.3	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)	1.4	Glazing, dB R _{w+Ctr}	24	18	26	40	45
Is dwelling within roof	☒	Vents, D _{n,e,w+Ctr}	38.4	36.8	33.8	29.7	33.8

Noise Levels, dB



External Level	63.6 dB LAeq
Internal Levels	31.1 dB LAeq
Insertion Loss	32.5 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 (Open) 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	0.00014	0.0002	0.0004	0.001	0.0004
Term 2	0.00054	0.0022	0.00034	1E-05	4.3E-06
Term 3	6.87E-05	3E-05	2.7E-05	3E-06	1.4E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	25.6	28.8	25.0	28.1	24.7
Internal, dB LAeq	9.5	20.2	21.8	28.1	25.9

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Hit & Miss Trickle Vent (Open)

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Bedroom 2 LAeq (Day)

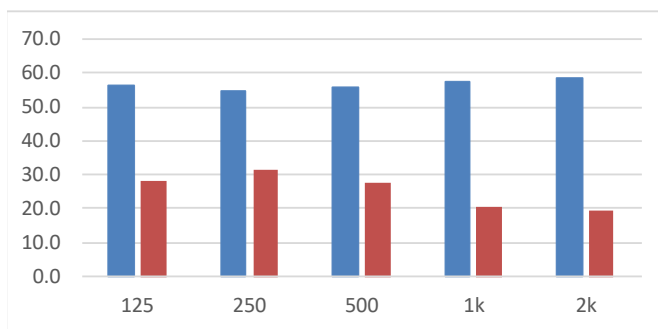
Room Properties

Room Width (m)	3.0
Room Depth (m)	2.9
Room Height (m)	2.4
Glazed Area (m ²)	0.9
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}	40.7	38.8	35.8	42.3	43.9

Noise Levels, dB



External Level	63.6 dB LAeq
Internal Levels	28.5 dB LAeq
Insertion Loss	35.1 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 4
Ventilation	40	D _{n,e,w+Ctr}	Acoustically Treated Trickle Vent (Open) Titon Xtra Sound Attenuator V75+C50

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	0.000118	0.0002	0.00037	8E-05	5.7E-05
Term 2	0.000476	0.0019	0.0003	1E-05	3.8E-06
Term 3	6.99E-05	3E-05	2.8E-05	4E-06	1.4E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	28.0	31.2	27.5	20.7	19.4
Internal, dB LAeq	11.9	22.6	24.3	20.7	20.6

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Acoustically Treated Trickle Ve

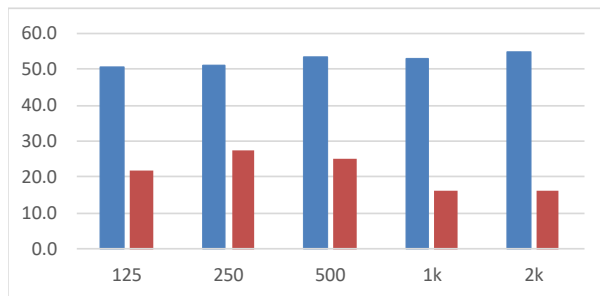
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Bedroom 2 LAeq (Night)

Room Properties			Sound Insulation Properties					
Room Width (m)	3.0		Freq. Hz	125	250	500	1k	2k
Room Depth (m)	2.9		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)	0.9		Glazing, dB R _{w+Ctr}	24	18	26	40	45
Is dwelling within roof	☒		Vents, D _{n,e,w+Ctr}	40.7	38.8	35.8	42.3	43.9

Noise Levels, dB



External Level 59.4 dB LAeq

Internal Levels 25.2 dB LAeq

Insertion Loss 34.2 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 4
Ventilation	40	D _{n,e,w+Ctr}	Acoustically Treated Trickle Vent (Open) Titon Xtra Sound Attenuator V75+C50

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	0.000118	0.0002	0.00037	8E-05	5.7E-05
Term 2	0.000476	0.0019	0.0003	1E-05	3.8E-06
Term 3	6.99E-05	3E-05	2.8E-05	4E-06	1.4E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	22.0	27.4	25.1	16.0	16.1
Internal, dB LAeq	5.9	18.8	21.9	16.0	17.3

Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Acoustically Treated Trickle Vent (Open)

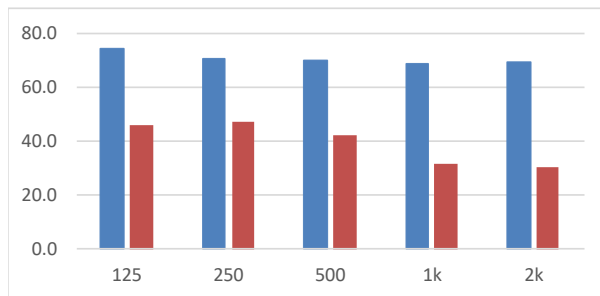
Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

Bedroom 2 LAmax

Room Properties		Sound Insulation Properties					
Room Width (m)	3.0	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	2.9	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)	0.9	Glazing, dB R _{w+Ctr}	24	18	26	40	45
Is dwelling within roof	☒	Vents, D _{n,e,w+Ctr}	40.7	38.8	35.8	42.3	43.9

Noise Levels, dB



External Level 74.0 dB LAmax

Internal Levels 42.6 dB LAmax

Insertion Loss 31.4 dB LAmax

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	30(26)	dB R _{w(+Ctr)}	Double Glazing 4 / 16 / 4
Ventilation	40	D _{n,e,w+Ctr}	Acoustically Treated Trickle Vent (Open) Titon Xtra Sound Attenuator V75+C50

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	0.000118	0.0002	0.00037	8E-05	5.7E-05
Term 2	0.000476	0.0019	0.0003	1E-05	3.8E-06
Term 3	6.99E-05	3E-05	2.8E-05	4E-06	1.4E-06
Term 4	0	0	0	0	0
Internal, dB L _{eq}	45.8	46.9	41.9	31.7	30.3
Internal, dB LAeq	29.7	38.3	38.7	31.7	31.5

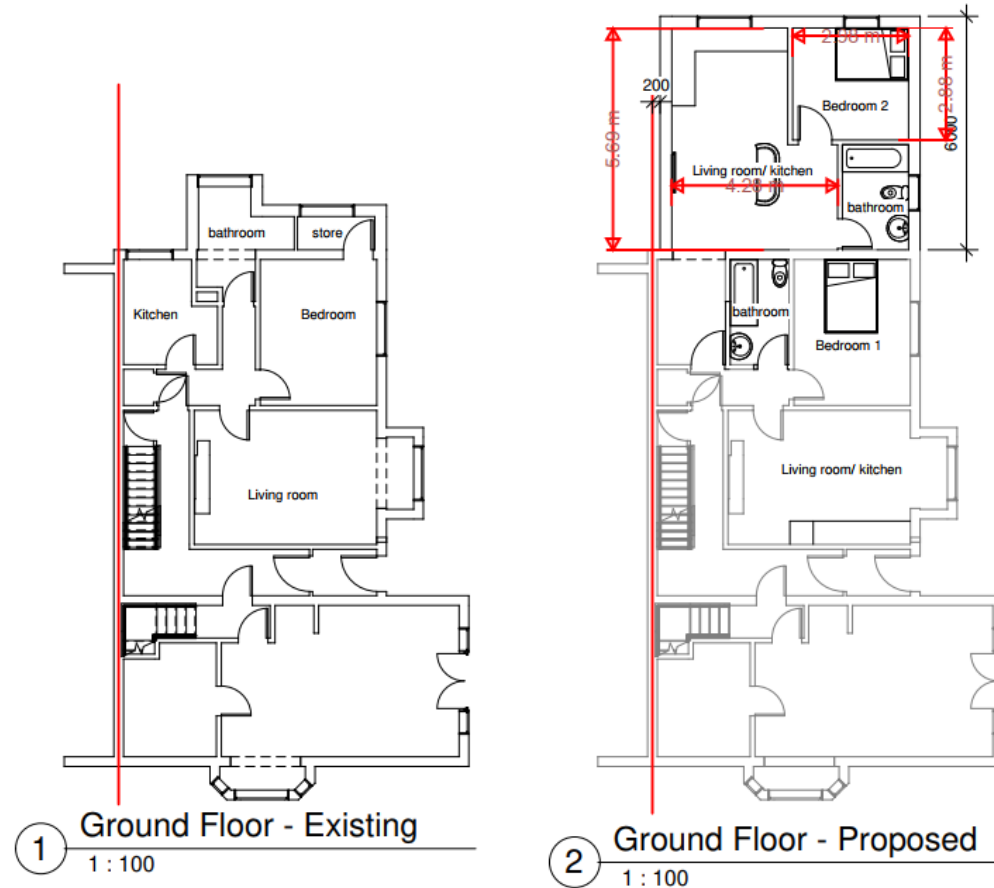
Façade Components

Wall	Brick and block, 75mm cavity
Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Acoustically Treated Trickle Vent (Open)

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

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

APPENDIX G – Site Plans



J. Parrott BEng (Hons) AMIOA

T: 0330 043 1764

SP Architectural

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A 01/12/21 First Planning Issue SP

Rev # Issue Date Description Issued By

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Care Today

PROJECT:
Building control for 4 apartments
51 Marshall road, Levenshulme
Manchester, M19 2EG

DRAWING TITLE:
Existing and proposed Extension plans
005

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PROJECT NUMBER: PR-04	SUITABILITY CODE: Building control	
DRAWING CLASSIFICATION:		

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SP Architectural

[illegible]

- 1) New Facing Brick work
- 2) New White uPVC window
- 3) New GRP Flat roof

[illegible]

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:

- 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.

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.