

NOISE IMPACT ASSESSMENT

82-84 MARKET STREET, MANCHESTER M1 1PD

REPORT REFERENCE NO. J005365-8637-SI-02

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This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.



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1.0 SUMMARY

At the request of Cambridge Park Ltd, Philip Dunbavin Acoustics has conducted an assessment of the ambient noise climate for the proposed residential development at 82-84 Market Street, Manchester, M1 1PD.

Noise levels at the site are dominated by pedestrian noise on Market Street.

Mitigation is proposed to the building envelope to ensure that internal noise levels within habitable areas are suitable for resting and sleeping and are in accordance with the requirements of the NPPF and BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings”. Noise mitigation advice for the proposed residential facades is given in Section 6.0 in the form of treatment to the glazing and ventilation, and conditions for any other mechanical services.

2.0 BRIEF FOR CONSULTANCY

PDA Ltd. was engaged to carry out the following:

A. Noise Survey

We will travel to the site and carry out an ambient noise survey to assess the level of environmental noise incident upon the proposed development. We note that Market Street in front of the property and Sickle Street to the side of the property are pedestrianised. The measurement and assessment will include for noise from pedestrians, delivery vehicles, building services from adjacent commercial properties, and other local noise sources.

Where practical unmanned measurements representative of daytime and night time hours at the site, and if practicable, additional weekend sound levels, will be conducted by extending microphone(s) on a boom from upper story windows of the existing building.

We will carry out all noise surveys in accordance with the provisions of BS7445 “Description and Measurement of Environmental Noise”. The measurements made will include both dBA and octave band noise levels including L_{eq} , L_{max} , and L_{90} parameters. During the survey duration, we will require unrestricted access to the site.

B. Survey Processing and Report

The results of the noise survey will be assessed in line with the requirements of the National Planning Policy Framework (NPPF). We will carry out basic calculations, based on available room data/drawings, to predict internal noise levels within the development to compare with good practice guidance criteria, e.g. BS8233:2014, and the criteria of the Local Planning Authority. This will be used to develop specifications for the building façades, glazing and ventilation elements.

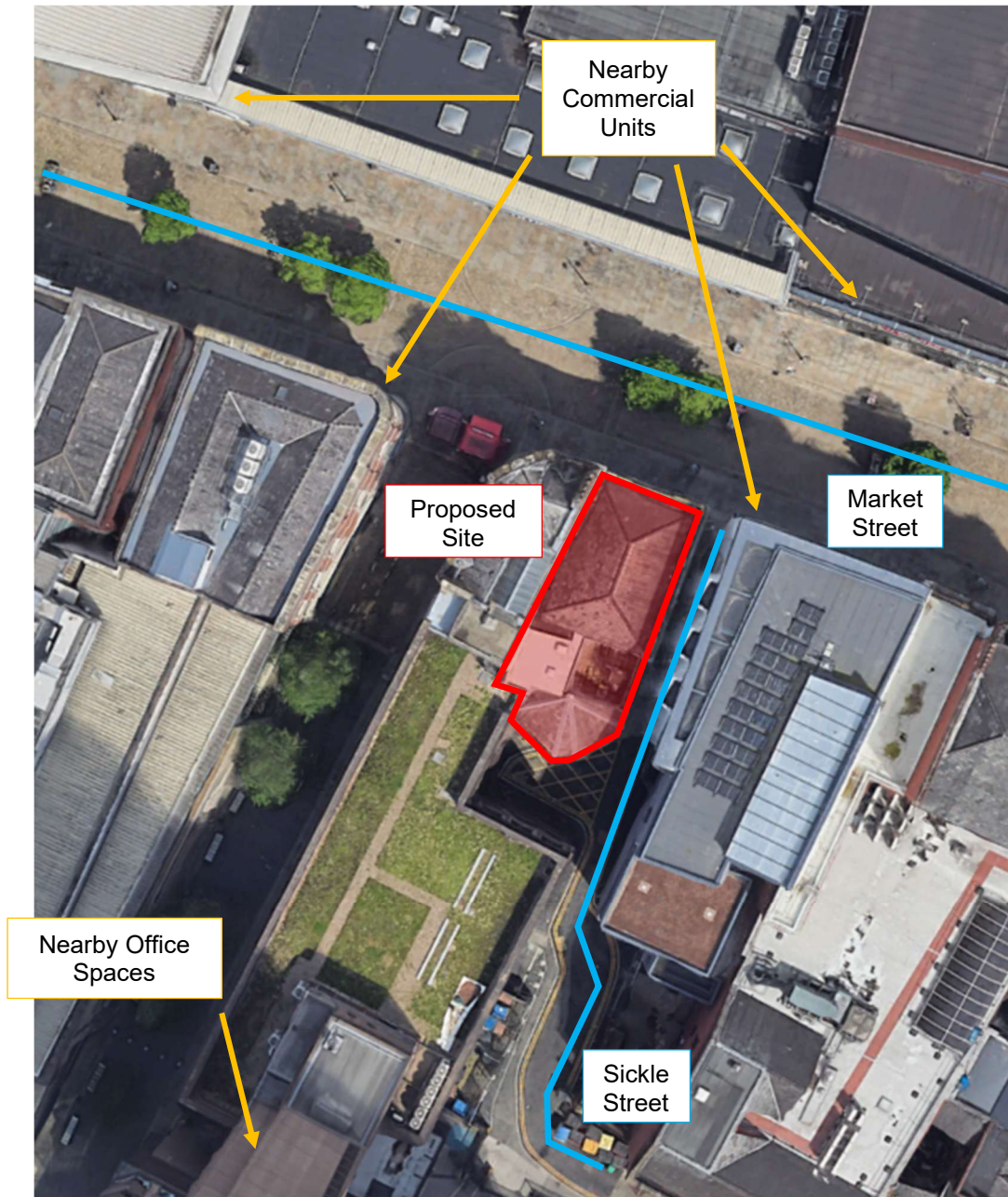
We will produce a report detailing all survey procedure, measurements and results suitable for submission to the Local Authority in support of your planning application. We will suggest a scheme of sound insulation works (typically windows and ventilation openings) to ensure suitable internal noise levels within the development.

3.0 SITE DESCRIPTION

The existing site consists of a four-storey building on the corner of Market Street and Sickle Street, which reduces to three stories at the rear, which is in retail use on ground floor level and disused office space above. The proposed development comprises of the retention of the commercial use at ground floor level and conversion of upper floors into 8 no. apartments, including the conversion of the roof space to the front of the building to 'room in roof' apartments, and extension of the roof to the rear to form an additional storey at the rear of the building.

An aerial photo presenting the location of the site and surrounding local area is shown in Figure 1 below.

Figure 1. Location with proposed site outlined





The development is situated within a wider concentration of commercial units and office spaces. The commercial areas primarily consist of retail units – predominantly the Arndale Centre to the north of site – and a number of food takeaway units. All of these units were understood to be open and operating as usual during the survey period.

4.0 ASSESSMENT CRITERIA

4.1 National Planning Policy Framework

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in December 2024. With regard to Noise the Framework states the following;

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

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

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:

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

The terms 'significant adverse impact' and 'adverse impact' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE)' which states;

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

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.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

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

The notes also offer an explanation of the term 'adverse impacts' as follows;

... refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

Although no specific noise limits for LOAEL and SOAEL have been defined, in 2014 the UK Government published a planning practice guidance document for noise which indicates where these limits fall with

relation to the perception of noise. A summary is reproduced in Section 4.2 below, and the full document is published at <https://www.gov.uk/guidance/noise--2>. Planning Practice Guidance – Noise

4.2 Planning Practice Guidance – Noise

The UK Planning Practice Guidance on noise offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL and is reproduced in the table below;

Table 1. Planning Practice Noise Level Guidance

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

It is notable from the above planning guidance that development should not normally be permitted above Significant Observed Adverse Effect Levels, and should aim to minimise Other Adverse Effect Levels

(below SOAEL but above LOAEL). However, it is clear that noise is permitted to approach and/or exceed the Lowest Observed Adverse Effect Level, providing that noise is mitigated and reduced to a minimum.

4.3 BS8233:2014

BS8233 proposes acceptable noise levels for new residences. The guidance within BS8233 has been revised and updated in 2014 to take into account the most recent research and expert opinion on suitable noise levels for new developments.

4.3.1 Internal noise levels in domestic dwellings

With regard to residential development BS8233 gives the following criteria;

Table 2. BS8233:2014 indoor ambient noise levels for dwellings

Activity	Location	Design range $L_{Aeq,T}$	
		Daytime (07:00 - 23:00)	Night-time (23:00 – 07:00)
Resting	Living rooms	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom	35	30

The above criteria apply to steady external noise sources, such as road traffic. Where specific noise events are likely to occur during the night time BS8233:2014 gives the following guidance;

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.

5.0 SURVEY DETAILS

An ambient environmental noise survey was carried out at two locations on the site. The measurements were taken 1m from the first-floor façades of the building, representative of the sound level outside some of the living room/kitchen windows of the proposed development.

5.1 Measurement Procedure

5.1.1 Survey times

The ambient noise survey measurements were made between the hours of 11:37 on Friday 10th January and 11:58 on Monday 13th January 2025. Measurements were taken using sound level meters fitted with 'all-weather' windshields, set up and partially attended by Mr. Sam Iles of PDA Ltd.

5.1.2 Measurement Equipment

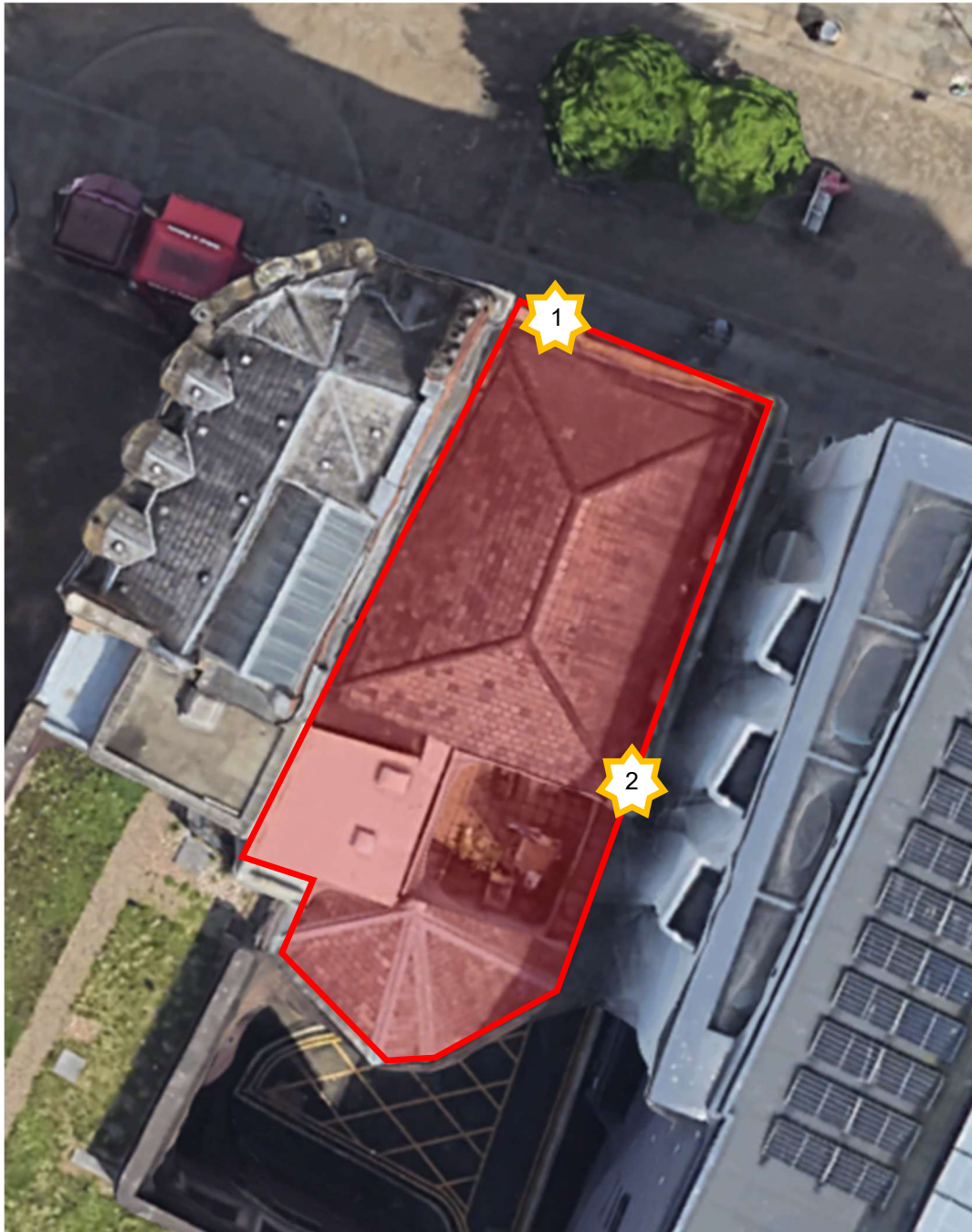
The noise survey was conducted using an NTi XL2 sound level meter and a RION NL-52 sound level meter. Both meters are Class 1 sound level meters in accordance with IEC 61672-1:2002, capable of operating as integrating sound level meters with frequency analysis (NTi Only) and statistical functions. The sound level meters were field calibrated both before and after the measurement period, during which time no significant deviation from the calibrated level was observed. The meters were set to measure A-weighted broadband sound pressure levels, octave frequency band sound pressure levels and statistical parameters. Audio recordings were also taken throughout the duration of the survey. Calibration certificates for the sound level meters are held.

5.1.3 Measurement Locations

Measurements were taken at two measurement positions. Position 1 was 1m from the 1st floor north façade, overlooking Market Street. Position 2 was 1m from the 1st floor east façade, overlooking Sickle Street.

See Figure 2 below for the measurement locations.

Figure 2. Survey Measurement Locations



The measurement positions are detailed as follows:

- Measurement Position 1 – microphone located on a pole out of first floor window at least 1m from the north façade, overlooking Market Street.

- Measurement Position 2 – microphone located on a pole out of first floor window at least 1m from the east façade, overlooking Sickle Street.

5.1.4 Weather

10/01/2025

- Temperature: -1 – 5°C
- Wind Speed: 0 – 3 m/s ENE
- Overcast with no precipitation

11/01/2025

- Temperature: -3 – 5°C
- Wind Speed: 0 – 3 m/s ENE
- Clear with no precipitation

12/01/2025

- Temperature: 2 – 5°C
- Wind Speed: 0 – 3 m/s NE
- Overcast with very low levels of precipitation

13/01/2025

- Temperature: 4 – 6°C
- Wind Speed: 0 – 4 m/s NNW
- Overcast with very low levels of precipitation

Weather data has been taken from Weather Underground measurement position 'IMANCH162'

5.2 Subjective Assessment

Sound levels at the site were dominated by pedestrian activity on Market Street, primarily consisting of spoken and shouted conversation. The street is an extremely popular area with the public in the centre of Manchester, and loud pedestrian activities can be heard throughout the weekend. Whilst it is noted that Market Street is not an accessible road for vehicular traffic, some of the noise climate is also made up of infrequent and intermittent loading and unloading activities from smaller vehicles, such as cars and vans.

Although pedestrian activity was the dominant sound source both during the day and the night-time periods, during quieter periods noise from building services from building services from adjacent buildings formed the background sound, particularly on Sickle Street further away from regular pedestrian activity.

5.3 Measurement Results

A summary of the noise levels measured at each position across site is given in the table below.

Table 3. Predicted noise levels at developed façade

Date	Position	Time Period (hh:mm)	L _{Aeq,T} (dB)	Range of L _{Amax,5mins} (dB)	Range of L _{AF90,5mins} (dB)
10/01/2025	1	Day 11:59 – 23:00	67	-	53 - 73
		Night 23:00 – 07:00	57	60 - 92	47 - 57
	2	Day 11:37 – 23:00	62	-	57 - 64
		Night 23:00 – 07:00	58	56 - 82	56 - 58
11/01/2025	1	Day 07:00 – 23:00	70	-	52 - 75
		Night 23:00 – 07:00	58	61 - 92	47 - 58
	2	Day 07:00 – 23:00	63	-	56 - 68
		Night 23:00 – 07:00	58	59 - 83	55 - 57
12/01/2025	1	Day 07:00 – 23:00	64	-	50 - 65
		Night 23:00 – 07:00	56	58 - 85	47 - 54
	2	Day 07:00 – 23:00	59	-	55 - 60
		Night 23:00 – 07:00	57	58 - 87	55 - 57
13/01/2025	1	Day 07:00 – 11:58	64	-	54 - 62
	2	Day 07:00 – 11:57	60	-	56 - 60

In PDA's opinion the above levels indicate that the site is suitable for residential development with appropriate selection of glazing and ventilation to achieve recommended internal noise levels within the dwellings.

6.0 NOISE BREAK-IN CALCULATIONS AND MITIGATION

6.1 Building Envelope Elements

Noise ingress calculations are based on room dimensions taken from NC Architecture drawings of the proposed building conversion. The following construction elements have been used to model the external building envelope of the proposed residential development:

6.1.1 Walls

54 dB R_w wall, e.g. two leaves of 102.5mm brickwork, 50mm cavity, rigid wall ties, plastered both sides.

6.1.2 Glazing

As the glazing is the acoustically weak area, the noise level incident on the façade will determine the type of glazing specified.

6.2 Design Assumptions

Assessment and specification of the acoustic performance of the building envelope and suitable glazing and ventilation, has been undertaken based on achieving the internal ambient acoustic conditions, specified in Section 4.3.1 above.

Information on the sound insulation properties for specific element details have been obtained from manufacturers test data.

For the purposes of the noise break-in calculations room dimensions have been taken from NC Architecture drawings of the proposed residential development.

6.3 Calculated noise levels

Noise break-in through the proposed building façades have been calculated in octave frequency bands using the detailed method of BS 8233:2014 taking into account the octave band sound reduction of the façade elements, façade element areas, room volume and reverberation time in the finished rooms. For the purposes of calculation the finished reverberation time has been assumed to be 0.5 seconds in all frequencies in habitable rooms. The calculated octave frequency band internal noise levels have then been used to determine the overall A-weighted noise level in the habitable rooms which has been compared to the criteria of Section 4.3.1. Glazing and ventilation specifications have been selected to ensure that the criteria of Section 4.3.1 are achieved within the proposed dwellings.

Table 4. Glazing and ventilator schedule for habitable rooms

Floors	Rooms	Minimum Glazing Rating R_w dB	Minimum combined Ventilator Rating $D_{n,e,w}$ dB ¹	Internal Noise Level Target (Day/Night/Night L_{max}) ²	Calculated Internal Noise Level
All	Kitchen/Living	39	53	35/30/45	34/-/-
	Bedrooms	44	53		35/21/39

Notes

1. Calculations have allowed for one vent for bedrooms and two for kitchen/living rooms
2. Values for night-time and night L_{max} are only required in bedrooms.

6.4 Glazing

Table 5 below gives the required glazing sound insulation performance in octave frequency bands, together with typical glazing products which achieve the required sound insulation. Any alternative products should meet the given sound insulation performance in each octave frequency band to ensure that the internal noise levels specified in Table 4 are achieved.

Table 5 – Required glazing performance (minimum)

Rating R_w	Typical example (mm glass / mm cavity / mm glass)	Frequency band [Hz]					
		125	250	500	1000	2000	4000
39	8/16/4 MB-705	23	30	37	41	41	46
44	10.8SI/16/12 72 BW TBT	29	38	43	39	45	56

Please note that it must be ensured that the sound insulation of the windows is not compromised by the frame.

As an alternative to the above, a secondary glazing system could be used to provide glazing in accordance with the requirements of the Building Regulations. Table 6 provides the acoustic performance of a typical secondary glazing system that would achieve the required sound insulation.

Table 6 – Required glazing performance (minimum) for secondary glazing systems

Rating R_w	Typical example (mm glass / mm cavity / mm glass)	Frequency band [Hz]					
		125	250	500	1000	2000	4000
46	6/100/4	26	34	44	56	53	53

6.5 Ventilation

Ventilation indicated in Table 6 will be required as an alternative to open windows in order to achieve the design criterion. Our calculations have allowed for 1 of the specified vent type to each bedroom, and for 2 of the specified vent type to each kitchen/living area.

Table 7 gives the required acoustic performance of the specified vents in octave frequency bands, together with typical products which achieve the required sound insulation. Any alternative vent should achieve the same performance or greater in each octave band. Where more than 1 vent is installed per room the combined performance of the vents should achieve the sound insulation criteria of Table 7 which will require each individual vent to have a higher sound insulation. Please contact PDA or vent manufacturers for advice in this case.

Table 7 – Required ventilator performance (minimum)

$D_{n,e,w}$	Typical example vent	Frequency band [Hz]					
		125	250	500	1000	2000	4000
53	Renson Sonovent XL 15	36	40	50	58	66	66

Please note that the specification of vents is in terms of acoustic performance only. It should be checked by others that the ventilation requirements of the Building Regulations are also met.

As an alternative to the above a mechanical ventilation system could be used to provide ventilation in accordance with the requirements of the Building Regulations.

Bear in mind that with any fan-assisted ventilation systems it should be ensured that the fan itself does not exceed the noise criteria as specified in Section 4.3.1.

6.5.1 Mechanical Services

In accordance with the criterion of the Local Planning Authority, any mechanical services associated with this development should be designed such that the Rating Level of any noise egress to nearby noise sensitive properties does not exceed 5dB below the pre-existing Background Level. This equates to a limit of 50 dB(A) during the daytime (07:00 - 23:00) and 45 dB(A) during the night-time. The Rating Level should be determined in accordance with BS 4142:2014+A1:2019 and should include appropriate penalties for any acoustic features such as impulsivity, tonality or intermittency in the sound.



7.0 CONCLUSION

At the request of Cambridge Park Ltd, Philip Dunbavin Acoustics has conducted an assessment of the ambient noise climate for the proposed residential development at 82-84 Market Street, Manchester, M1 1PD.

Noise levels at the site are dominated by pedestrian noise on Market Street.

Mitigation is proposed to the building envelope to ensure that internal noise levels within habitable areas are suitable for resting and sleeping and are in accordance with the requirements of the NPPF and BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings". Noise mitigation advice for the proposed residential facades is given in Section 6.0 in the form of treatment to the glazing and ventilation, and conditions for any other mechanical services.

APPENDIX A – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq} . Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq} . It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB L_{An} . It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max} , dB L_{Amax} , etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq} , L_{90} , L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.

APPENDIX B – SURVEY DATA CHARTS

Figure 3. Ambient Noise Level Survey – Market Street (NS1)

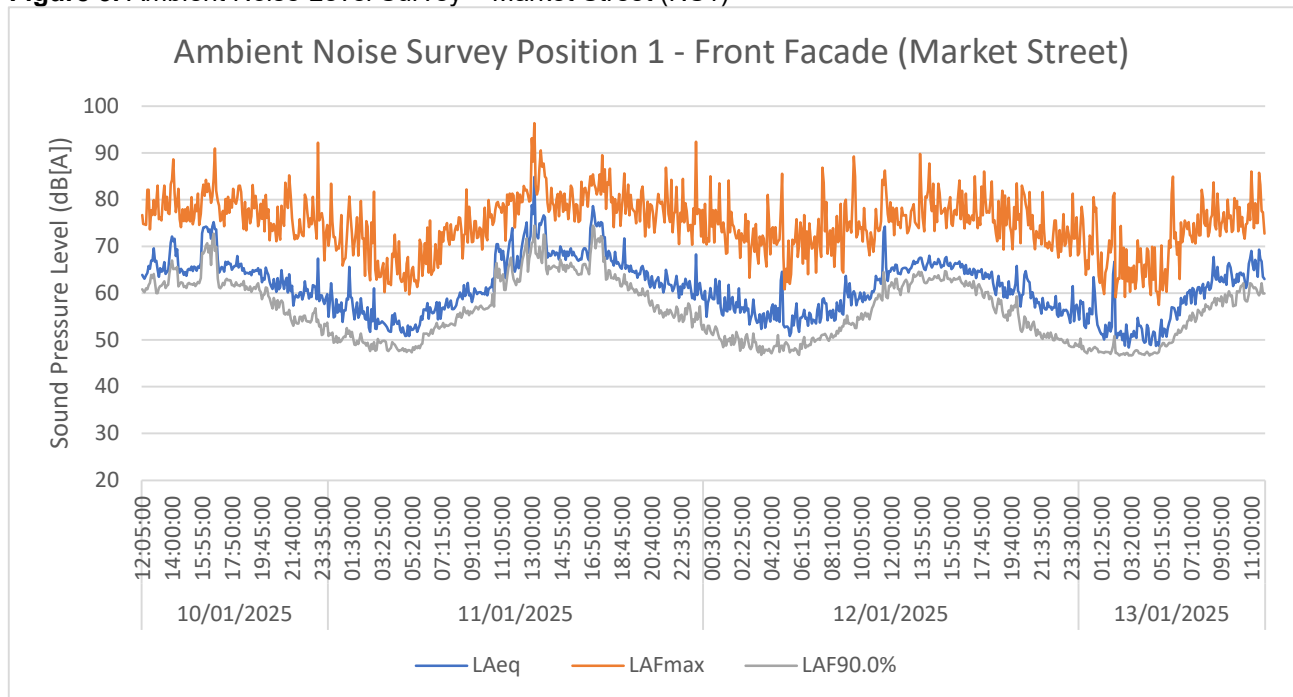


Figure 4. Ambient Noise Level Survey – Sickle Street (NS2)

