232-266 Palatine Road

Noise Impact Assessment

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Client: Atzaro Real Estate

Date: 21/04/2026

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REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R01	21/04/2026	Original Issue	[redacted] Susan Witterick BSc MIOA	[redacted] Ben Tomlin BSc MIOA

1 INTRODUCTION

1.1 dBx Acoustics Ltd has been appointed by Atzaro Real Estate to carry out a noise survey, and to undertake a noise impact assessment for a proposed residential development at 232-236 Palatine Road, Didsbury, Manchester, M20 2WF.

1.2 The proposals comprise 88 residential units, with a building fronting Palatine Road and two deck access apartment blocks behind, with reduced form to the rear of the site.

1.3 Planning permission is sought from Manchester City Council, and a noise impact assessment is required to support the planning permission application.

1.4 The intent of this report is to present the results of a noise survey undertaken at the site, to detail the subsequent noise impact assessment, and to provide outline guidance on appropriate acoustic requirements for façade glazing and ventilation build-ups to control noise intrusion in line with Manchester City Council's standard planning conditions.

1.5 A glossary of acoustic terminology has been supplied in Appendix A to assist the reader.

2 ACOUSTIC DESIGN CRITERIA

Manchester City Council

2.1 This site falls under the jurisdiction of Manchester City Council (MCC).

2.2 Manchester City Council's Planning & Noise Technical Guidance (October 2022) sets out Manchester City Council's requirements with regard to current guidance and policy. The guidance refers to the WHO Guidelines for Community Noise 1999, BS 8233:2014, BS 4142:2014, NPPF and NPSE as described below.

2.3 MCC has adopted the following internal noise limits for residential properties:

- Bedrooms (night time 23:00-07:00h) 30dB$L_{Aeq,\ 8h}$ (individual noise events should not normally exceed 45dB$L_{Amax,\ F}$ more than 10 times);
- Living Rooms (daytime – 07:00-23:00h) 35dB$L_{Aeq,16h}$.
- Gardens and terraces (daytime) 55dB$L_{Aeq,\ 16h}$.

2.4 MCC also requires that externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB below the typical background noise level at the nearest noise sensitive location.

BS 8233:2014: 'Guidance on sound insulation and noise reduction for buildings'

2.5 BS 8233:2014 gives guidance for noise levels within residential properties. It discusses appropriate criteria for reasonable rest and sleep conditions and provides noise levels which are considered to provide appropriate conditions in accordance with WHO guidelines. The guidance on limits from the standard is reproduced in Table 1, below.

Table 1: Indoor Ambient Noise Limits (BS8233)

Activity	Location	07:00h – 23:00h	23:00h – 07:00h
Resting	Living room	35dB$L_{Aeq,16h}$	-
Dining	Dining room/area	40dB$L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35dB$L_{Aeq,16h}$	30dB$L_{Aeq,8h}$

2.6 It should be noted that these limits represent the average noise level over the 16-hour day or 8-hour night period. This potentially means that higher noise levels may be experienced internally over a shorter period (e.g., individual passing trains or vehicles). These equivalent noise levels, over a period of time, are the best representation of the average noise level and are generally the main focus when it comes to evaluating noise exposure.

2.7 Under the updates to BS 8233 in 2014, for both day and night-time cases, a relaxation of up to 5dB is considered to provide "reasonable internal conditions" where development is considered necessary or desirable.

2.8 To assess the maximum noise levels, the World Health Organisation (WHO) document "Guidelines for Community Noise: 1999" recommends that maximum noise levels ($dBL_{Amax,F}$) do not exceed 45$dBL_{Amax,F}$ more than 10-15 times a night.

The Building Regulations 2010: Overheating: Approved Document O

2.9 Section 3 of Overheating: Approved Document O (ADO) states the following;

> *"3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*
>
> *A. 40$dBL_{Aeq,T,}$ averaged over 8 hours (between 11pm and 7am).*
>
> *B. 55dBL_{AFmax}, more than 10 times a night (between 11pm and 7am).*
>
> *3.4 Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use."*

2.10 It is also highlighted that guidance on reducing the passage of external noise into buildings can be found in the Association of Noise Consultants' '*Acoustics, Ventilation and Overheating: Residential Design Guide'* (2020).

Ventilation and Overheating: Residential Design Guide 2020 (AVO)

2.11 AVO outlines a two-level procedure to estimate the potential impact on occupants in the case of the overheating condition.

2.12 The AVO Level 1 assessment is used to determine the 'Potential Effect without Mitigation' and to establish if there is a requirement for a Level 2 Assessment.

2.13 A level 1 assessment is undertaken by comparing the external noise levels measure to the values shown on Table 3-2 of AVO, reproduced as Figure 1, below.

Figure 1: AVO Table 3-2, Guidance for Level 1 Site Risk Assessment

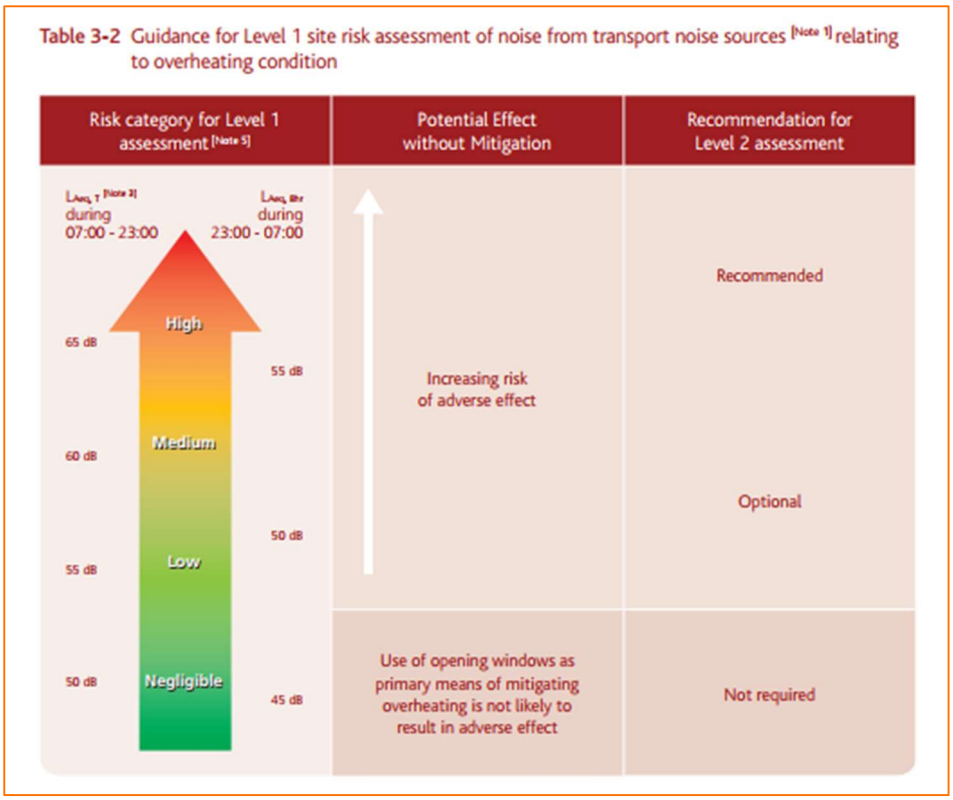


Table 3-2 Guidance for Level 1 site risk assessment of noise from transport noise sources [Note 1] relating to overheating condition

Risk category for Level 1 assessment [Note 5]	Potential Effect without Mitigation	Recommendation for Level 2 assessment
$L_{Aeq,T}$ [Note 3] during 07:00 - 23:00 / $L_{Aeq,8hr}$ during 23:00 - 07:00 High: 65 dB / 55 dB Medium: 60 dB / 50 dB Low: 55 dB Negligible: 50 dB / 45 dB	Increasing risk of adverse effect	Recommended Optional
	Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Not required

2.14 If required, a Level 2 assessment is then undertaken by comparing the predicted internal noise levels to Table 3-3 of AVO, reproduced as Figure 2, below.

Figure 2: AVO Table 3-3, Guidance for Level 2 Assessment

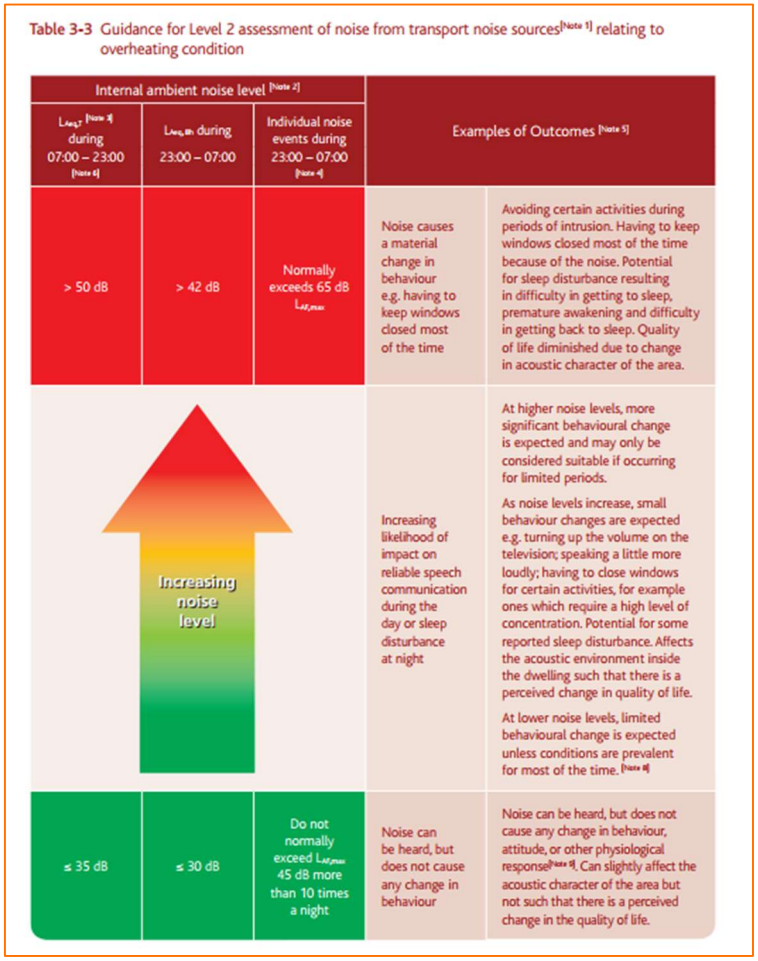


Table 3-3 Guidance for Level 2 assessment of noise from transport noise sources[Note 1] relating to overheating condition

Internal ambient noise level [Note 2]			Examples of Outcomes [Note 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{Af,max}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. 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.
Increasing noise level			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. [Note 8]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{Af,max}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response[Note 9]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

2.15 It can be seen from the figures above that there are no strict numerical limits for an acceptable level of noise within residences during the overheating condition.

2.16 Table 3-3, however, does suggest that night-time noise levels of ≥42dB$L_{Aeq,8hour}$, or 65dB$L_{Amax,F}$ can be considered upper limits for acceptable noise levels in rooms in which overheating is controlled by the use of open windows.

BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'

2.17 BS 4142:2014 sets out a procedure for assessing noise impact whereby a Noise Rating is determined and compared with the existing local Background Sound Level.

2.18 The Rating Level ($dBL_{Ar,Tr}$) is evaluated from the Specific Noise Level by including several, cumulative corrections to account for factors such as distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristics.

2.19 The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3 SITE DESCRIPTION

3.1 The site is located at 232-236 Palatine Road, and at the time of the noise survey comprised three detached houses which are to be demolished.

3.2 The nearest noise sensitive receptors are identified as;

- Britannia Country House Hotel circa 35m to the north; and
- Brookside Apartments circa 20m to the south.

3.3 The hotel access road passes to the rear of the site.

3.4 The site location is indicated in Figure 3, below.

Figure 3: Site Location



3.5 The proposed ground floor site layout is shown as Figure 4, below.

Figure 4: Proposed Ground Floor Plan



3.6 The proposed residential dwellings comprise four storeys from ground level, with a basement car park and plant area.

4 ENVIRONMENTAL NOISE SURVEY

4.1 dBx Acoustics Ltd undertook an environmental noise survey at the site between 12:00h on Wednesday 2nd October 2024 to 14:30h on Friday 4th October 2024.

4.2 Noise levels were monitored continuously in 15-minute periods at two locations, identified as LT1 and LT2 on Figure 5, below. The microphone was extended from second floor windows in each location, at approximately 0.5m from the building façade.

4.3 Additional attended measurements were undertaken at locations ST1 to ST2 on Friday 4th October.

Figure 5: Noise Monitoring Locations



Equipment Used

4.4 The equipment used during the environmental noise survey is detailed in Table 2, below.

Table 2: Equipment Used in the Environmental Noise Survey

Location	Equipment	(Manufacturer & Part No./ Serial Number)	Serial Number
LT1	Meter	CR:171B	G300741
	Pre-Amp	MV:200F	9082F
	Microphone	MK:224	211753D
	Calibrator	CR:515	87160
LT2	Meter	CR:171C	G300656
	Pre-Amp	MV:200F	9136F
	Microphone	MK:224	215619A
	Calibrator	CR:515	87921
ST1, ST2, ST3	Meter	NOR 140	1405619
	Pre-Amp	NOR 1209	15526
	Microphone	NOR 1225	168247
	Calibrator	NOR 1251	33827

4.5 The sound level meters were calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, except for the calibrator, which had been calibrated not more than one year prior to the survey.

Weather Conditions

4.6 Weather conditions during noise monitoring were generally cool and dry with scattered clouds throughout the daytime and night-time measurements.

4.7 Wind speeds were within suitable parameters for the measurement of environmental noise (i.e., generally under 5 ms^{-1}). The measurement microphone was protected with a windshield for the duration of the survey.

5 MEASURED NOISE LEVELS

LT1 and LT2

5.1 The measured noise levels at LT1 and LT2 are summarised in Tables 3 and 4, below.

Table 3: Summary of Measured Noise Levels, LT1

Start	End	Period	Ambient Noise Level, $dBL_{Aeq,T}$	Typical Maximum Noise Level, $dBL_{Amax,F}$	Background Noise Level, $dBL_{A90,T}$
02/10/24 12:00	02/10/24 23:00h	Day	67	--	47
02/10/24 23:00	03/10/24 07:00h	Night	61	75	38
03/10/24 07:00h	03/10/24 23:00h	Day	67	--	51
03/10/24 23:00h	04/10/24 07:00h	Night	61	75	42
04/10/24 07:00h	04/10/24 14:00h	Day	68	--	59

Table 4: Summary of Measured Noise Levels, LT2

Start	End	Period	Ambient Noise Level, $dBL_{Aeq,T}$	Typical Maximum Noise Level, $dBL_{Amax,F}$	Background Noise Level, $dBL_{A90,T}$
02/10/24 12:00	02/10/24 23:00h	Day	59	--	43
02/10/24 23:00	03/10/24 07:00h	Night	50	61	37
03/10/24 07:00h	03/10/24 23:00h	Day	62*	--	44
03/10/24 23:00h	04/10/24 07:00h	Night	49	59	38
04/10/24 07:00h	04/10/24 14:30h	Day	55	--	51

5.2 Measurements made on 3rd October were affected by tree felling work to the rear of the site, as such the ambient noise level has been excluded from this assessment.

5.3 The ambient noise levels are the logarithmic average of all measurements taken in each day or night-time period.

5.4 The typical maximum noise levels consider the highest values measured, excluding one off atypical events, that are not exceeded more than 5 to 10 times per night, to comfortably meet World Health Organisation guidelines.

5.5 In terms of the background noise levels, the typical daytime and night-time background noise levels have been determined using the statistical analysis methodology described in *BS 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound'* (BS4142).

5.6 Graphs showing the measured noise levels throughout the survey period are presented in Appendix B.

ST1-ST3

5.7 The attended noise measurements at ST1 – ST3 are presented in Table 5, below. All measurements were made on Friday 4th October 2024.

Table 5: Short Term Measurement Results

Monitoring Location	Start Time	End Time	Ambient Noise Level, $dBL_{Aeq,T}$	Background Noise Level, $dBL_{A90,T}$
ST1	14:12h	14:17h	54	53
	14:18h	14:23h	55	54
ST2	14:28h	14:33h	52	50
	14:33h	14:38h	52	50
ST3	14:38h	14:41h	55	54
	14:41h	14:44h	55	52

6 BUILDING ENVELOPE SOUND INSULATION

6.1 Based on the noise survey data, the free-field noise levels impacting on all facades of the proposed development have been predicted, taking account distance from Palatine Road and screening provided by the new constructions.

6.2 Based on a typical reduction in external noise levels to indoor noise levels of 15dB for a partially opened window (based on WHO guidance), allowable external noise levels for compliance with BS8233:2014 (Table 1, above) are therefore 50dB$L_{Aeq,T}$ outside living rooms in the day, and 45dB$L_{Aeq,T}$ and 60dB$L_{Amax,F}$ outside bedrooms at night.

6.3 On the basis of the measured and predicted noise levels, the required indoor noise levels can only be achieved with closed windows.

6.4 The facades have been divided into two acoustic categories, A (red) and B (green), as indicated in Figure 6, below.

Figure 6: Facade Acoustic Categories



6.5 The predicted worst-case free-field noise levels affecting each façade category are summarised in Table 6, below.

Table 6: Predicted Free-Field Noise Levels

Façade Category	Daytime Ambient Noise Level, $dBL_{Aeq,16h}$	Night Time Ambient Noise Level, $dBL_{Aeq,16h}$	Typical Night Time Maximum Noise Level, $dBL_{Amax,F}$
A	64	58	72
B	56	47	58

6.6 Calculations have been undertaken for living rooms and bedrooms in both façade categories to determine the required sound insulation performance of glazing and ventilation elements to achieve the BS8233:2014 indoor ambient noise level limits which are detailed in Table 1, above.

6.7 The calculations take into account room volume and the area of glazing indicated on the architectural drawings.

6.8 Table 7, below, summarises the required minimum sound insulation performance for glazing and ventilators for each façade type.

Table 7: Glazing and Ventilator Sound Insulation Performance

Façade Category	Glazing Sound Insulation Performance, dB R_w+C_{tr}	Example Glazing Configuration	Ventilator Sound Insulation Performance, dB $D_{n,e,w}$
A	32	10/TC/6	38
B	29	10/TC/4	26

*TC = Thermal Cavity

6.9 The sound insulation performances detailed must be achieved by the glazing unit as a whole, including frames, seals, opening lights etc, as opposed to the glass panels alone.

6.10 The glazing configurations shown above are a suggestion only, and alternative configurations may be acoustically suitable.

6.11 The external wall and roof should achieve a sound insulation performance at least 10dB greater than the glazing. This would be readily achieved with cavity masonry walls and a tiled or concrete roof with plasterboard ceiling and insulation.

6.12 Windows can be openable at occupant discretion (e.g. for purge ventilation) but must be well sealed when closed.

Overheating

6.13 At this stage, an overheating assessment has not been completed. This initial guidance is therefore presented on the basis that an overheating condition may arise, but will need to be reviewed as the scheme progresses.

6.14 Approved Document O is based on guidance in the Association of Noise Consultants' document '*Acoustics, Ventilation and Overheating Guide'* (2020) (AVO).

AVO Level 1 Assessment

6.15 The AVO Level 1 Assessment is used to determine the 'Potential Effect without Mitigation' and to establish if there is a requirement for a Level 2 Assessment.

6.16 AVO indicates that a Level 2 assessment is 'recommended' when 65dB$L_{Aeq,16hour}$ (daytime) and 55dB$L_{Aeq,8hour}$ (night-time) is exceeded.

6.17 Furthermore, AVO mentions that 'where 78dB$L_{AF,\ max}$ is normally exceeded during the night-time period, a Level 2 assessment is recommended'.

6.18 The Level 1 Assessment is summarised in Table 8, below.

Table 8: AVO Level 1 Assessment

Facade Type	Daytime Ambient Noise Level, dB$L_{Aeq,16h}$	Night Time Ambient Noise Level, dB$L_{Aeq,16h}$	Typical Night Time Maximum Noise Level, dB$L_{Amax,F}$	Risk Category (day/night)	AVO Recommendation for Level 2 Assessment
A	64	58	72	High/High	Recommended
B	56	47	58	Low/Low	Optional

6.19 On this basis, a Level 2 Assessment for Façade Type A is presented below.

AVO Level 2 Assessment

6.20 For the Level 2 assessment, there are no definitive criteria proposed, only a sliding scale of 'Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night'.

6.21 However, internal noise level limits of 50dB$L_{Aeq,16hour}$ in the day and 42dB$L_{Aeq,8hour}$ at night are indicated as the limits at which 'noise causes a material change in behaviour'.

6.22 Approved Document O indicates that windows are likely to be closed during sleeping hours if noise within bedrooms exceeds 40dB$L_{Aeq,8hr}$ or 55dB$L_{Amax,F.}$

6.23 These noise levels would therefore appear to be a worst-case upper limit. Furthermore, any adverse effects relating to noise are affected by both the noise level itself, and the duration (how long overheating occurs) and frequency (how many times per year/month) the overheating condition occurs.

6.24 AVO specifies an expected reduction from external to internal noise levels of -13dB when a window is open.

6.25 The Level 2 assessment is summarised in Table 9, below.

Table 9: AVO Level 2 Assessment

Parameter	Façade A: Daytime	Façade B: Daytime	Façade A: Night Time	Façade B: Night Time
External Ambient Noise Level, $dBL_{Aeq,8hr}$	64	56	58	47
Reduction, open window, dB	-13dB			
IANL ($dBL_{Aeq,T}$)	51	43	45	34
Upper Limit Outlined in AVO/ADO	>50$dBL_{Aeq,16h}$		>40$dBL_{Aeq,8h}$	
Exceedance	**+1dB**	**-7dB**	**+5dB**	**-6dB**

6.26 Maximum noise levels in bedrooms are also considered in Table 10, below.

Table 10: AVO Level 2 - Bedroom Maximum Noise Levels

Parameter	Façade A	Façade B
External Maximum Noise Level, $dBL_{AMax,F}$	72	58
Reduction, open window, dB	-13dB	
IANL ($dBL_{Amax,F}$)	59	45
Upper Limit Outlined in AVO/ADO	55$dBL_{Amax,F}$	
Exceedance	**+4dB**	**-10dB**

6.27 On this basis, it can be seen that the requirements of AVO/ADO will not be met with windows open to mitigate overheating for bedrooms on Façade Type A (overlooking Palatine Road) and alternative means of mitigation (e.g. MVHR) will be required.

6.28 Living rooms on Façade Type A exceed the AVO upper limit by 1dB during the daytime period, which is negligible. The acceptability of this and the requirement for alternative means of mitigation should be discussed further with MCC should the overheating condition occur.

6.29 For Façade Type B, overheating can be mitigated by means of open windows.

7 EXTERNAL AMENITY

7.1 The daytime ambient noise levels measured at ST1-ST3 (Table 5) were circa 55dB$L_{Aeq,15min}$.

7.2 The proposed building form (Figure 6) will provide full screening of road traffic on Palatine Road to the central amenity area.

7.3 On this basis it is anticipated that daytime ambient noise levels within this area will be <50dB$L_{Aeq,16hr}$ on completion of the development.

8 BUILDING SERVICES NOISE EMISSIONS

8.1 Manchester City Council requires that externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB below the typical background noise level at the nearest noise sensitive location.

8.2 On the basis of the background noise levels measured at LT1 and LT2, therefore, the rating level of any plant associated with the development when assessed at the Britannia Hotel and Brookside Apartments should not exceed 38dB$L_{Ar,Tr}$ during the daytime period (07:00h-23:00h), and 32dB$L_{Ar,Tr}$ at night (23:00h-07:00h).

9 CONCLUSION

9.1 dBx Acoustics Ltd has been appointed by Atzaro Real Estate to carry out a noise survey, and to undertake a noise impact assessment for a proposed residential development at 232-236 Palatine Road, Didsbury, Manchester, M20 2WF.

9.2 The proposals comprise 88 residential units, with a building fronting Palatine Road and two deck access apartment blocks behind, with reduced form to the rear of the site.

9.3 Accordingly, this report presents the results of an environmental noise survey undertaken at the site, an assessment of the acoustic requirements for glazing and ventilation elements associated with the new residential buildings, and an outline assessment of acoustic conditions during overheating.

9.4 Further consideration is given to noise levels in the external amenity area, and noise emission limits for any building services plant are set in accordance with MCC requirements.

9.5 On this basis, noise should not be a limiting factor in determining this planning application.

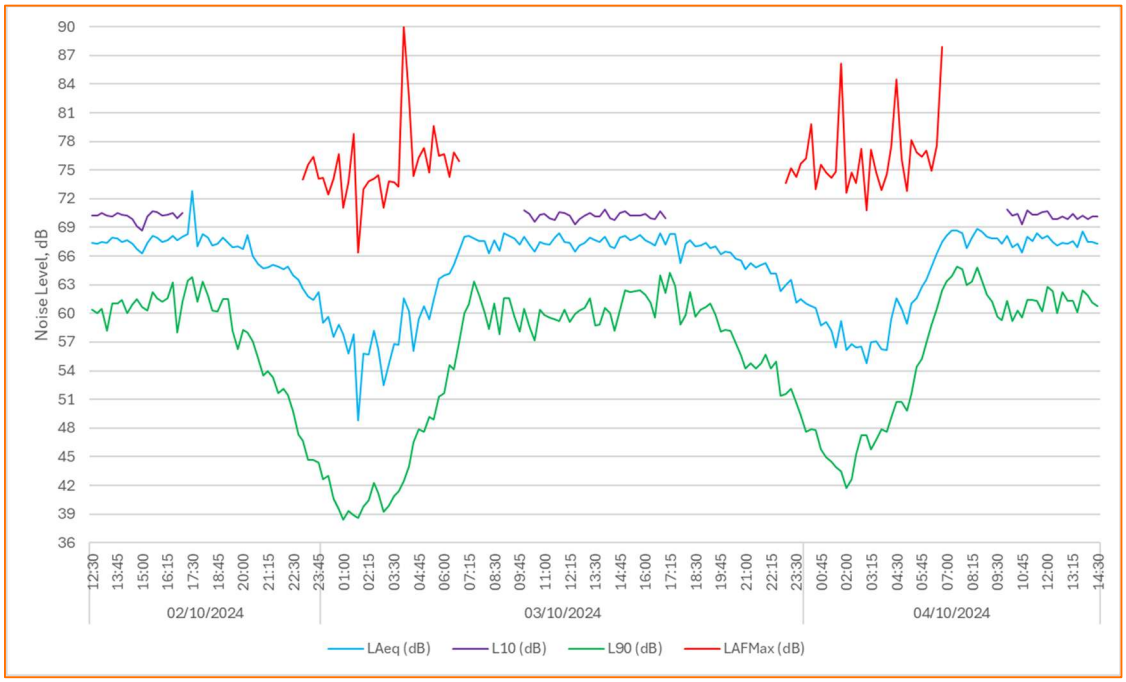
APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is 2x10-5 N/m2. The sound pressure level existing when microphone measured pressure is 2x10-5 N/m2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
L_{Fmax}	The instantaneous maximum sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
L_{AFmax}	The instantaneous maximum A weighted sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
$L_{Ar,Tr}$	The rating level: the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Reverberation Time, T	The time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped. The descriptor *T,* often includes other nomenclature to describe the type of reverberation time measurement or if the reverberation time is an average taken for specific frequencies. For example, a T_{mf} is the mid-frequency reverberation time.
Absorption Coefficient, α	The fraction of reverberant sound energy absorbed by a material. It is expressed as a value between 1.0 which equates to perfect absorption and 0 which equates to zero absorption.
Acoustic Class, A - E	Classification of sound absorbers into Sound Absorption Classes A-E, according to BS EN ISO 11654, including frequencies 200-5000 Hz
NRC	A single-number rating system used to compare the sound-absorbing characteristics of building materials. A measurement of the acoustical absorption performance of a material, calculated by averaging its Sound Absorption Coefficients at 250, 500, 1000 and 2000 Hz
STI	**Speech Transmission Index**, Metric ranging between 0 and 1 representing the transmission quality of speech with respect to intelligibility by a speech transmission channel
R	**Sound Reduction Index,** the laboratory measured sound insulation properties of a material or building element in octave or third octave bands.
R_w	**Weighted Sound Reduction Index**, a single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.
D_w	**Weighted Level Difference**, the weighted level difference between a pair of rooms, stated as a single figure.

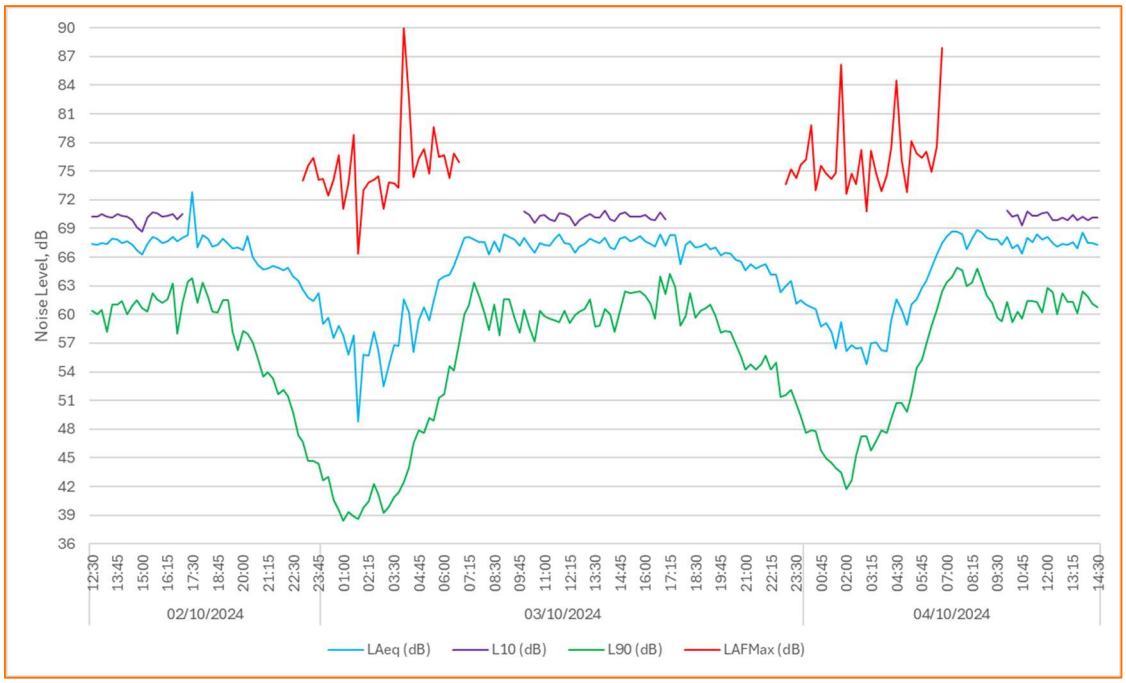
D_{nT}	**Standardised Level Difference,** a frequency-dependent measurement of airborne sound insulation, calculated using the following formula: $D_{nT} = L_1 - L_2 + 10\log(T/T0)$ dB Where: L_1 is the energy-averaged sound pressure level due to the pink noise source measured in the source room using a sweep technique. L_2 is the energy-averaged sound pressure level measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (= 0.5s for dwellings).
$D_{nT,w}$	**Weighted Standardised Level Difference,** a single-figure value of airborne sound insulation performance, derived according to procedures in BS EN ISO 717-1, based on the D_{nT} values at different frequencies (100-3150 Hz third octave bands).
$D_{n,F,w}$	**Weighted, Normalised Flanking Level Difference,** the normalised, weighted difference in sound level between a pair of rooms via a flanking element, such as mullion or ceiling detail. The level difference in octave bands is first normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
D_{ne}	**Normalised Element Level Difference**. The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalized to a reference amount of absorption.
$D_{n,e,w}$	**Weighted, Normalised Element Level Difference**. The normalised, weighted difference in sound level between a pair of rooms via a small element such as a trickle ventilator, stated as a single figure. The level difference in octave bands is normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
C_{tr}	**Spectrum Adaptation Term** , a correction term applied to the sound insulation single-number values (R_w, D_w, and $D_{nT,w}$) in accordance with BS EN ISO 717-1. Applying the C_{tr} penalises a construction's performance if its low frequency performance is poor in relation its performance at higher frequencies.
Impact Sound	The noise generated by an impact on a structure. This is normally used to describe the noise created by people walking or moving furniture on a floor structure.
L_{nT}	**Standardised Impact Sound Pressure Level,** a frequency dependent measurement of impact sound insulation, calculated using the following formula: $L_{nT} = L_1 + 10\log(T/T0)$ dB Where: L1 is the mean sound pressure level due to the tapping machine measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T30 measured in seconds). T_o is the reference reverberation time (0.5s for dwellings)
$L'_{nT,w}$	**Weighted Standardised Impact Sound Pressure Level,** a single-figure value (@ 500 Hz) of impact sound insulation, performance, derived according to BS EN ISO 717-2, based on the L_{nT} values at different frequencies (100Hz- 3150 Hz third octave bands).
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.
NR	The **Noise Rating level**. This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting NR level.

APPENDIX B: MEASURED NOISE LEVELS, LT1 & LT2

LT1 – Palatine Road



LT2 – Rear of House



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