Egmont Street, Mossley

Noise Impact Assessment

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23080-R01-SW

Client: Bridgewater Land and Developments Ltd

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REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R01	11/08/2023	Original Issue	[redacted] Susan Witterick BSc MIOA	[redacted] Ben Tomlin BSc MIOA

1 INTRODUCTION

1.1 dBx Acoustics Ltd has been appointed by Bridgewater Land and Developments Ltd to provide a noise survey and noise impact assessment for the proposed residential development at Egmont Street, Mossley.

1.2 The proposed development comprises 36no. residential flats.

1.3 Accordingly, this report presents the results of an environmental noise survey carried out at the site, and provides outline guidance on the acoustic requirements for facades, glazing and ventilation in order to meet the requirements of the Local Planning Authority (Tameside Metropolitan Borough Council) and relevant standards and guidance.

1.4 A glossary of acoustic terminology is provided in Appendix A.

2 DESIGN CRITERIA

Tameside MBC

Pre-Application Guidance

2.1 In response to a pre-application enquiry, Julian Jackson, Director of Place at Tameside MBC, provided the following response;

> *"There are reservations about the influence of any activity taking place within the employment buildings upon any future occupants, the location of units should be informed by suitable noise assessments."*

2.2 The response from Environmental Health stated:

> *"Identify that a noise impact assessment will be required to determine what the impact of any noise from the surrounding industrial units will have on the proposed development, this assessment should also recommend suitable mitigation measures, where required."*

BS 8233:2014: 'Guidance on Sound Insulation and Noise Reduction for Buildings'

Indoor Ambient Noise Levels within Habitable Rooms

2.3 BS 8233 gives guidance for noise levels within residential properties for noise without a specific character. 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.

2.4 The guidance on noise limits from the standard is reproduced in Table 1.

Table 1: Indoor Ambient Noise Limits (BS 8233)

Activity	Location	Daytime Noise Limit, 07:00 – 23:00 hrs	Night-time Noise Limit, 23:00 – 07:00 hrs
Resting	Living room	$35dBL_{Aeq,16h}$	-
Dining	Dining room/area	$40dBL_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	$35dBL_{Aeq,16h}$	$30dBL_{Aeq,8h}$

2.5 It should be noted that these limits represent the average noise level over the 16-hour day or 8-hour night period.

2.6 This potentially means that higher noise levels may be experienced internally over a shorter period of time (e.g. individual passing trams 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 To assess the maximum noise levels, the World Health Organisation (WHO) document 'Guidelines for Community Noise: 1999' recommends that maximum noise levels do not exceed $45dBL_{AF,max}$ more than 10-15 times a night.

Outdoor Noise Levels in External Amenity Areas

2.8 BS 8233: 2014 and the World Health Organisation (WHO) document 'Guidelines for Community Noise: 1999' present guidance for external noise levels within outdoor amenity areas of residential properties to be within 55dB$L_{Aeq,16h}$.

2.9 It is, however, noted that compliance with these noise levels may not always be practical, and that the benefits of a development in other areas may take precedence overachieving external amenity noise levels.

The Building Regulations 2010: Overheating: Approved Document O

2.10 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. 40dB$L_{Aeq,T,}$ 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.*

2.11 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).

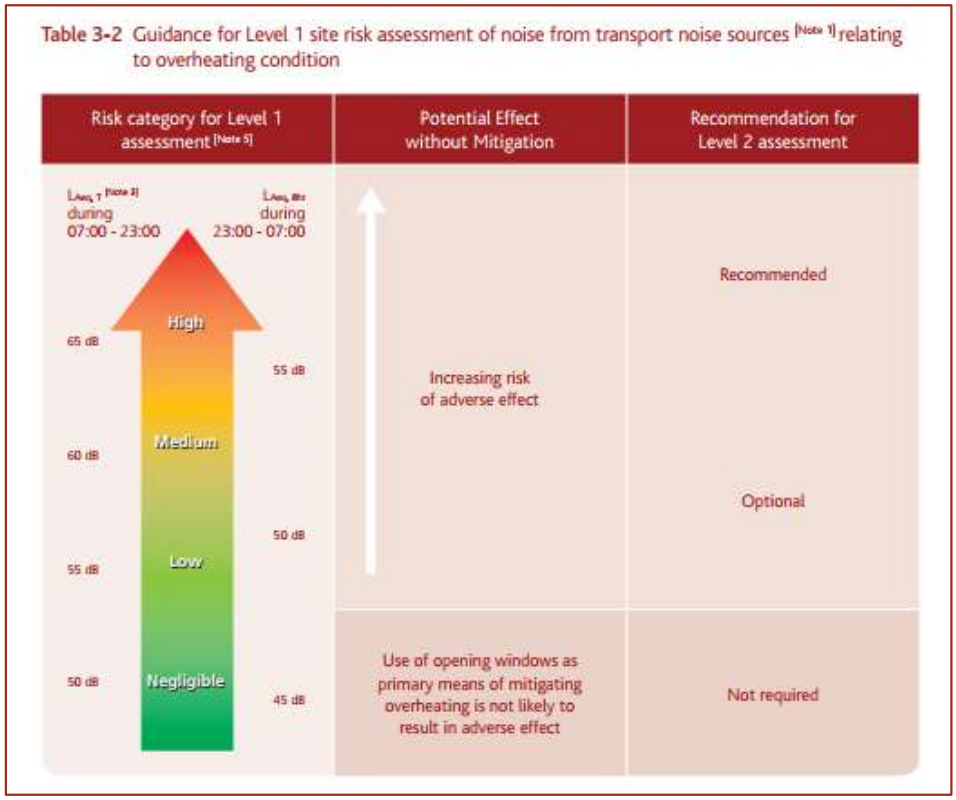
Acoustics, Ventilation and Overheating: Residential Design Guide 2020 (AVO)

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

2.13 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.

2.14 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



2.15 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

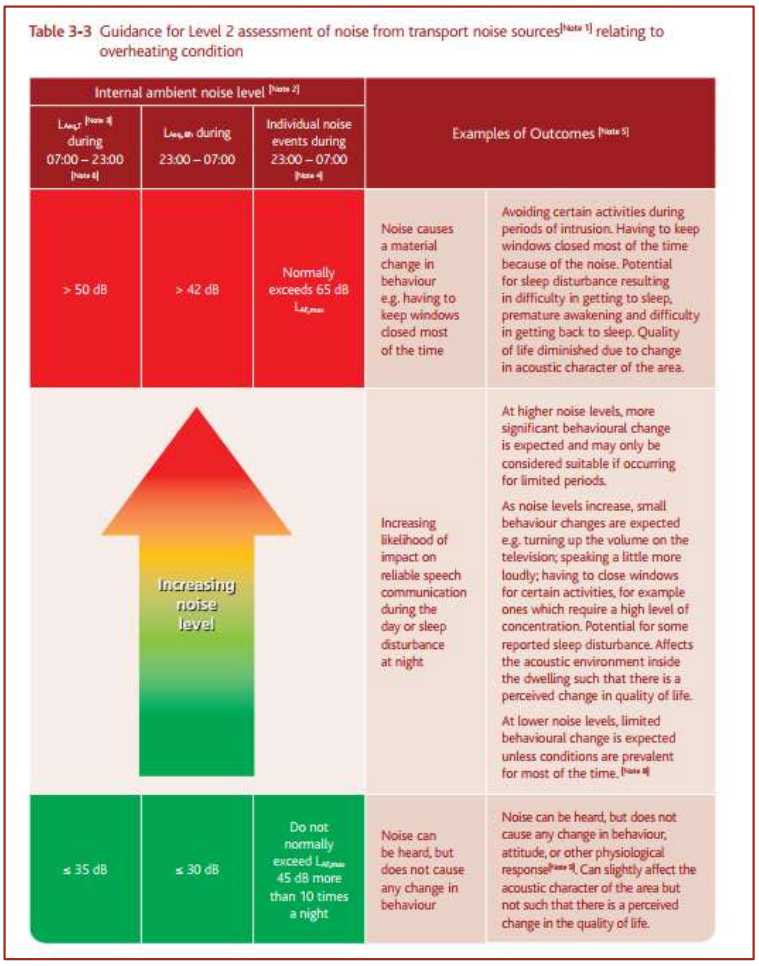


Table 3-3 Guidance for Level 2 assessment of noise from transport noise sources[Note 1] relating to overheating condition

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 $L_{Amax,F}$	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 $L_{Amax,F}$ 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.

2.16 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.

2.17 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.

3 SITE DESCRIPTION

3.1 The development site sits on vacant land accessed from Egmont Street in Mossley.

3.2 Immediately to the south is a warehouse operated by AUT who provide wheels and castors. Occasional noise from this site (vehicle movements and forklift trucks) was observed during the noise survey, however, no significant or consistent noise sources were identified.

3.3 Immediately to the west of AUT is Fielden Autos. This premises is operational Monday-Friday 08:00h-17:00h only.

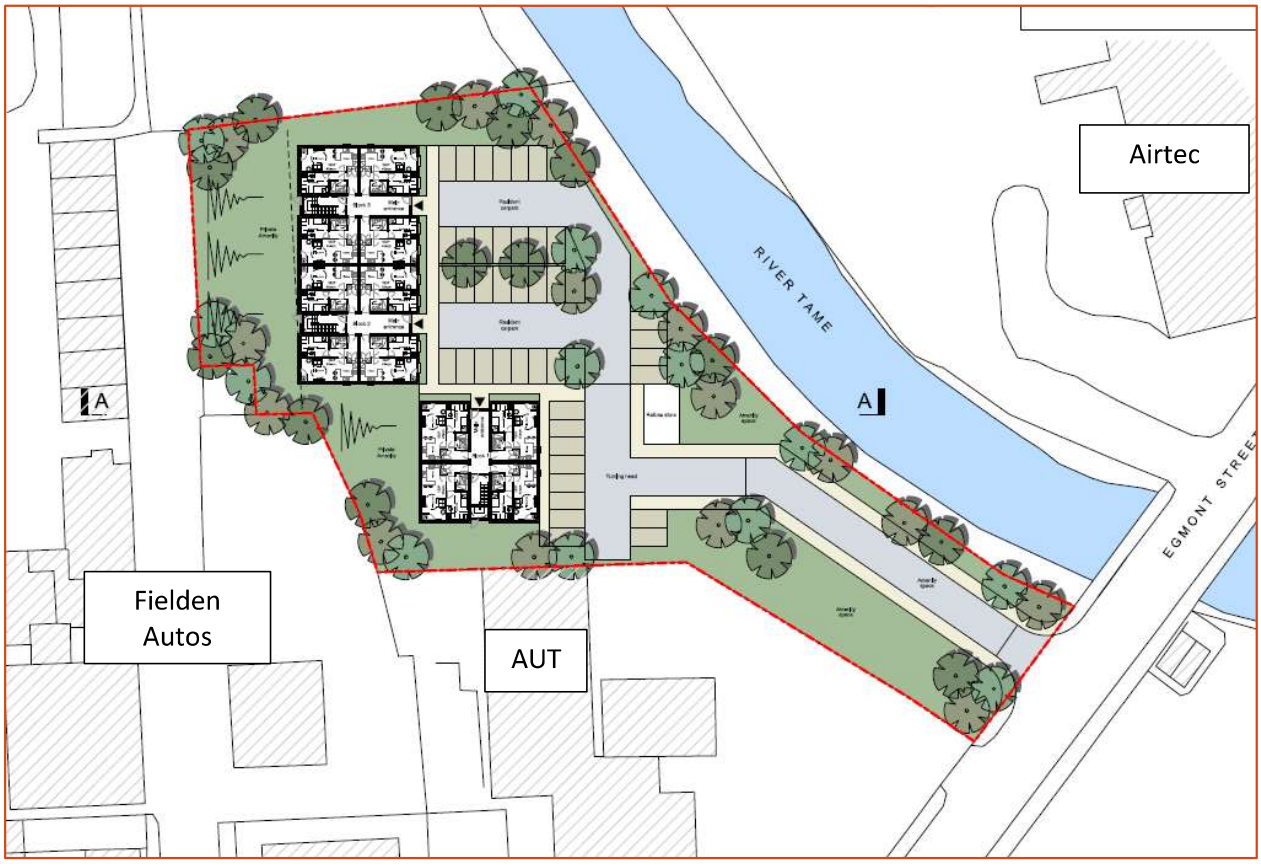
3.4 The site is bounded to the north by the River Tame beyond which are a number of commercial/industrial units including Airtec Air Systems (operational Monday-Thursday 09:00h-16:30h and Friday 09:00h-15:00h), Benchmaster (operational hours Monday-Friday 08:00h-17:00h), and Mossley Car Care (operational Monday-Friday 08:00h-17:00h).

Proposed Development

3.5 The proposed development comprises the construction of 36 no. new build apartments in two blocks.

3.6 The current indicative site plan is presented in Figure 3, below.

Figure 3: Indicative Site Plan



4 NOISE SURVEY

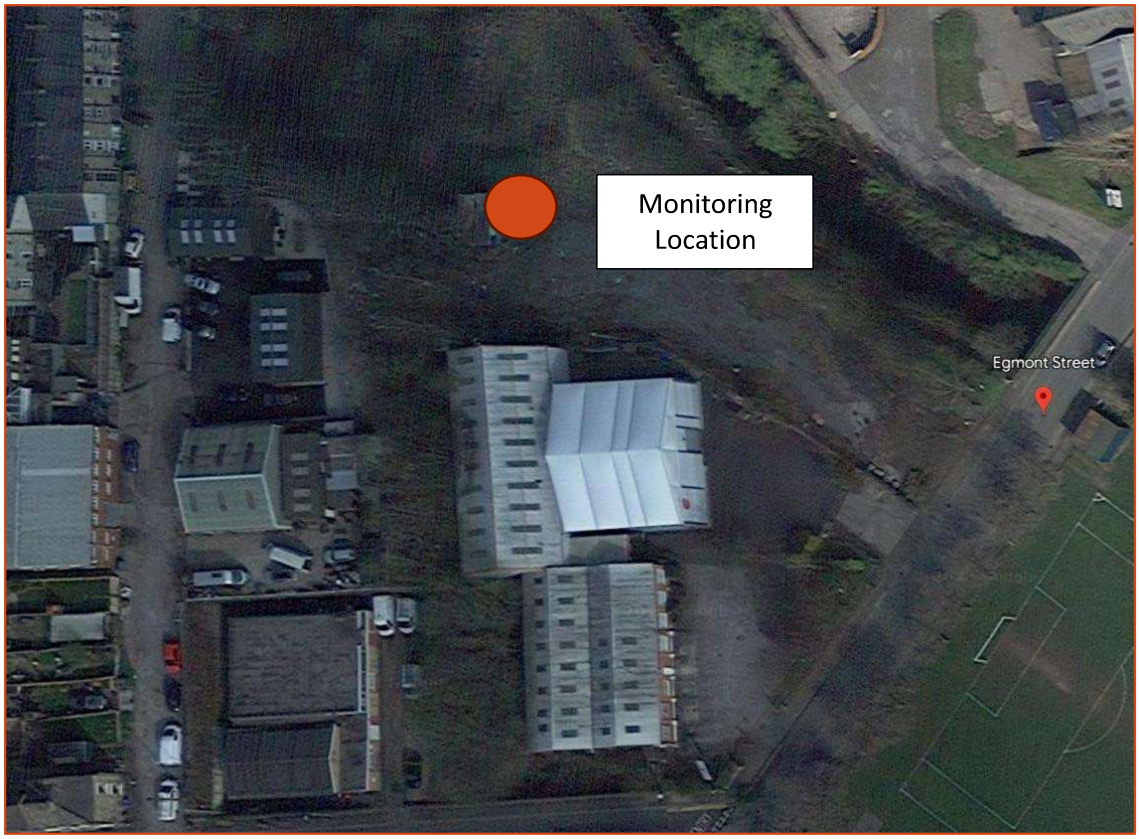
4.1 Noise levels were recorded on site continuously between 11:30h on Thursday 10th August 2023 and 15:15h on Friday 11th August 2023. Measurements were made in 15-minute periods.

Measurement Location

4.2 Measurements were made at a location representative of the proposed residential façades. The measurement location was subject to occasional noise from AUT and Fielden Motors, as well as continuous fan noise from the industrial/commercial properties on the far side of the River Tame.

4.3 The monitoring location was selected as being exposed to noise from the industrial/commercial sites and had a view to traffic on Egmont Street. This location is considered to represent a worst-case for noise impact on the proposed residences.

Figure 4: Noise Survey Location



4.4 The microphone was mounted approximately 1.2m above the ground in free-field conditions.

Weather Conditions

4.5 The temperature during the noise survey varied between 18°C-28°C. There was no precipitation. Wind speeds during the survey were below 5m/s.

Noise Sources

4.6 On deployment of the noise meter on Thursday, some noise from the industrial site was audible, potentially due to fume extract fans at Mossley Car Care. An analysis of the octave band survey data indicates that this is not tonal in nature.

4.7 On collecting the noise meter on Friday afternoon, the surveyor walked around the industrial site. There was very little noise generation noted, other than occasional noise from tools. This was not audible within the site.

4.8 No noise generation from AUT was observed. It is understood that there are occasional forklift movements at this site.

Equipment Used

4.9 The equipment used during the noise survey is presented in Table 2, below.

Table 2: Equipment Used

Equipment	Manufacturer & Part No.	Serial Number	Calibration Date	Certificate Number
Meter	Casella C633C	1716934	01/10/2021	04082/4
Pre-Amp	CEL 495	001773		
Microphone	CEL 251	000847		
Calibrator	CEL 120/1	204515	18/01/2023	06083/4

4.10 The sound level meter was 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, with the exception of the calibrator, which had been calibrated not more than one year prior to the survey.

Measured Noise Levels

4.11 The noise levels measured during the environmental noise survey are summarised in Table 3, below. Full data are available on request.

4.12 All measurements were 15 minutes in duration.

Table 3: Measured Noise Levels

Period	$L_{Aeq,T}$, dB	$L_{AF90,T}$ dB	$L_{AF,max}$ dB
Daytime 07:00h-23:00h	49	44	n/a
Night Time 23:00h-07:00h	42	32	62

4.13 The typical background noise level ($L_{A90,T}$) is calculated from the mode of the measured 15-minute noise levels throughout the relevant period, based on guidance within BS4142.

4.14 The maximum noise level ($L_{AF,max}$) is calculated based on measurements made using a 1-minute profile and represents the typical maximum noise level exceeded no more than 10-15 times per night.

5 NOISE IMPACT ASSESSMENT

Facades and Ventilation

5.1 The indoor ambient noise level criteria which have been adopted for the proposed development, in accordance with BS8233 are summarised in Table 4, below.

Table 4: Indoor Ambient Noise Criteria

Daytime (07:00h-23:00h)	Night-Time (23:00h-07:00h)	
$L_{Aeq,16h}$	$L_{Aeq,8h}$	$L_{Amax,\ F}$
35dB	30dB	45dB[1]
[1]It is generally agreed that this limit would not apply to atypical night time maximum events. The previous version of BS8233 (1999) stated that *'…individual noise events should not normally exceed 45dBL_{Amax}.'*		

5.2 An external noise break-in assessment has been undertaken to assess the suitability of the site for residential development and to specify the minimum sound insulation performance of the façades required to meet the internal noise criteria.

5.3 WHO guidance suggests a typical reduction in external noise levels to internal noise levels of 15dB for a partially opened window.

5.4 On this basis, the allowable external noise levels for natural ventilation via open windows is 50dB$L_{Aeq,T}$ during the daytime, and 45dB$L_{Aeq,T}$ and 60dB$L_{AF,max}$ at night.

5.5 With reference to Table 3, it can therefore be seen that natural ventilation via open windows is acceptable for all rooms during the daytime period, but due to the maximum noise levels occurring overnight, bedrooms should be ventilated using trickle ventilation.

5.6 Calculations have been undertaken to establish the acoustic requirements for ventilation and glazing to bedrooms.

5.7 In order to meet the required indoor ambient noise levels, the glazing should achieve a minimum sound insulation performance of 38dBR_w / 32dBR_w+C_{tr}. This is not an onerous requirement and can be achieved using e.g. 10mm/Thermal Cavity/6mm double glazed units.

5.8 Trickle ventilators to bedrooms should achieve a sound insulation performance of at least 22dB$D_{n,e,w}$. This would be achieved with standard trickle vents. If multiple vents are required to a room, this performance requirement must be increased by *10 log n* dB, where *n* is the number of vents.

5.9 Windows can be openable at occupant discretion but must be well sealed when closed.

Overheating

5.10 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.

5.11 During the daytime, the measured ambient noise level is 49dB$L_{Aeq,T}$ which is considered a 'negligible' risk with open windows used to control overheating.

5.12 At night, the measured ambient noise level is 42dB$L_{Aeq,T}$. Again, this is considered a 'negligible' risk.

5.13 A Level 2 assessment is therefore not required and openable windows can be used to mitigate overheating.

External Amenity Areas

5.14 Private amenity space is proposed to the west of the site.

5.15 A daytime ambient noise level of 49dB$L_{Aeq,16hr}$ was measured during the noise survey.

5.16 BS 8233: 2014 and the World Health Organisation (WHO) document 'Guidelines for Community Noise: 1999' indicate that external noise levels within outdoor amenity areas of residential properties should be lower than 55dB$L_{Aeq,16h}$.

5.17 The proposed amenity areas are therefore compliant with these recommendations.

6 CONCLUSION

6.1 dBx Acoustics Ltd has been appointed by Bridgewater Land and Developments Ltd to carry out a noise survey and noise impact assessment for the proposed development of 36no. new build residential apartments at land on Egmont Street, Mossley.

6.2 This report presents the results of an environmental noise survey carried out at the site, including measurements during day and night time periods.

6.3 Using the noise levels measured on site, it is identified that bedrooms will require attenuated ventilation (e.g. trickle ventilators). Acoustic performance requirements for the glazing and ventilators are provided.

6.4 There are no acoustic requirements for living rooms, which can be naturally ventilated via partially opened windows.

6.5 Noise levels within external amenity areas across the site will be within WHO guidelines of no higher than 55dB$L_{Aeq,16hr.}$

6.6 On this basis, noise should not be a limiting factor in any 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.

23080-R01-SW Egmont Street Mossley

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