

MEMO P23-229-M01v1

Project	Approved Bar & Restaurant - Manchester Central; Windmill Street, Manchester M2 3GX
Date	09 July 2024
To	Stephen Sands, Mark Lamoury
From	George Zelenovic BSc MSc MIOA – Consultant
Subject	Acoustics Verification Testing to satisfy planning conditions 9b and 11

Following our recent contact, this memo sets out the findings of our acoustics verification testing of the approved bar & restaurant at Manchester Central, Windmill Street, Manchester M2 3GX.

This verification testing has been completed in connection with the requirements of Condition 9b and 11 of Manchester City Council (MCC) planning consent for the bar & restaurant (ref. 137413/FO/2023). These require submission of a verification report to validate that the work undertaken, and that the development conforms to the recommendations and requirements to ensure compliance with the MCC noise criteria as described in our noise assessment report ref. P23-229-R01v5, dated October 2023.

The location of the development and external plant is shown in **Figure 1**.

Noise Control Requirements

The measured baseline noise levels at the site (as indicated in the enclosed **Figure 1**), taken from our 2023 noise assessment are as follows:

Table 1: Summary of Noise Levels Measured (dB)

Location	$L_{Aeq,5mins}$	$L_{A90,5mins}$
The Midland Hotel	54 - 67	50 - 55
The Edwardian Hotel	59 - 65	55 - 57

On this basis, we have adopted the representative background noise levels to be the arithmetic average of the measured octave band L_{90} values and broadband L_{A90} values over the course of the noise survey as presented in **Table 2**.

Table 2: Adopted Background Noise Levels (dB)

Adopted background noise in dB L ₉₀	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
The Midland Hotel	58	55	51	49	47	42	35	52
The Edwardian Hotel	63	58	54	53	50	45	38	55

Tables 1 & 2 show that the background noise levels outside the Midland Hotel were lower than those outside Edwardian Hotel. The Midland hotel is also the closest receptor to the development and hence dictates the noise control requirements for the development.

On the basis that the MCC noise control criterion requires both entertainment noise to be controlled to be 5 dB below the representative background noise levels in each octave band, and plant noise to be 5 dB below the representative A-weighted background noise level, the following noise limits are therefore applicable:

Table 3: Adopted Noise Limits Design Limits (dB)

Description	Octave Band Centre Frequency (Hz) – entertainment noise							A (plant noise)
	63	125	250	500	1k	2k	4k	
Adopted noise limits in dB	53	50	46	44	42	37	30	47

We visited the site during the day on Monday 8 July 2024 in order to carry out a series of noise measurements to establish compliance with the noise control requirements of the planning consent.

The measurements were carried out using a B&K 2250 (serial no. 3011706) ‘Class 1’ sound analyser that was tripod mounted with the microphone fitted with a windshield and was calibrated before and after the measurements with no variance observed. The weather conditions were calm, dry and partially cloudy and hence suitable for the noise measurements

Entertainment Breakout Noise from Bar & Restaurant

We have carried out a series of noise measurements in order to establish the sound insulation of the building envelope to assist in determining the likely resulting worst-case trading noise levels outside the Midland Hotel.

High levels of a pink noise test signal were generated inside the main trading area of the bar/restaurant, with the internal source noise levels and the resulting external noise levels at 5m from the main external glazed elevation facing the Midland Hotel measured. Residual noise measurements at 5m from the main external glazed elevation were also taken to allow the contribution from noise break-out alone to be determined. The measured/calculated sound level difference from inside to outside (5m from the main glazed elevation) were as follows:

Description	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Measured Internal Noise Level	85	89	94	96	93	92	92	100
External Noise Breakout Level at 5m	69	64	60	58	57	45	48	60
Inside to outside level difference at 5m	16	26	34	38	37	48	44	

Using the above along with the adopted worst-case internal trading noise levels, along with a correction for attenuation of sound over distance, we have calculated the corresponding worst-case trading noise levels outside the Midland Hotel:

Table 3: Calculated trading noise break-out (dB)

Description	Octave Band Centre Frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Adopted worst-case internal trading noise (L_{eq})	69	73	78	80	77	76	76	84
Inside to outside level difference at 5m	16	26	34	38	37	48	44	
Distance attenuation correction (60m)	22	22	22	22	22	22	22	
Calculated trading noise outside Midland Hotel (L_{eq})	31	26	22	21	19	7	11	23
Adopted noise limit in dB	53	50	46	44	42	37	30	47
Difference	-22	-24	24	-23	-23	-30	-19	

Taking the above into account, we calculate that the resulting noise levels outside the nearest dwellings will be well within the relevant MCC criteria.

Noise from External Plant

A series of noise measurements have been carried out close up to the new external; plant/equipment (or associated external louvres) to determine source noise levels. These noise levels have then been adjusted for attenuation of sound over distance to establish the corresponding overall noise level outside the Midland Hotel.

Noise measurements were taken at 1m from each of the following:

- Upper roof - three separate louvres where internally located AHU ducts terminate;
- Lower roof - one louvre associated with an internally located condenser and four external condensers for the Coca Cola draft (only two of which will operate at any given time); and
- Ground level to the rear - eight air conditioning condenser units on the ground floor. There are in total four Coca-Cola condensers on the lower roof however, we have been informed only two will be running at any one time.

All noise measurements were made with all the plant running concurrently (two of the four Coca Cola condensers) and then subsequently measurements of the residual noise with all equipment switched off were taken in order determine the contribution from the equipment only. Corrections for attenuation of sound over distance and screening where appropriate in order to determine the resulting overall plant/equipment noise levels outside the Midland Hotel.

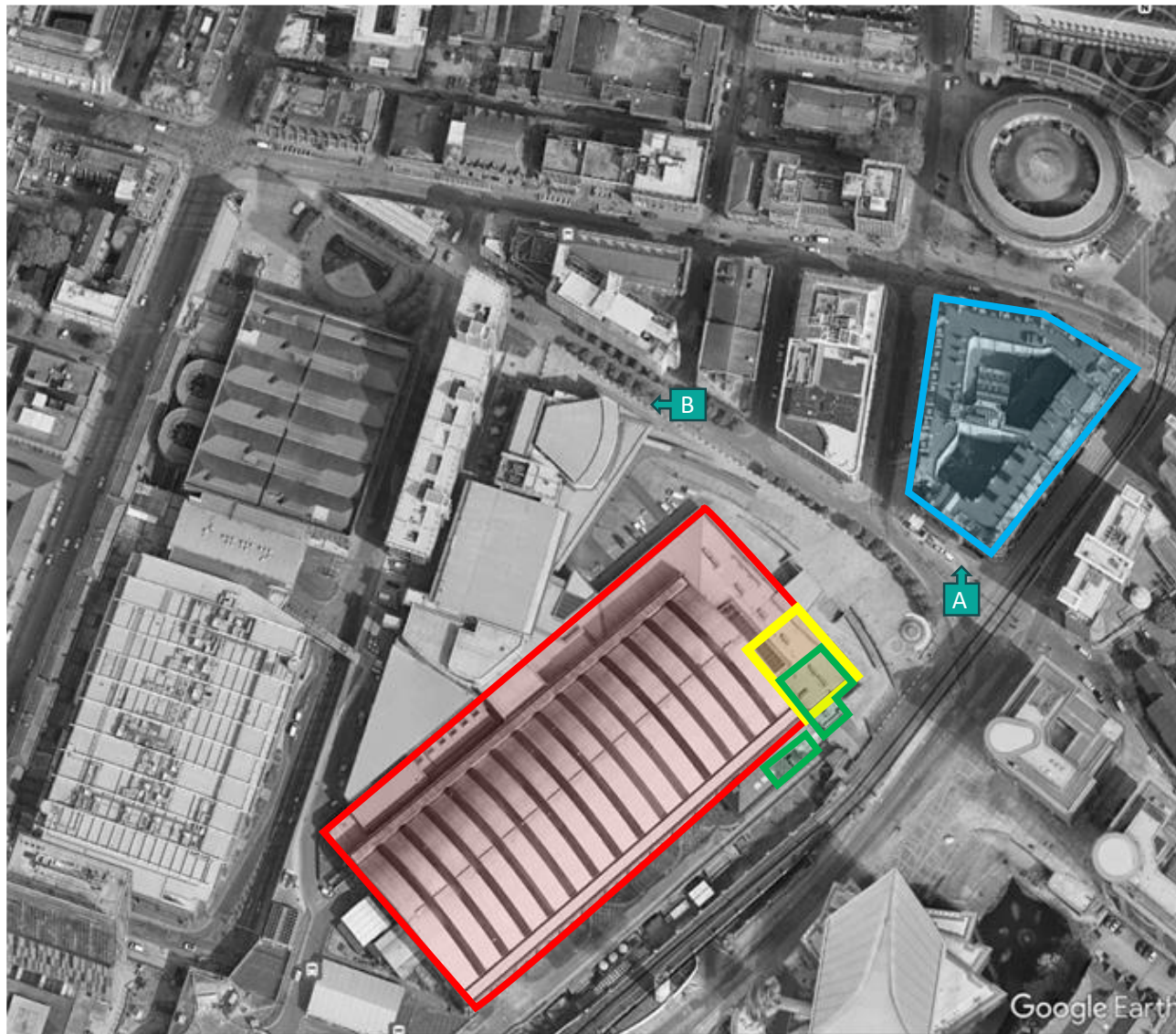
Table 4: Buildings Services Plant Noise Level assessment

Description	Sound Pressure Level in dB L_{Aeq} at 1m
Upper Roof	
Cumulative noise level of all louvres at 1m	64
Distance attenuation (73m)	-37
Resulting noise at Midland Hotel	27
Lower Roof	
Cumulative noise from Coca-Cola condensers & condenser with louvre at 1m	64
Distance attenuation (80m)	-38
Screening (partial line of sight)	-5
Resulting noise at Midland Hotel	21
Ground Floor	
Combined noise from AC condenser units (8no.) at 1m	66
Distance attenuation (100m)	-40
Screening (no line of sight)	-10
Resulting noise at Midland Hotel	15
Cumulative	
Overall resulting noise at Midland Hotel	28
Adopted noise limit	47
Difference	-19

The equipment does not produce any significant tonal or impulsive noise that would be audible at the dwellings. Furthermore, the noise from the equipment is generally steady. On this basis, no character corrections in line with BS 4142: 2014 are appropriate and the corresponding rating level of noise is therefore 28 $L_{Ar,Tr}$.

As such, we predict that the plant noise levels will be well below the relevant noise limit of 47 dB $L_{Ar,Tr}$ outside the Midland Hotel.

Therefore, on the basis of the above, we conclude the requirements of conditions 9b and 11 of the Manchester City Council (MCC) planning consent have been met and no further noise mitigation is warranted.



Key:

Not to scale

-  - Approximate site boundary
-  - Approximate bar restaurant boundary
-  - Nearest Residential Receptors
-  - Location of External Plant
-  - Noise measurement positions



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Title: Figure 1: Site location & noise measurement positions

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