

DDN-AC-08

DATE:	09 June 2022	CONFIDENTIALITY:	Public
SUBJECT:	Condition 5 pre-completion testing		
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This note has been prepared in response to planning condition 5 of the consent (27325/FO/2020) for the proposed gym and spa at 2 – 4 Booth Street in Manchester City Centre. Condition 5 requires a verification report to confirm that the criteria relating to the control of noise transfer from the proposed gym to dwellings have been satisfied.

CONDITION 5

Condition 5 states

'The premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

Where entertainment noise is proposed the L_{Aeq} (entertainment noise) shall be controlled to 10 dB below the L_{A90} (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63 Hz and 125 Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47 dB and 41 dB, respectively.

Upon completion of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of nearby properties, pursuant to policy DM1 (Development Management) and policy SP 1 (Spatial Principles) within Manchester Core Strategy

A scheme of acoustic treatment is to be submitted to and approved in writing by the City Council as local planning authority.

Upon completion of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report'

As the gym will include a sound system for background music and there are structurally connected dwellings immediately above, the acoustic requirements applicable can be summarised as follows:

- § Music breaking out through the building envelope shall be at least 10 dB below the octave band background sound levels at windows of the nearest noise sensitive property.
- § Music noise through the shared party floor to the residential properties above shall be no more than 47 and 41 dB in the 63 and 125 Hz octave bands respectively.

BACKGROUND SOUND LEVELS

Unattended noise monitoring equipment was used to measure background sound levels between 18 and 27 March 2020 from an open window of the top floor apartment in 2 – 4 Booth Street. The microphone of the noise monitoring equipment extended approximately 1 m from the façade and was approximately 10 m above ground level. 3 dB has been subtracted from the measured levels as they are subject to reflections from the façade.

COVID-19 related lockdown officially started on 23 March 2020, therefore, all measurements completed on and after this date have been excluded from the data analysis.

Prior to lockdown, the dominant source of noise affecting the measurement location was road traffic from the surrounding roads, pedestrian movements and building services noise.

Details of the noise measurement equipment are included in the table below.

Table 1 Noise survey measurement equipment

Equipment	Make/Model	Serial No.	Calibration due
Sound Level Meter	Sound Level Meter	01dB-METRAVIB Solo Master	08 September 2021
Pre-amplifier	Pre-amplifier	01dB-Stell PRE 21 S	08 September 2021
Microphone	Microphone	Microtech Gefell GmbH MCE212	08 September 2021
Calibrator	Calibrator	01dB-Stell Cal 21	05 September 2020

The weather is not expected to have had an impact on the measured background sound levels, with it being mostly dry and sunny and wind speeds generally below 5 m/s.

All measurements were 15 minutes long. The octave band background sound levels measured during the survey have been analysed as per the guidance in MCC's *Planning & Noise Technical Guidance (December 2015)* and typical octave band background sound levels determined, these are included in Table 2.

Table 2 Octave band background sound levels at the windows of 2 – 4 Booth Street

Noise sensitive receiver	Period	63	125	250	500	1k	2k	4k	8k
Residential properties in 2 – 4 Booth Street	Day (07:00 – 23:00)	53	50	51	49	48	43	36	23
	Night (23:00 – 07:00)	53	50	51	48	48	42	33	21

ASSESSMENT OF NOISE BREAK-OUT THROUGH THE ENVELOPE

The building envelope is to remain largely as is, with only the main door and a single glazed window being replaced. The retained envelope was inspected by WSP and is predominantly double glazed, but the exact configuration of the glazing could not be confirmed. For the purpose of assessing operational noise break-out, the glazing is assumed to have sound insulation performance 27 dB $R_w + C_{tr}$, which is typically the lowest level of sound insulation achieved by a thermal double-glazed unit in reasonable condition. The new door and window have been specified to achieve the same level of sound insulation.

Noise breaking-out of the gym has been assessed at the windows of the residential properties in 2 – 4 Booth Street as these are the closest noise sensitive receivers to the gym. This assessment is based on the following:

- § Music will be limited as per Table 3. These are reverberant sound pressure level limits that should not be exceeded as a result of a spatial average measurement.
- § The new and existing parts of the building envelope achieve $R_w + C_{tr} \geq 27$ dB.
- § There are no openable windows in the envelope.
- § The distance from the centre of the gym building envelope to the windows of the residential properties above is 4 m.

The music noise levels predicted at the windows of the apartments above the gym are compliant with the requirements of Condition 5.

Table 3 Assessment of music noise break-out through the building envelope

	63 Hz	125 Hz	250 Hz	500	1k Hz	2k Hz	4k Hz	8k Hz
Music noise limit, L_{eq} (dB)	69	71	69	70	81	81	67	55
Sound insulation performance of the envelope, R (dB)	18	23	20	24	35	41	36	36
Music noise levels at 2 – 4 Booth Street, L_{eq} (dB)	43	40	41	38	38	32	23	11
Daytime background sound level, L_{90} (dB)	53	50	51	49	48	43	36	23
Difference between music noise level and daytime background sound level	-10	-10	-10	-11	-10	-11	-13	-12
Night time background sound level, L_{90} (dB)	53	50	51	48	48	42	33	21
Difference between music noise level and daytime background sound level	-10	-10	-10	-10	-10	-10	-10	-10

ASSESSMENT OF MUSIC NOISE THROUGH THE SHARED PARTY FLOOR

With regard to the transfer of music noise through the party floor which separates the gym from the dwellings above, Condition 5 states:

‘... internal noise levels at structurally adjoined residential properties in the 63 Hz and 125 Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47 dB and 41 dB, respectively’



The sound insulation performance of the party floor was measured by WSP on 25 May 2022, the results of which are included in Table 4. The test was from the gym up to the living room of apartment 15.

Table 4 Airborne sound insulation between gym and dwelling above

Test location	Octave Band Centre Frequency (Hz) level difference, D (dB)								$D_{nT,w} + C_{tr}$ (dB)
	63	125	250	500	1k	2k	4k	8k	
Gym to apartment 15 living room above	30	43	55	67	67	65	72	76	57

The noise level from the gym in the apartment above has been calculated using the music noise limits included in Table 3 and the levels of sound insulation in Table 4, see Table 5. The music noise levels in the apartment at 63 and 125 Hz are compliant with the requirements of Condition 5.

Table 5 Assessment of music noise transfer via the party floor

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Gym music noise limit, L_{eq} (dB)	69	71	69	70	81	81	67	55
Floor sound insulation, D (dB)	30	43	55	67	67	65	72	76
Level in apartment, L_{eq} (dB)	39	28	14	3	14	16	-5	-19
Condition 5 limit, L_{eq} (dB)	47	41	-	-	-	-	-	-
Difference between level and Condition 5 limit	-8	-13	-	-	-	-	-	-

I trust the above is clear. If you have any further queries, please do not hesitate to contact me.

Yours sincerely,

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