

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

20270-R04-A

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58-66 King Street, Manchester

Planning condition 3 discharge report

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

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Version	Date	Comments	Author	Reviewer
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Summary

Sandy Brown has been commissioned by CogentBC to provide acoustic advice in relation to the proposed development at 58-66 King Street, Manchester.

This report sets out relevant information to discharge Planning Condition 3 imposed by Manchester City Council as per planning references 122835 P30PA 2019 and 122836 P30PA 2019.

The acoustic design as set out in this report meets the requirements of Planning Condition 3.

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1 Introduction

Sandy Brown has been commissioned by CogentBC to provide acoustic advice in relation to the proposed development at 58-66 King Street, Manchester.

This report sets out relevant information to discharge Planning Condition 3 imposed by Manchester City Council as per planning references 122835 P30PA 2019 and 122836 P30PA 2019.

2 Planning condition 3

Planning Condition 3 imposed by Manchester City Council as per planning references 122835 P30PA 2019 and 122836 P30PA 2019 states the following:

A scheme for acoustically insulating the proposed residential accommodation against noise from commercial premises to be submitted and approved by LPA.

3 Basis of review

The review has been based on the following documents:

- Sandy Brown report 20270-R03-A *Stage 4 acoustic design report* dated 18 August 2021
- Sandy Brown report 20270-R02-F *Noise and vibration planning report* dated 8 October 2022
- AEW Architects Stage 4 architectural drawings:
 - Proposed ground floor plan drawing ref 11702-AEW-XX-00-DR-A-2000 Rev P04
 - Proposed first floor plan drawing ref. 11702-AEW-XX-01-DR-A-2001 Rev P04
 - Ground floor floor and ceiling reference plan drawing ref. 11702-AEW-XX-00-DR-A-2300 Rev P01
 - First floor floor and ceiling reference plan drawing ref. 11702-AEW-XX-01-DR-A-2301 Rev P01.

4 Development proposals

The proposed development comprises of the redevelopment and conversion of three adjacent buildings that were previously used as offices to form residential apartments over four floors (first floor to fourth floor). One of the buildings, 62 King Street has Grade II listed status. The ground floor of each of the buildings comprises a commercial unit.

4.1 Hours of operation

The exact uses for the commercial units are yet to be confirmed as at this time they are currently vacant, however for the purpose of this assessment it is assumed they will be able to operate during both the daytime (07:00-23:00) and night-time (23:00-07:00).

5 Assessment criteria

5.1 Entertainment noise egress limits

Manchester City Council stipulates the following in relation to amplified music associated with a new development:

‘Entertainment noise (L_{Aeq}) should be controlled to 10 dB below the background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location.’

The wording of Planning Condition 3 does not explicitly state the above criteria, though this is how Manchester City Council would typically assess external noise egress from entertainment noise and is the basis of the acoustic design for this element.

Where entertainment noise is a factor in the noise climate, Manchester City Council states the following:

‘Music noise levels in the 63 Hz and 125 Hz octave centre frequency bands should be controlled so as not to exceed (in habitable rooms) 47 dB and 41 dB (L_{eq}), respectively.’

These criteria apply to both music noise from existing premises in the surrounding area and from any non-residential units proposed as part of the development.

From discussions with Manchester City Council, it is understood that the low frequency noise criteria only apply to living-areas during the daytime (07:00-23:00) and to bedrooms during night-time (23:00-07:00).

Although the wording of Planning Condition 3 does not explicitly state the above criteria, this is the criteria Manchester City Council would typically use to assess external noise egress from entertainment noise and is the basis of the acoustic design for this element.

5.2 Floors between Level 1 apartments and commercial areas

Preliminary sound insulation testing has been undertaken between the existing commercial units and Level 1 spaces. The measured sound insulation performance was $D_{nT,w}+C_{tr}$ 49 dB.

The first floor construction between the Level 1 apartments and commercial area is to be enhanced to achieve a minimum sound insulation performance of $D_{nT,w}+C_{tr}$ 50 dB.

It is proposed to enhance the first floor construction between the ground floor commercial units and first floor residential apartments using a floating timber floor, comprising of 20 mm screedboard bonded to a resilient layer.

The existing floor joists and ceilings within the commercial units are to be retained.

6 Operational noise limits

6.1 Noise egress to nearby noise sensitive premises

As per Section 5.1, the cumulative noise level resulting from amplified sound egress at 1 m from the most affected windows of the nearest noise sensitive premises shall not exceed 10 dB below the existing background sound level in octave bands. These limits are set out in Table 1.

Table 1 Maximum operational noise limits at 1 m from noise sensitive premises

Period	Maximum operational noise limits at 1 m from noise sensitive premises, L_{eq} (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00 – 23:00)	49	44	37	38	35	30	23
Night-time (23:00 – 07:00)	48	43	35	37	33	29	22

6.2 Operational noise limits

The maximum operational noise levels (L_{eq}) from amplified sound within the proposed commercial unit are set out in Table 2.

These are based on the following:

- Meeting the daytime and night-time noise egress criteria set out in Section 6.1.
- An assumed minimum overall facade sound insulation performance of $R'_w + C_{tr}$ 28 dB which is considered a reasonable worst-case scenario.
- Meeting the internal noise transfer criteria for the residential apartments above set out in Section 5.1.
- A minimum first floor sound insulation performance of $D_{nT,w} + C_{tr}$ 50 dB, this will require enhancement works to the first floor constructions as discussed in Section 5.2.

These limits are provided for guidance only.

Table 2 Guideline maximum operational noise limits in commercial units

	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Guideline maximum operational noise limits in one of the ground floor commercial units, L_{eq} (dB)	76	74	68	68	68	64	62

6.2.1 Comments on proposed noise limits

The above limits would be suitable for low level amplified background music.

If noise levels higher than those noted above were desirable, additional enhancement works would be required in order to ensure that the Manchester City Council criteria are still met. Typical enhancement works would be expected to include:

- An enhanced floor / ceiling construction with flanking pathways suitably controlled
- Enhancements to external glazing
- Enhancements to the non-glazed elements of the facade
- Lobbied external doors.

6.2.2 Setting operational noise limits

The exact amplified noise limits shall be determined following pre-completion sound insulation and that electronic limiters are used for each commercial unit. These limits would typically be included in a tenant lease agreement to control noise transfer and minimise disturbance to the residents of the apartments above the commercial units. Final sound levels should be set during commissioning of electronic sound limiters in the commercial units to ensure the Manchester City Council requirements are met.

Appendix A

Glossary of terms

General terms

Absorptive material	Material that absorbs sound energy. Soft or porous finishes such as mineral fibre are effective sound absorbers.
Acoustic absorption	The conversion of sound energy, often by the use of a porous material. It is a term used to describe the amount of sound absorbed by a finish or object within a room.
Airborne sound	Sound propagating through the air.
Airborne sound insulation	The ability of building elements or structures to reduce airborne sound transmission.
Density	Mass per unit volume, expressed in kilograms per cubic metre (kg/m^3).
Direct sound transmission	The process in which sound that is incident on one side of a building element is radiated by the other side.
Flanking element	Any building element that contributes to the sound transmission between rooms in a building that is not the separating element in question. It is typically an element which continues past the separating element
Flanking sound transmission	Sound transmitted between rooms via flanking elements instead of directly through separating elements, or along any path other than the direct path.
Floating/isolated floor	A floating or isolated floor consists of a floating layer that is decoupled from the main structure by a resilient layer or other resilient element (see also 'Resilient layer' and 'Floating/isolated layer'). The type of resilient element depends on the level of isolation required.
Floating/isolated layer	A surface that rests on a resilient layer or other resilient element and is therefore isolated from the main structure (see also 'Floating/isolated floor' and 'Resilient layer').
Frequency	The number of cycles per second. The unit of frequency is the Hertz (Hz). Frequency gives a sound its distinctive tone.
Frequency band	A continuous range of frequencies between stated upper and lower limits (see also 'Octave band' and 'One-third octave band').
Impact sound	Sound resulting from direct impact (such as footsteps) on a building element.
Impact sound insulation	The ability of building elements or structures to reduce impact sound transmission.
Independent ceiling or lining	A ceiling or lining which is mounted independently of (ie with no direct physical connections to) a separating floor or wall.
Isolation	The absence of rigid connections between two or more building elements.
Mass per unit area	The mass per unit area, expressed in terms of kilograms per square metre (kg/m^2). Also known as 'surface density'.
Resilient layer/element	A layer or other resilient element that isolates a floating layer from a base floor and the surrounding walls.

Resiliently mounted ceiling or lining	A ceiling or lining which is mounted resiliently from (ie connected only via specialist resilient hangers or ties) a separating floor or wall.
Reverberation	The persistence of sound in a space after a sound source has stopped.
Reverberation time	The time, in seconds, taken for the sound in a room to decay by 60 dB after a sound source has been stopped.
Separating element	An element (such as a wall, floor, door, window) which separates buildings or parts of buildings.
Sound pressure level	A logarithmic measure of the effective sound pressure of a sound relative to a reference value, measured in decibels, dB. Sound pressure levels are dependent on the conditions under which they are measured.
Sound power level	A logarithmic measure of the sound power in comparison to specified reference level, measured in decibels, dB. Unlike sound pressure, sound power is not room or distance dependent.
Spectrum	The composition of a particular sound in terms of separate frequency bands.
Surface density	The surface density, expressed in terms of kilograms per square metre (kg/m^2). Also known as 'mass per unit area'.
Structure-borne sound	Sound which is transferred by vibration via the structure of a building.

Acoustic parameters

'A' weighting	Frequency weighting based on the frequency response of the human ear which has been found to correlate well with the subjective response to sound.
C_{tr}	The correction to a sound insulation quantity (such as R_w or $D_{nT,w}$) to take account of a specific sound spectrum with low frequency sound energy.
Decibel (dB)	A logarithmic unit used for many acoustic values to indicate the level with respect to a reference level
$D_{n,f}$, $D_{n,c}$	The difference in sound level between a pair of rooms via a specified flanking sound transmission path in a stated frequency band. $D_{n,c}$ relates specifically to ceilings but has been superseded by $D_{n,f}$ which can relate to any specified path. A higher numerical quantity represents a better performance.
D_{nT}	The difference in sound level between a pair of rooms, in a stated frequency band, normalized for the reverberation time. A higher numerical quantity represents a better performance.
$D_{nT,w}$	A single number weighted quantity which characterizes the airborne sound insulation between rooms, corrected for reverberation time. A higher numerical quantity represents a better performance.
Hz	Hertz (Hz) is the unit of frequency (see also 'Frequency')
L'_{nT}	The impact sound pressure level in a stated frequency band, corrected for the reverberation time. A lower numerical quantity represents a better performance.

$L'_{nT,w}$	A single number weighted quantity used to characterise the impact sound insulation of floors. A lower numerical quantity represents a better performance.
$L_{A90,T}$	The A-weighted sound pressure level exceeded 90% of the measurement period (T) over which a noise is measured (ie, the quietest 10% of the period). When not weighted it is denoted $L_{90,T}$. This parameter is generally considered to be representative of a constant noise source, or background noise level.
$L_{Aeq,T}$	Equivalent A-weighted sound pressure level of a steady noise that has the same acoustic energy as a fluctuating noise over the measurement period (T). When not weighted it is denoted $L_{eq,T}$.
$L_{Amax,T}$	The highest A-weighted sound pressure level measured in the period (T) with either fast (L_{AFmax}) or slow (L_{ASmax}) time weightings. When not weighted it is denoted L_{Fmax} or L_{Smax} .
NR	Noise rating. Single figure term used to reflect the spectral content of noise. This is generally applied within rooms in relation to building services noise.
Octave band	A frequency band in which the upper limit of the band is twice the frequency of the lower limit.
One-third octave band	A frequency band in which the upper limit of the band is the cube root of two times the lower limit of the band or more simply one third of an octave band.
R	Sound reduction index. A quantity, measured in a laboratory, which characterises the airborne sound insulation of a material or building element in a stated frequency band. A higher numerical quantity represents a better performance.
R_w	Weighted sound reduction index. A single number quantity which characterises the airborne sound insulation of a material or building element in the laboratory. A higher numerical quantity represents a better performance.
R'	Apparent sound reduction index. The on-site equivalent of the sound reduction index, R , which is measured in the presence of flanking paths. A higher numerical quantity represents a better performance.
R'_w	Apparent weighted sound reduction index. The on-site equivalent of the weighted sound reduction index, R_w . A higher numerical quantity represents a better performance.
T_{mf}	The arithmetic average of the reverberation time in the 500 Hz, 1 kHz and 2 kHz octave bands (see also 'Reverberation time').
α_w	Weighted absorption coefficient – a quantity characterising the effectiveness of a sound absorbing surface. The proportion of sound energy absorbed is given as a number between zero (for a fully reflective surface) and one (for a fully absorptive surface).

ΔL_w

The measured improvement of weighted impact sound insulation resulting from the installation of a floor covering or floating floor on a test floor in a laboratory. A higher numerical quantity represents a better performance.