

fisher acoustics

Union T2, Manchester

Gym Noise Impact Assessment

November 2025

Report Reference: T2-FAC-A180-Rp-02-003 P01

Flint Glass Works, 64 Jersey Street, Manchester, M4 6JW

0161 605 0905 

info@fisheracoustics.co.uk 

fisher acoustics

PROJECT TITLE

UNION T2, MANCHESTER

REPORT TITLE

GYM NOISE IMPACT ASSESSMENT

CLIENT

UNION LIVING LIMITED

HORSESHOE FARM

ELKINGTON WAY

ALDERLEY EDGE

CHESHIRE

SK9 7GU

REPORT REFERENCE

T2-FAC-A180-RP-02-003 P01

DATE

19 NOVEMBER 2025

AUTHOR

MATT FISHER, BENG (HONS) CENG MIOA

DOCUMENT HISTORY

P01

19 NOVEMBER 2025

CONTENTS

1.0	SUMMARY	2
2.0	INTRODUCTION	3
3.0	DESCRIPTION OF SITE	4
4.0	CURRENT USES WITHIN BUILDING	5
5.0	LOCATION OF GYM	6
6.0	NOISE SENSITIVE RECEPTORS	8
7.0	ENVIRONMENTAL NOISE SURVEYS AND EXTERNAL NOISE CRITERIA	9
8.0	INTERNAL NOISE TRANSFER	12
9.0	ACTIVITY NOISE BREAKOUT FROM GYM	15
10.0	IMPACT SOUND TRANSFER FROM GYM	16
11.0	CONCLUSION.....	22
Table 1:	Summary of measured environmental noise levels	10
Table 2:	Typical lowest background noise levels at sensitive receptors close to the proposed gym	11
Table 3:	Maximum allowable external music noise levels due to proposed gym.....	11
Table 4:	Maximum recommended noise levels in residential units due to music replay in gym	13
Table 5:	Maximum recommended noise levels in non-residential areas due to music replay in gym.....	13
Table 6:	Maximum allowable noise levels in gym– re internal noise transfer	14
Table 7:	Expected sound reduction index of gym curtain wall.....	15
Table 8:	Calculated external noise levels due to maximum allowable internal noise level – gym	15
Table 9:	Guidance Internal Sound Target Criteria for Gym Activity – Residential	16
Figure 1:	Site location plan – Union T2	4
Figure 2:	Level 2 plan showing layout of gym	6
Figure 3:	Level 3 plan showing footprint of gym below.....	6
Figure 4:	Level 5 plan showing footprint of gym below.....	7
Figure 5:	Noise sensitive residential receptors in the vicinity of the development.....	8
Figure 6:	Noise survey measurement location	10
Figure 7:	Level 2, Free Weights Area of Gym	17
Figure 8:	Measured impact sound levels due to 20 kg kettlebell weight drops - Apartment 5.08, Bedroom C	19

1.0 SUMMARY

Union T2 is located on Water Street, Manchester and is a 36 storey plus basement mixed use building which comprises co-living units, amenity space, co-working space and flexible commercial space.

A full planning application has been submitted for change of use on Level 2 of Union T2 from co-working space (Use Class E) to ancillary gymnasium, co-working space, staff office, marketing suite and laundry room for the exclusive use of co-living residents (Sui Generis) and associated works.

Fisher Acoustics Ltd has been commissioned by Union Living Limited to carry out an assessment of the potential noise impact of the proposed gym on the co-living residential units which are located on Level 5 and above. A noise impact assessment has been carried out that determines the effect of noise breakout and internal noise transfer due to use of the gym, with reference to the document 'ProPG: Gym Acoustics Guidance', published in March 2023.

An assessment of noise break out from the gym has determined that compliance with external noise limits is expected.

Maximum recommended airborne noise levels within the gym have been determined such that compliance with guidance published by Manchester City Council can be achieved.

Impact noise due to the dropping of free weights and weight stacks is to be controlled to acceptable levels by proprietary resilient gym flooring.

2.0 INTRODUCTION

Union T2 is located on Water Street, Manchester and is a 36 storey plus basement mixed use building which comprises co-living units, amenity space, co-working space and flexible commercial space.

A full planning application has been submitted for change of use on Level 2 of Union T2 from co-working space (Use Class E) to ancillary gymnasium, co-working space, staff office, marketing suite and laundry room for the exclusive use of co-living residents.

Fisher Acoustics Ltd has been commissioned by Union Living Limited to carry out an assessment of the potential noise impact of the proposed gym on the co-living residential units which are located on Level 5 and above. A noise impact assessment has been carried out that determines the effect of noise breakout and internal noise transfer due to use of the gym, with reference to the document 'ProPG: Gym Acoustics Guidance', published in March 2023.

The report advises on the maximum allowable internal noise levels within the gym such that compliance with external noise criteria guidance published by Manchester City Council can be achieved. An assessment of airborne and impact sound transmission from the proposed gym to the residential units within the building is also provided.

3.0 DESCRIPTION OF SITE

General Site Description

Union T2 is located on Water Street, Manchester and is bounded by Water Street to the east, Aviva Studios to the south, the Manchester Marriott Victoria and Albert Hotel located to the north and the River Irwell to the west. Also to the east of the site is the Union T1 co-living residential building.

Further to the west of the site lies the Ordsall Chord rail line which spans the River Irwell. Across the River Irwell is the A6042, Trinity Way. Trinity Way is a busy major road that is trafficked by passenger vehicles, goods vehicles, motorbikes and buses.

The existing buildings around Union T2 include residential and commercial uses. The closest residential dwellings to the proposed gym will be those within the Union T2 building itself.

Figure 1 identifies Union T2 in the context of the surrounding roads and buildings.

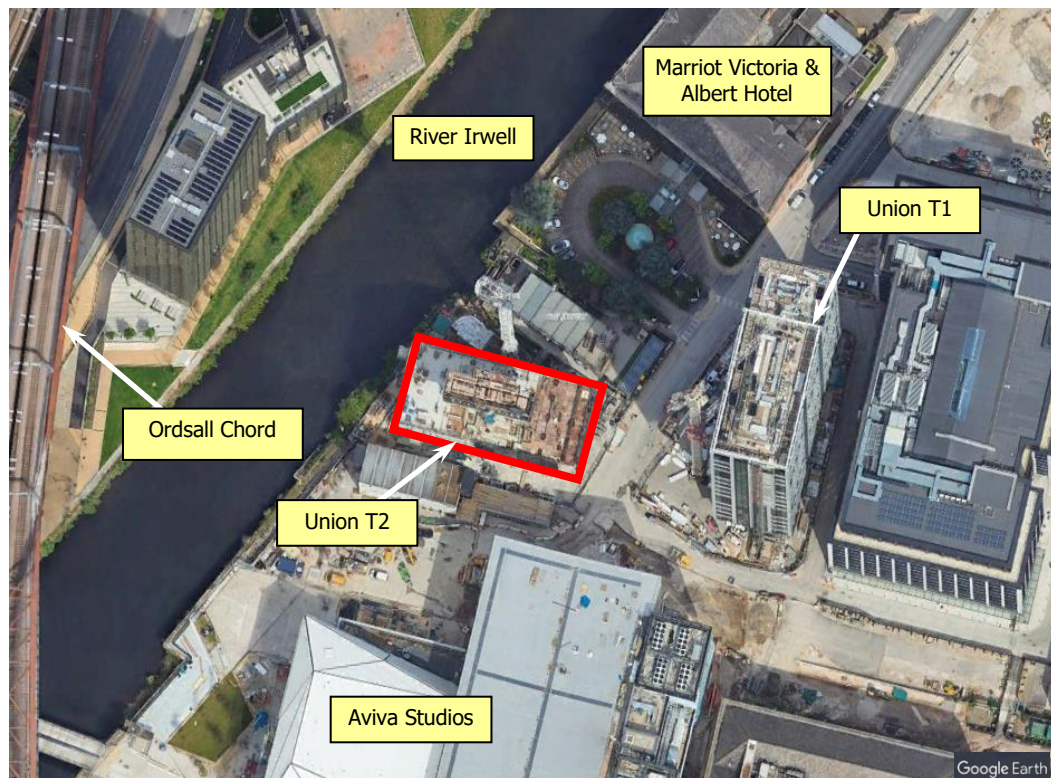


Figure 1: Site location plan – Union T2

4.0 CURRENT USES WITHIN BUILDING

The current room uses within Union T2 are as follows:

- Basement Level 1: Cycle storage, laundry room, laundry room, gas utility room, LV switch room, life safety room, staff welfare, accessible staff WC, plant room
- Ground Floor: Reception lobby, commercial area, substation, residential / co-work bin store, post room/staff office, DDA WC
- Mezzanine Level: Comms room, plant rooms, plant room (commercial unit), post room (overspill), void over commercial area, void over reception lobby
- Level 1: Bar, bar lounges, club room, cellar/ bar store, WCs, cleaners store, U+ lounge, amenity lobby
- Level 2 & Level 3: Currently only shell & core. Proposed uses include offices, office/meeting room, meeting room, open plan co-working area, WCs, Cleaners Store
- Level 4: Currently only shell & core. Proposed uses include offices, boardroom, open plan co-working area, WCs, WC & shower, comms room
- Level 5 to Level 35: Self-contained serviced apartments and studios, store room
- Roof: Internal plant area, external plant area

5.0 LOCATION OF GYM

The proposed gym is to be located internally on Level 2 of the building. Figure 2 shows the proposed layout of the gym.

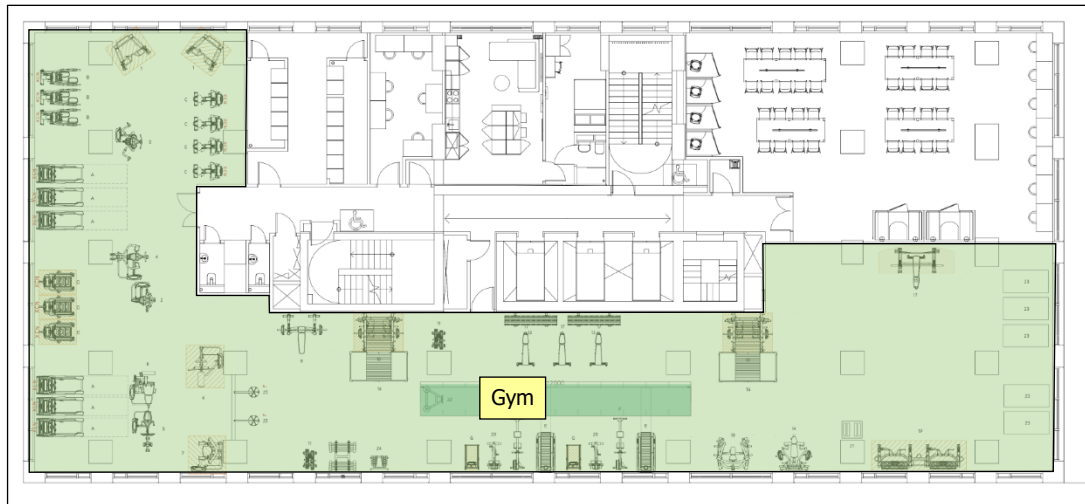


Figure 2: Level 2 plan showing layout of gym

Figure 3 shows the proposed Level 3 plan of the building. The footprint of the gym on the floor below is identified in the red dotted outline. The proposed gym is directly below proposed office and open plan co-working spaces. Level 3 is currently an empty shell as the fit-out works to Level 3 have not yet commenced.

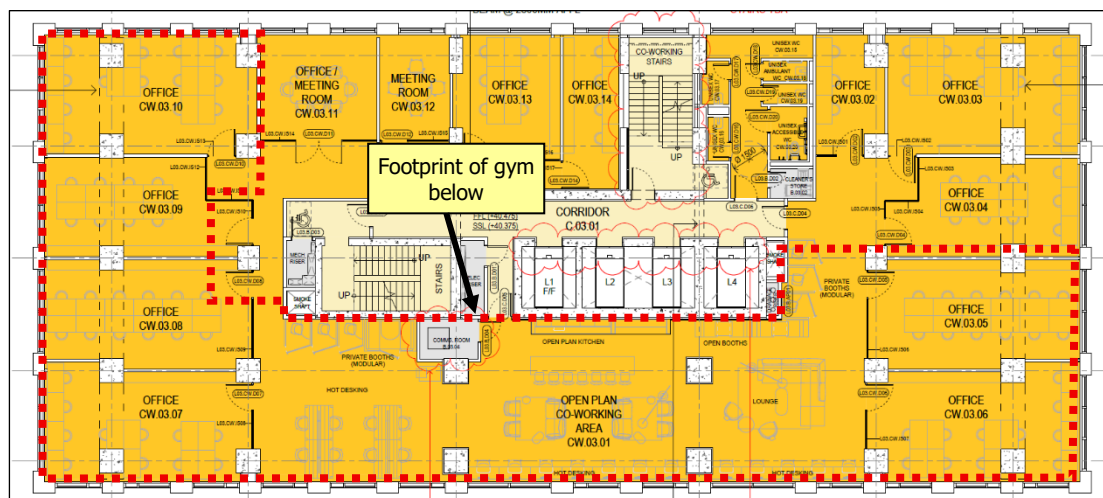


Figure 3: Level 3 plan showing footprint of gym below

The residential units within the building are located at Level 5 and above. Figure 3 shows the Level 5 layout. The footprint of the gym at Level 2 is outlined in red.



Figure 4: Level 5 plan showing footprint of gym below

6.0 NOISE SENSITIVE RECEPTORS

Figure 5 identifies the nearest noise sensitive receptors to Union T2. The buildings that are not identified as 'noise sensitive receptors' in Figure 5 are at a greater distance from the proposed gym than the identified receptors and are subject to similar or greater levels of pre-existing ambient noise. It should be noted that Union T2 itself is a noise-sensitive receptor due to the residential rooms at and above Level 5 of the building. These residential rooms at Union T2 are substantially closer to the gym than any other building in the area, such that if satisfactory conditions are expected at the Union T2 residential rooms, then satisfactory conditions can also be expected at any other buildings.

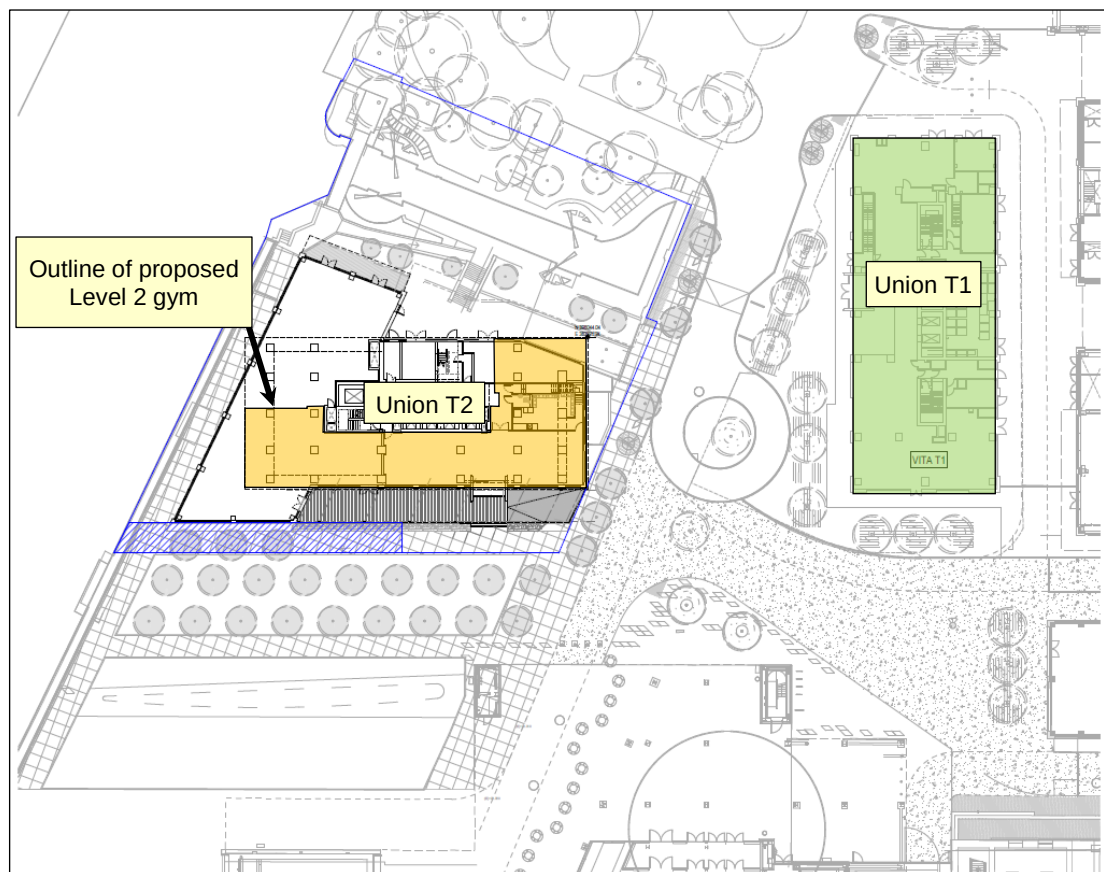


Figure 5: Noise sensitive residential receptors in the vicinity of the development

7.0 ENVIRONMENTAL NOISE SURVEYS AND EXTERNAL NOISE CRITERIA

Gym activity noise breakout limits

With regard to noise break-out from an 'entertainment venue' to residential properties that are structurally detached, 'Planning & Noise, Technical Guidance' (October 2022) issued by Manchester City Council states:

- 'A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

Entertainment noise ($L_{Aeq,5 \text{ min}}$) should be controlled to 5dB below the typical background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location'.

Although the gym is not an 'entertainment' space, it is to be provided with a sound system with the ability to play background music. It is therefore appropriate to design to the noise levels identified in the above guidance.

In order to determine the prevailing ambient and background noise levels at and around the site, a daytime and night-time noise survey of the existing noise environment at the site was out by Fisher Acoustics between 13:35 on Friday 26 April 2024 and 11:50 on Tuesday 30 April 2024.

The measurement location used for the survey is identified on Figure 6 and is described below.

- Water Street elevation of Union T2, at a microphone height of 26 m above ground level, 1m from the facade

The long-term background noise levels at and around the site is determined primarily by distant road traffic.

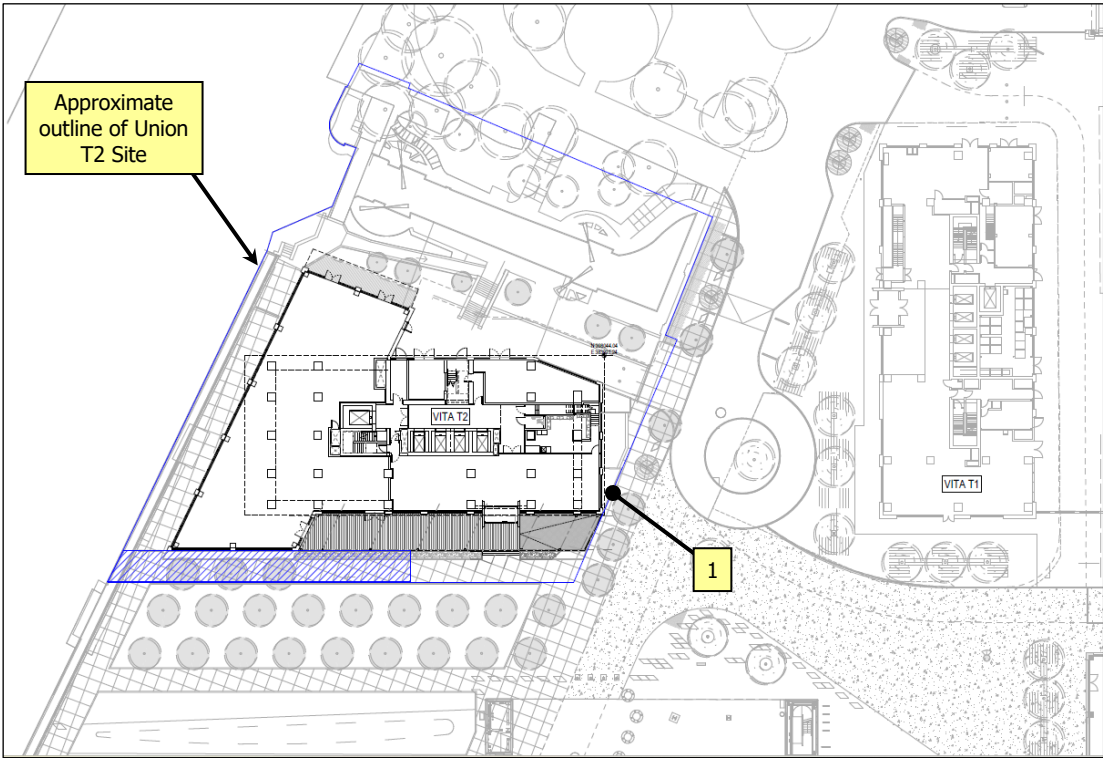


Figure 6: Noise survey measurement location

The measured noise levels during the day and night are summarised in Table 1.

Date	Measured Noise Level					
	Daytime (defined as 0700 to 2300)			Night time (defined as 2300 to 0700)		
	dB, LAeq	dB, LAmax	dB LA90	dB, LAeq	dB, LAmax	dB LA90
Friday 26 April 2024	55	62 to 83	47 to 61	52	48 to 79	43 to 58
Saturday 27 April 2024	54	53 to 77	47 to 60	51	48 to 76	43 to 55
Sunday 28 April 2024	54	53 to 84	46 to 57	52	49 to 73	44 to 56
Monday 29 April 2024	58	56 to 86	49 to 69	53	56 to 87	44 to 56
Tuesday 30 April 2024	56	57 to 72	51 to 66	-	-	-

Table 1: Summary of measured environmental noise levels

The statistical noise levels ('LAmax' and 'LA90') given in Table 1 show the range of noise levels measured over the sample periods. The quoted average (LAeq) noise levels are the average noise levels measured over the full measurement periods in question at each measurement position.

From the results of the external noise surveys, the typical lowest prevailing background noise levels have been determined and are identified in Table 2.

Period	Sound Pressure Level (dB L90) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00 to 23:00) – Sunday 28 April 2024	46	46	48	44	45	38	24
Night time (23:00 to 07:00) – Friday 26 April 2024	43	46	45	40	40	33	22

Table 2: Typical lowest background noise levels at sensitive receptors close to the proposed gym

Table 3 identifies the maximum allowable cumulative daytime and night time free-field external noise levels at the closest residential façades due to activity noise from the gym to comply with the guidance published by Manchester City Council.

Period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00 to 23:00)	43	41	43	39	40	33	19
Night time (23:00 to 07:00)	43	41	40	35	35	28	17

Table 3: Maximum allowable external music noise levels due to proposed gym

Although the expected operating hours of the gym are 07:00 to 22:00, night time noise limits have been provided above for completeness.

8.0 INTERNAL NOISE TRANSFER

'Planning & Noise, Technical Guidance', dated October 2022 has been issued by the Environmental Protection, Environmental Health and The Neighbourhoods Service sections of Manchester City Council. The document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development.

With regard to entertainment venues, the document states:

- 'When considering the potential impact of a proposal for an entertainment venue, consultants should consider the overall noise level (LAeq) and the 63 Hz and 125 Hz octave band noise levels (Leq). Music noise in the 63 Hz and 125 Hz octave bands, which is often described as "bass noise", is particularly difficult to contain and the impulsive character of this low frequency music noise is particularly disturbing for local residents exposed to it'.
- a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:

'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively'.

Although the gym is not an 'entertainment venue', it is to be provided with a sound system with the ability of playing background music. It would therefore be appropriate to design to the music noise levels identified in MCC's guidance document.

MCC's guidance document does not provide allowable noise levels at frequency bands above 125 Hz. However, section 3.7.1.2 'Entertainment Venues' of the document states that in relation to entertainment noise 'the [NR15] curve may be too stringent at mid and higher frequencies'. It is therefore suggested that at frequency bands above 125 Hz, the allowable noise level in apartments due to entertainment (music) noise from adjoining amenity spaces lies between NR15 and NR20.

With reference to the above, it is recommended that the internal noise levels within a residential dwelling within Union T2 due solely to music replay in the gym does not exceed the values given in Table 4.

Location	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Residential dwellings within Union T2	47	41	26	20	17	15	12

Table 4: Maximum recommended noise levels in residential units due to music replay in gym

In order to avoid disturbance to the non-residential areas of Union T2, it is recommended that noise levels within the amenity spaces at Level 1 and the co-working spaces at Level 3 do not exceed the values given in Table 5 due solely to airborne noise transfer from the proposed gym. Compliance with the noise limits in Table 5 should achieve the near-inaudibility within the non-residential areas of airborne noise from the gym on the basis that there will be a degree of ambient noise in the non-residential spaces due to the normal operation of building services systems.

Location	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Non-residential areas within Union T2	50	40	32	25	20	15	15

Table 5: Maximum recommended noise levels in non-residential areas due to music replay in gym

As identified in Figure 4 above, the closest residential dwellings within the building are located three storeys above the proposed gym. Therefore direct noise transfer via a common separating floor is not a concern. However, there is the possibility of internal structureborne noise transfer between the gym and the apartments above via the concrete frame of the building.

The party floor between the gym and the Level 1 and Level 3 non-residential areas is a 275 mm thick flat concrete slab. Given the party floor slab and associated structures, Table 6 identifies the calculated maximum allowable music noise levels that could be generated in the gym without exceeding the noise limits given in Table 4 and Table 5.

Room	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Gym	80	80	79	74	75	70	70

Table 6: Maximum allowable noise levels in gym– re internal noise transfer

The music noise levels identified in Table 6 would allow background music replay in the gym, whilst achieving compliance with the criteria given in Tables 4 and 5 above.

9.0 ACTIVITY NOISE BREAKOUT FROM GYM

Noise egress calculations have been carried out to determine the expected noise level at the closest residential properties due to activity noise breakout from the proposed gym. The gym is to be a fully mechanical ventilated and cooled space such that the opening of windows and doors is not required to ventilate the space. Therefore, the determinant of the sound insulation performance of the external envelope will be the glazed curtain wall.

The installed curtain wall to the proposed gym is fitted with double glazing of minimum weighted sound reduction index 48 dB Rw. The expected minimum weighted sound reduction index octave band values of the curtain wall system are given in Table 7.

Building element	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Gym curtain wall	26	31	36	39	42	43	50

Table 7: Expected sound reduction index of gym curtain wall

Calculations have been carried out to determine the external noise level at the closest residential receptors to the gym on the basis that the allowable internal noise levels given in Table 6 are generated. Table 8 identifies the calculated external noise levels.

Location	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Union T1, West Façade, Level 2	22	20	26	12	13	7	5
Union T2, South Façade, Level 5	38	29	28	12	13	7	5

Table 8: Calculated external noise levels due to maximum allowable internal noise level – gym

Comparison of the values in Table 3 and Table 8 shows that the calculated external noise levels due to music noise breakout from the gym are lower than the applicable external noise limits. Therefore compliance with both the daytime and night time external noise limits is fully expected given the internal noise levels within the gym.

10.0 IMPACT SOUND TRANSFER FROM GYM

There is the potential for disturbance of residents due to the dropping of weights on the floor of the proposed gym. There is no statutory performance requirement in relation to the transfer of noise from gyms to residential areas. However, guidance has been jointly published by the Institute of Acoustics, the Association of Noise Consultants and the Chartered Institute of Environmental Health. In particular, ‘ProPG: Gym Acoustics Guidance’, published in March 2023, provides suggested maximum noise levels in residential dwellings due to both airborne and impact noise transfer from gyms.

(The guidance document also provides suggested maximum noise levels due to airborne noise transfer from gyms. However, the values in Table 4 to comply with the recommendations of Manchester City Council are more onerous than the upper noise limits of ‘ProPG: Gym Acoustics Guidance’ for daytime airborne noise transfer to residential areas and similar to the upper noise limits of ‘ProPG: Gym Acoustics Guidance’ for night time airborne noise transfer to residential areas. Therefore, the Manchester City Council noise limits have been designed to in relation to airborne noise transfer).

Table 9 identifies the applicable criteria for residential areas, with reference to the ‘G curves’ presented within ProPG: Gym Acoustics Guidance. G curves provide a way to reference sound spectra data in a single figure.

Receptor Type	Guide Criteria	
	Airborne Sound (e.g. music) Leq, T (31.5Hz to 8kHz)	Heavy Impact Sound Lmax,F (31.5Hz to 8kHz)
Residential Areas	G15-G25 (day)	G20-G25 (day)
	G10-G20 (night)	G15-G20 (night)

Table 9: Guidance Internal Sound Target Criteria for Gym Activity – Residential

The ProPG guidance relates to all gyms, including commercial gyms. It could therefore be argued that the guidance is necessarily more onerous than needs to be the case for a gym that is solely for the use of the residents of the building, as the users of a residents-only gym can be instructed in the safe use of weights such that the dropping of weights on the floor does not occur frequently.

To date, the client has applied this method along with the installation of high performance proprietary resilient flooring, to successfully mitigate potential impact noise in numerous developments. On this basis, it would not normally be proposed to design fully for the impact noise targets of the ProPG.

However, it is understood that Manchester City Council's preference is that the guidance values of the ProPG document are targeted.

Free Weights area

The dropping of free weights such as dumbbells and kettlebells typically generates the highest levels of structureborne impact noise from a gym. Figure 7 shows the proposed free weights benches and racks within the gym.

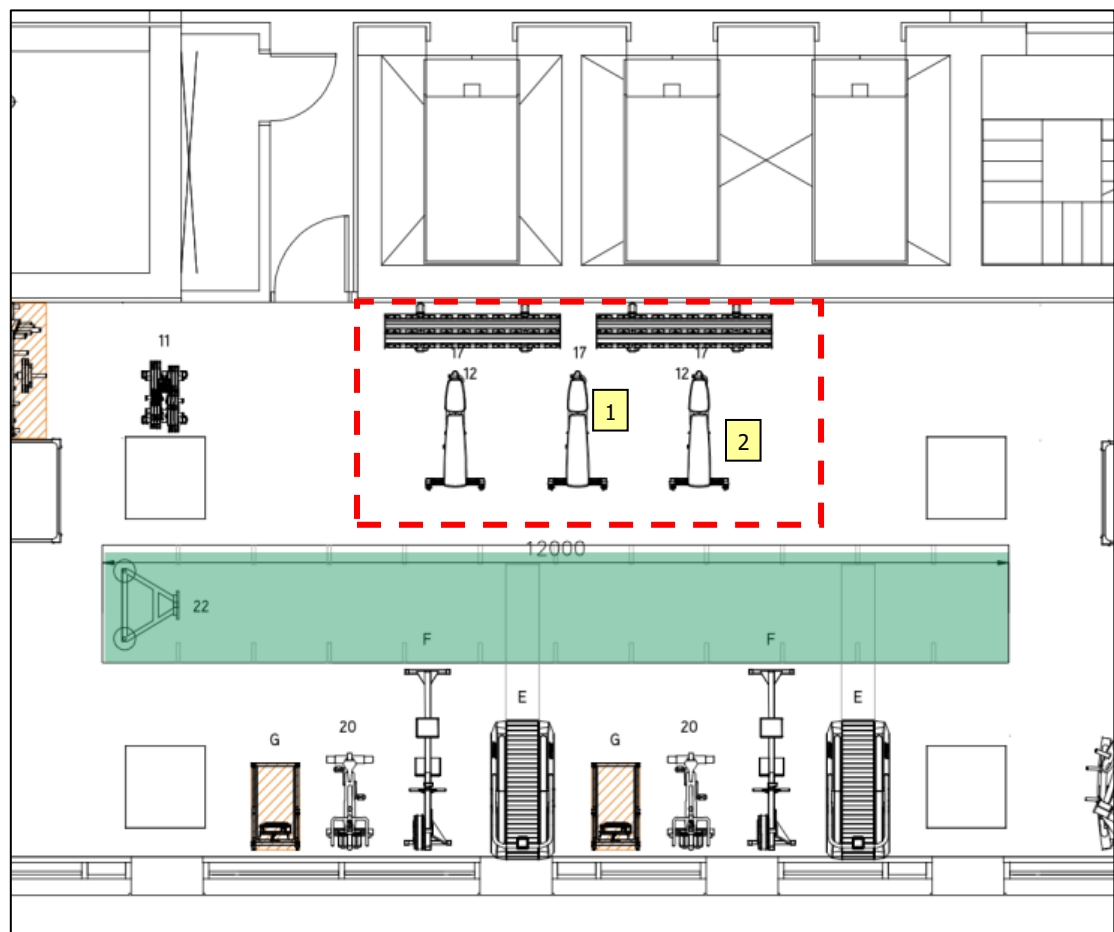


Figure 7: Level 2, Free Weights Area of Gym

Reasonable mitigation of impact noise due to the dropping of free weights can be achieved by the installation of proprietary resilient floor coverings in the weights area of the gym.

Measurements of impact noise transfer have been carried out to determine the potential impact noise levels in the residential areas at Level 5 due to weight drops within the proposed free weights area and to assess the impact sound insulation performance of a potential gym flooring system.

The potential proprietary resilient gym floor covering in the free weights area and below weight resistance machines is as follows.

- GenieMat FIT70 (70 mm thick) on GenieMat FF25 (25 mm thick) by Pliteq

A 20 kg kettlebell, dropped from a height of 0.5 m was used to generate impact noise on the gym flooring. The noise levels generated by the impacts on the proposed floor system were measured in Bedroom C of Apartment 5.08 that lies above the free weights area.

The maximum (L_{max}) noise levels generated by repeated impacts on the floor covering at locations 1 and 2 identified in Figure 7 was measured.

Bedroom C of Apartment 5.08 was furnished at the time of the testing. The measured noise levels have therefore not been corrected in relation to reverberation time.

Figure 8 identifies the results of the impact sound testing in Apartment 5.08, Bedroom C and also identifies the daytime G25 curve to allow a comparison with the recommendations of the ProPG document.

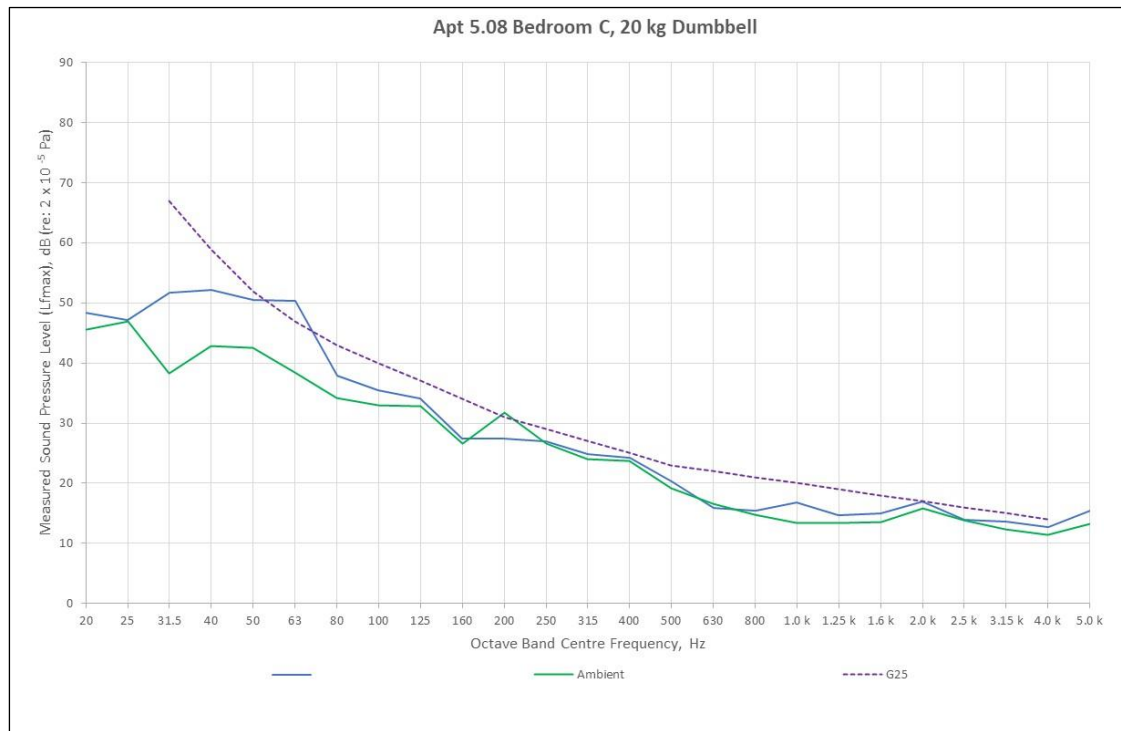


Figure 8: Measured impact sound levels due to 20 kg kettlebell weight drops - Apartment 5.08, Bedroom C

It can be seen that the measured impact sound levels due to the weight drops are less than the G25 curve in all but one 1/3 octave frequency band. The small exceedance is not considered to be significant.

Compliance with the recommendations of the ProPG document relating to the dropping of free weights is therefore expected given the potential floor finish in the weights area of the gym.

‘Functional’ gym area

The functional area of the gym is to be provided with treadmills. With regard to the potential for ‘Synchronised Repetitive Excitation’ (SRE) of a gym floor and structure due to the use of treadmills, Section 3.5.3 of the ProPG guidance states:

3.5.3 SRE Testing Method

Synchronised Repetitive Excitation would typically occur in Gyms where people are running/stepping together. Estimates of the response factor and complementary heel-drop tests as described in SCI P354 can assist to determine if the structural floor is dynamically sensitive to footfall excitation.

Walk-by or running (with flat-footed style) to a metronome set typically to 160 steps per minute (to represent 11km/hr) are ways that have been used by members of the Working Group to explore this, but it is the experience of the Working Group that this is not commonly done and is usually dealt with by a combination of the isolation within treadmills and also the floor treatment. It should be for the SQA to use their experience to advise in this regard, as it is the Working Group’s view that this remains very hard to standardise.

As stated above, the ProPG relies on the ‘Suitable Qualified Acoustician’ to advise on control of SRE as there is no standardised testing method for treadmills.

Acoustic treatment of treadmills and resistance machines

Treadmills and weights machines can be provided with individual isolation pads to control impact noise to the adjacent areas and residential areas above. Such mounts can be installed retrospectively if required. Suitable products include:

- 1) TVS Impact Absorbers
- 2) Pliteq GenieMat TMIP (treadmill isolators)
- 3) Pliteq GenieMat WSI (weight stack isolators)

In the Functional area of the gym, it is recommended that any floor covering achieves a minimum impact sound reduction of 16 dB dLw. Treadmills and weights machines can be provided with individual isolation pads to control impact noise to the adjacent areas and residential areas above. Such mounts can be installed retrospectively if required. Suitable products include:

- 1) TVS Impact Absorbers
- 2) Pliteq GenieMat TMIP (treadmill isolators)
- 3) Pliteq GenieMat WSI (weight stack isolators)

Notwithstanding the above advice, the generation of SRE has not been reported in any similar residential gym to that proposed within concrete framed buildings.

11.0 CONCLUSION

The expected internal airborne noise levels within the gym are such that compliance with guidance published by Manchester City Council in relation to internal noise transfer and external noise breakout is fully expected.

Potential impact noise from the gym due to the dropping of weights is to be controlled by the provision of high performance proprietary resilient gym floor coverings specifically designed to reduce low frequency impact noise, such that acceptable levels of noise are expected in the residential areas above the gym.

Adverse impacts due to Synchronised Repetitive Excitation of the gym structure is not expected given the proposed structure and the option to install treadmill isolation pads if necessary.