

fisher acoustics

House Of Social, Manchester

Gym Noise Impact Assessment

November 2024

Report Reference: HS-FAC-A180-RP-00-001 P01

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PROJECT TITLE	HOUSE OF SOCIAL, FIRST STREET, MANCHESTER
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REPORT TITLE	GYM NOISE IMPACT ASSESSMENT
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CLIENT	RENAKER BUILD LTD
	1 ST FLOOR
	NQ BUILDING
	47 BENGAL STREET
	MANCHESTER
	M4 6BB

REPORT REFERENCE	HS-FAC-A180-RP-00-001 P01
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1.0 SUMMARY

Fisher Acoustics Ltd has been commissioned by Renaker Build Limited to conduct a Gym Noise Impact Assessment to respond to condition 12 of the planning approval for the House of Social, First Street, Manchester (planning reference 136170/FO/2023).

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

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

Fisher Acoustics Ltd has been commissioned by Renaker Build Limited to conduct an assessment of the potential impact of noise from the proposed gym on the ground floor of the House of Social student residential development at First Street, Manchester. The development will provide purpose-built student residential accommodation from 1st to 13th floor with communal amenities at ground floor and first floor.

This report responds to condition 12 of the planning approval for the development. In particular, the report advises on the maximum allowable internal noise levels within the gym to achieve compliance with the noise criteria stipulated in the planning condition.

An assessment of airborne and impact sound transmission from the proposed gym to the residential and non-residential spaces above is also provided.

3.0 DESCRIPTION OF SITE

General Site Description

House of Social is located at Plot 10B of the First Street Development Framework, Manchester and is bounded by River Street to the north and east, Hulme Street to the south and Plot 10A to the west. Plot 10A has planning approval for a 13-storey office building (planning reference 136043/FO/2023).

Other uses around the site include residential buildings, a hotel, offices, the 'Home' arts centre and bars at the northern perimeter of the First Street development. A main railway route into Manchester centre is located along the northern boundary of the overall First Street development site. Further to the south of the site lies the Mancunian Way (A57(M)). The Mancunian Way (A57(M)) and Medlock Street are major roads that are heavily trafficked. River Street and Hulme Street are relatively lightly trafficked side streets that provide local access. Figure 1 shows the overall Site in the context of the surrounding roads and buildings.

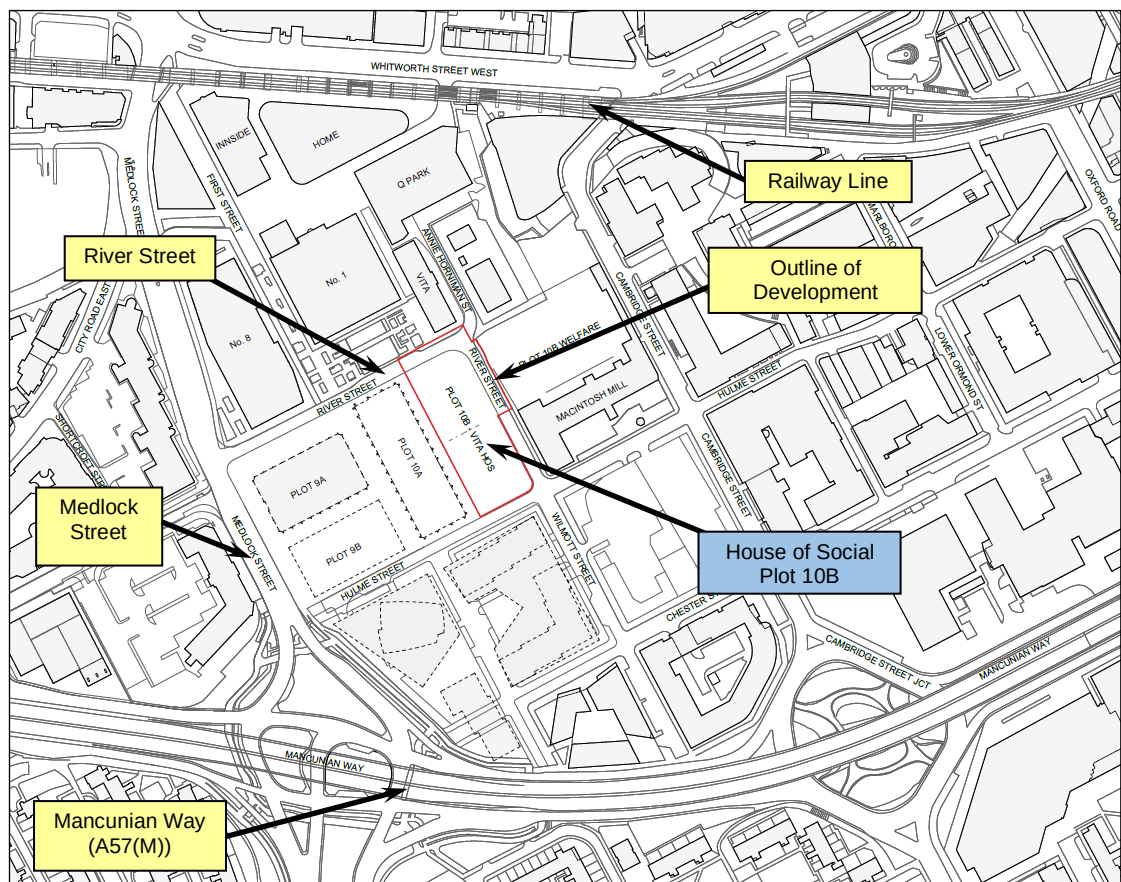


Figure 1: Site location plan – Plot 10B, House of Social, First Street

4.0 LOCATION OF GYM

The proposed gym is to be located internally on the ground floor of Plot 10B, House of Social. Figure 2 shows the position of the gym.

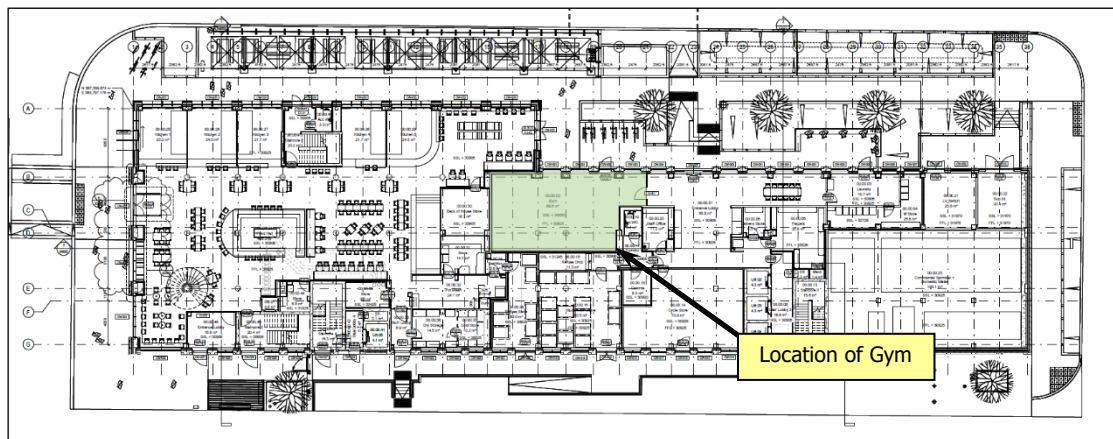


Figure 2: Ground floor plan showing location of gym

Figure 3 shows the 1st floor areas directly above the gym. The footprint of the gym on the floor below is identified in green. It can be seen that the gym is only directly below half of one residential room (room number 01.01.02, identified by the word 'Enhanced').

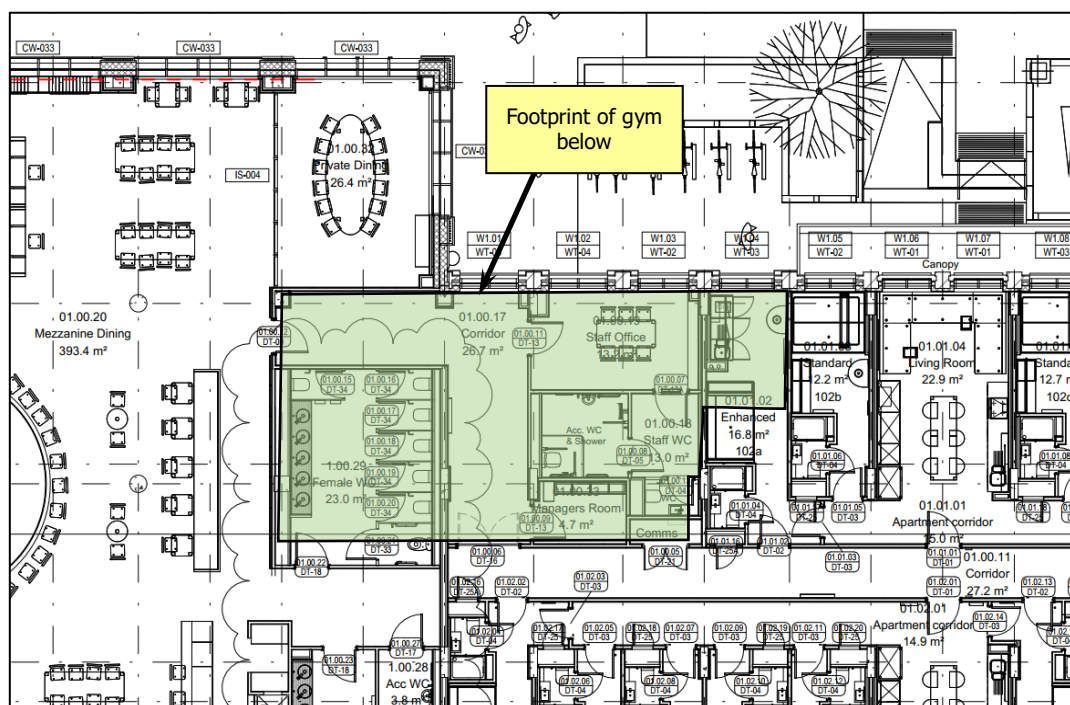


Figure 3: First floor plan showing footprint of gym below

5.0 PLANNING CONDITION

Planning condition 12 of the Planning Permission for Plot 10B, reference: 136170/FO/2023, dated 1 March 2023, states:

- *'12) Notwithstanding the details within the First Street Plot 10a Noise Impact Assessment First Street Developments Limited Ref PLOT10A-XX-XX-RP-Y-45001 P03 12 January 2023 by Cundall stamped as received on 17-02-23 before use of the gym area as shown in dwg 1172-TGA-XX-00-DR-A-95030 P05 commences a scheme for acoustically insulating the space to ensure that there is no unacceptable level of noise transfer from this unit to the PBSA above or any unacceptable noise break out shall be submitted to and approved in writing by the City Council as local planning authority.*

Noise from gym activities such as impact machines and free weights areas will need to be included within the assessment and details of any acoustic insulation / acoustic floor build up recommendation for these areas. Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 5dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location.

The approved noise insulation scheme shall be completed before the use of the gym commences. The approved details shall be implemented and remain in place for as long as the unit is in use.

Prior to the use commencing a post completion report to verify that all of the recommended mitigation measures have been installed and effectively mitigate any potential adverse noise impacts in adjacent residential accommodation arising directly from the proposed development shall be submitted and agreed in writing by the City Council as local planning authority. Prior to occupation any non compliance shall be suitably mitigated in accordance with an agreed scheme.

Reason - To secure a reduction in noise in order to protect future building occupiers from noise nuisance, pursuant to policies SP1 and DM1 of the Core Strategy and saved UDP Policy DC26.

6.0 NOISE SENSITIVE RECEPTORS

Figure 4 identifies the nearest noise sensitive receptors to House of Social. The buildings that are not identified as 'noise sensitive receptors' in Figure 4 are at a greater distance from the proposed development than the identified receptors and are subject to similar levels of pre-existing ambient noise. Thus, if satisfactory conditions are expected at the assessed receptors, then satisfactory conditions can also be expected at any other buildings.

It should be noted that House of Social itself is a noise-sensitive receptor due to the residential dwellings at and above Level 1 of the building.

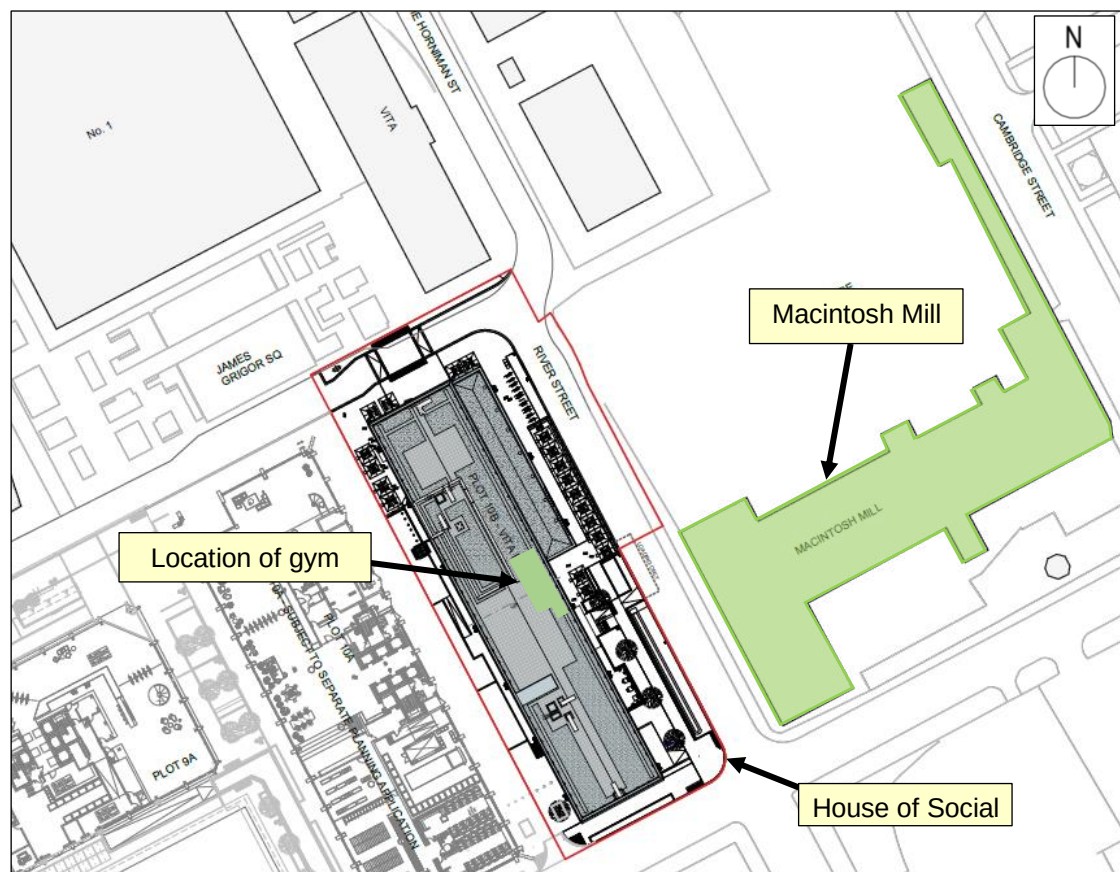


Figure 4: Noise sensitive receptors in the vicinity of the development

7.0 ENVIRONMENTAL NOISE SURVEYS AND EXTERNAL NOISE CRITERIA

The Environmental Impact Assessment that was conducted as part of the planning submission for Plot 10B included noise surveys at and around the site. The results of the noise surveys allow the establishment of the maximum allowable external noise levels at the closest noise sensitive receptors due to activity noise breakout from the gym. Appendix 10.3 of the Environmental Statement for Plot 10B identified these allowable noise levels (planning reference 136170/FO/2023).

Gym activity noise breakout limits

The environmental noise report submitted as part of the planning application for the development identifies the specific external noise levels that must not be exceeded at the nearest residential properties. In particular, Table 1 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 planning condition 12.

Period	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00 to 23:00)	55	48	45	34	46	38	26
Night time (23:00 to 07:00)	45	38	38	34	33	25	16

Table 1: Maximum allowable external music noise levels due to proposed gym

Although the proposed 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'. This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue

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, in order to comply with the requirements of condition 12, it is recommended that the internal noise levels within a studio due solely to music replay in the gym does not exceed the values given in Table 2.

Location	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Studios above gym	47	41	26	20	17	15	12

Table 2: Maximum recommended noise levels in residential studios due to music replay in gym

As identified in Figure 3 above, there is one residential studio that lies immediately above the proposed gym and there are other studios on Level 1 in reasonable proximity to the gym. There is therefore the possibility of internal noise transfer between the gym and the apartments above via the party floor structural slab.

The party floor between the gym and the apartments directly above is a 225 mm thick flat concrete slab. Given the party floor slab and associated structures, Table 3 identifies the calculated maximum allowable music noise levels in the gym without exceeding the noise limits given in Table 2 in the residential rooms.

Room	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Gym	83	79	72	73	75	75	80

Table 3: Maximum allowable noise levels in gym– re internal noise transfer

The allowable music noise levels identified in Table 3 would allow background music replay in the gym, such that compliance can be achieved with the guidance published by Manchester City Council.

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 spaces. Therefore, the determinant of the sound insulation performance of the external envelope will be the glazed curtain wall.

The glazing specification to the gym curtain wall, installed as part of the main construction contract for House of Social, is as follows:

- Double glazing of 11.5 mm laminated glass / 16 mm cavity / 6 mm float glass

The expected minimum weighted sound reduction index values of the curtain wall when glazed with the above glazing specification are given in Table 4.

Building element	Sound Reduction Index (dB) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Curtain wall, glazed with 11.5 mm laminate/16 mm cavity/ 6 mm float	24	26	29	34	40	41	45

Table 4: 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 3 are generated. Table 5 identifies the results of the calculations.

Location	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Macintosh Mill west façade	25	14	10	8	8	9	8
House of Social Level 1 studio, east façade	37	21	13	8	7	8	8

Table 5: Calculated external noise levels due to maximum allowable internal noise level – gym

Comparison of the values in Table 1 and Table 5 shows that the calculated external noise levels due to music noise breakout from the gym are substantially lower than the applicable external noise limits. 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 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. In addition, the ProPG publication post-dates the planning submission date for the development at House of Social.

On this basis, it is not proposed to design for the impact noise targets of the ProPG. However, reasonable and practicable measures are proposed to mitigate occasional weight drops by users, as described below.

Figure 5 shows the proposed equipment layout within the gym. The proposed free weights area is highlighted.

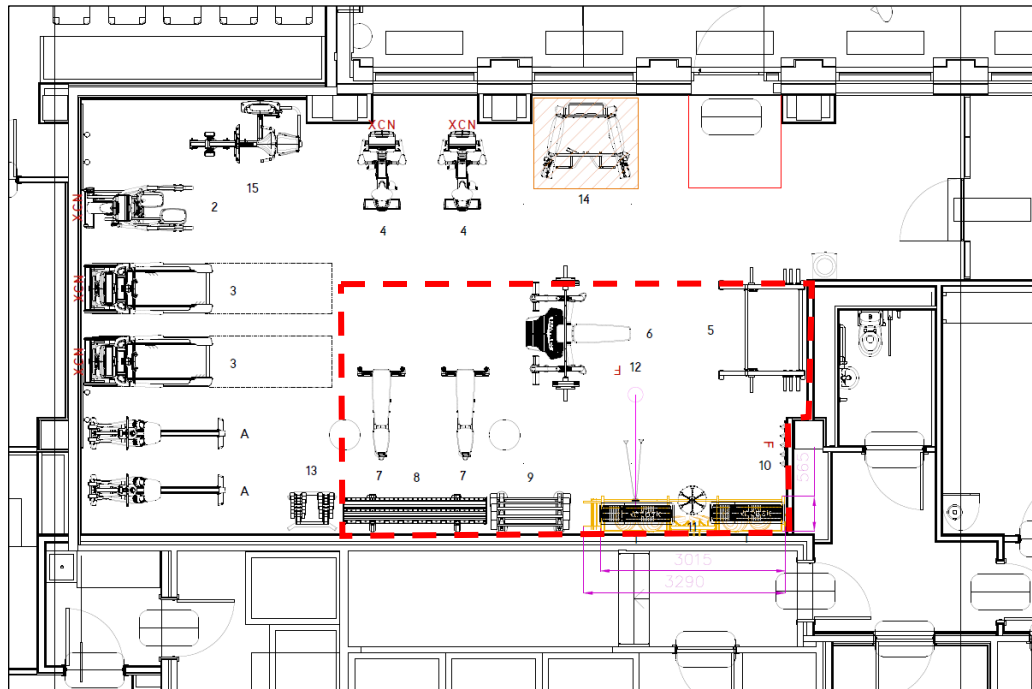


Figure 5: Ground floor, Gym floor plan

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

The proposed resilient floor covering in the weights area identified in Figure 5 is identified below.

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

The proposed resilient floor covering in all other areas of the gym is identified below.

- GenieMat FIT70 (70 mm thick)

The resilient floor coverings in the gym are expected to achieve maximum impact sound levels (L_{max}) in the residential studios above the gym that are approximately 6dB greater than the recommended maximum daytime impact sound levels in residential areas identified in the ProPG guidance due to the typical dropping of free weights (e.g. 20 kg dumbbells dropped from a height of 500 mm). This level of performance is expected for weights benches that are located close to columns.

The identified level of performance relative to the recommendations of the ProPG document is considered acceptable as the building management will be able to influence the conduct of gym users such that weight drops occur infrequently.

11.0 CONCLUSION

The expected internal noise levels within the gym are such that compliance with the requirements of condition 12 in relation to internal noise transfer and external noise breakout are 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.

Therefore, compliance with planning condition 12 is fully expected due to operation of the proposed gym.