

42632-T38v2

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Dear Jennifer

Cornbrook Hub - Planning Condition 27a - noise break-in from Gym and Retail unit

This letter sets out the assessment of noise break-in to demonstrate compliance with planning condition 27a which is reproduced below:

"27) Notwithstanding the Noise Impact Assessment prepared by REC stamped as received by the City Council, as Local Planning Authority, on the 21 December 2017, (a) prior to the first use of the commercial unit and gym within phase one a scheme of acoustic insulation shall be submitted for approval in writing by the City Council, as Local Planning Authority."

1.0 Internal noise level criteria

Manchester City Council's (MMC) Planning & Noise Technical Guidance, Dec. 2015 states the following limits for internal noise levels in habitable rooms:

"Manchester City Council has adopted the following internal noise limits for residential properties:

- *Bedrooms (night time - 23.00 - 07.00) 30 dB L_{Aeq} (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ by more than 15 times)*
- *Living Rooms (daytime - 07.00 - 23.00) 35 dB L_{Aeq}*
- *Gardens and terraces (daytime) 55 dB L_{Aeq} "*

The internal noise limits specified in the Local Authority guidance document are in line with the guidance for internal noise limits given in BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'.

The criteria represents the total noise level from all sources, averaged over the stated time period. This means that the internal ambient noise level can exceed 35 dB during the day and 30 dB at night for short durations. Maximum noise levels can exceed L_{AFMax} 45 dB up to 15 times per night.

2.0 Level 15 Gym

2.1 Airborne noise from gym equipment

We measured noise levels from a 'multi-gym' (shoulder/leg press combined) and a treadmill. The maximum sound pressure levels (L_{Fmax}) measured at 1m from the machine are given below.

Table 1 Measured noise levels for common gym equipment

	Maximum Sound Pressure Level, L_{max} , at 1m							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	L_{AFmax}
Bodycraft multi-gym - weight dropping*	67	67	73	80	92	96	97	102
Bodymax T80 treadmill at 12km/h	72	81	82	76	78	76	66	82

**this was an uncontrolled drop of the weights and represents a non-ideal (and typically "worst") case scenario. Normally the weights would be lowered in a more controlled manner.*

The equipment was situated on a hard floor in a large showroom with a wall in close proximity.

We have used the measured levels to calculate the reverberant sound pressure level in the room in each octave frequency band and used the measured on-site sound insulation of floors similar to those at the development to calculate the level expected in the adjacent apartment in terms of an NR level.

The resulting noise level in the bedroom below would be $L_{AFMax} < 24$ dB which makes the maximum noise events 10dBA below the design target for daytime ambient noise and 6dBA below the design target for night time ambient noise levels in the bedroom below. This will make airborne noise from the gym highly unlikely to be audible. Note that this does not include the contribution of structure-borne noise.

In addition to the sound insulation provided by the floor, users need to be inducted and given appropriate advice to ensure proper usage of the gym equipment to reduce the likelihood of noise generated by uncontrolled weight drops. The gym will also be monitored to ensure that residents are using the equipment properly.

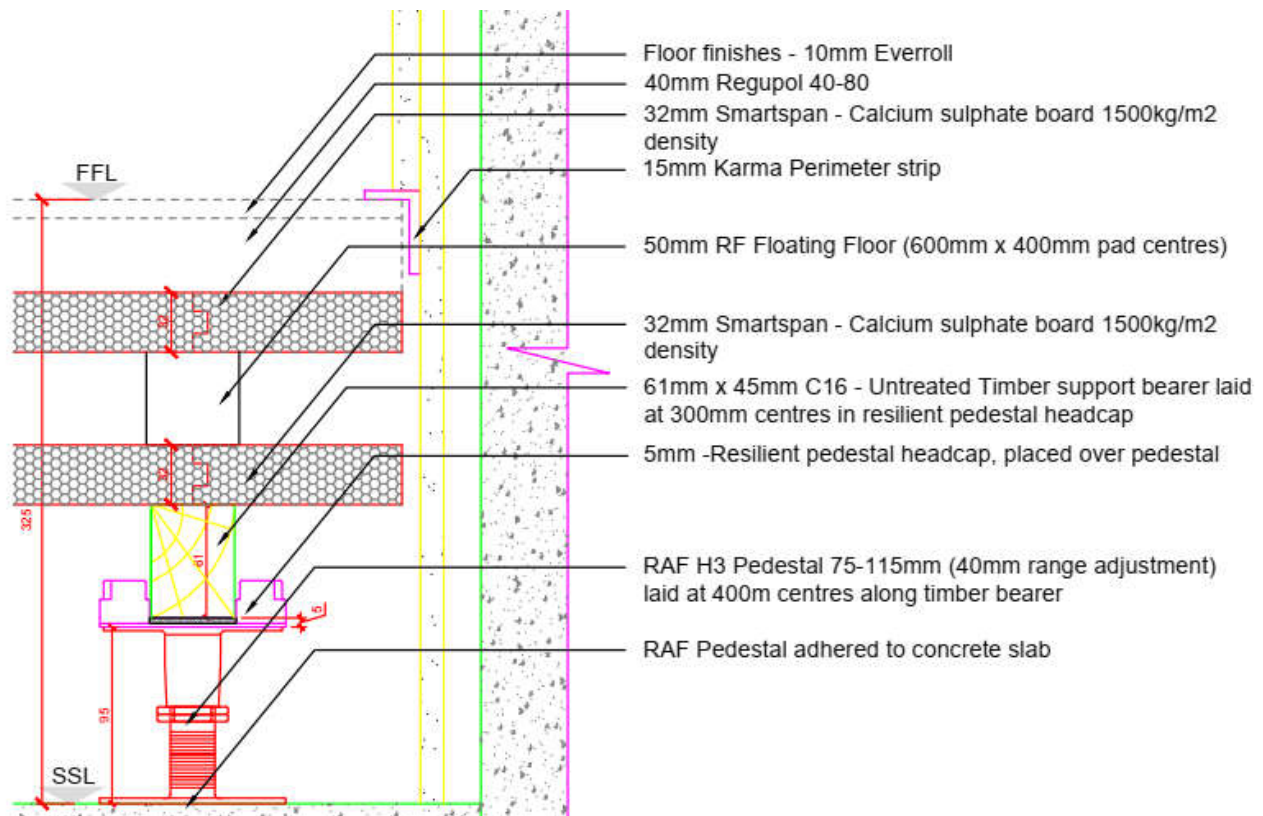
2.2 Airborne noise from sound systems

The gym and residents lounge will have sound systems. The management will have full control of the sound systems to ensure that noise levels produced by the systems will not be excessive, thereby avoiding any disturbance to residents.

2.3 Structure-borne noise

Structure-borne noise will be controlled by the following floor build up which will be installed above the 525mm concrete slab:

Figure 1 Floor build up for gym



Test data measured by the manufacturer for the build-up shown above on a 250mm slab shows that when a 35kg weight is dropped onto the build-up, the resulting maximum noise level is L_{AFMax} structure-borne noise is limited to L_{AFMax} 59 dB. It should be noted that this represents an uncontrolled weight drop which is not considered proper usage.

It is expected that the maximum noise level will be significantly lower than this as the slab thickness at the development is double than what was used in the test and a layer of 32mm Smartspan plus a resilient layer on the pedestals have been introduced into the build up. This additional mass and resilience will reduce the level of impact noise to below.

To further reduce the risk of maximum noise levels exceeding MCC criteria, the gym users will be trained on how to use the equipment and usage will be monitored.

It is expected that MCC's noise criteria will be met during the day and night with the floor build up outlined above and proper use of the gym equipment.

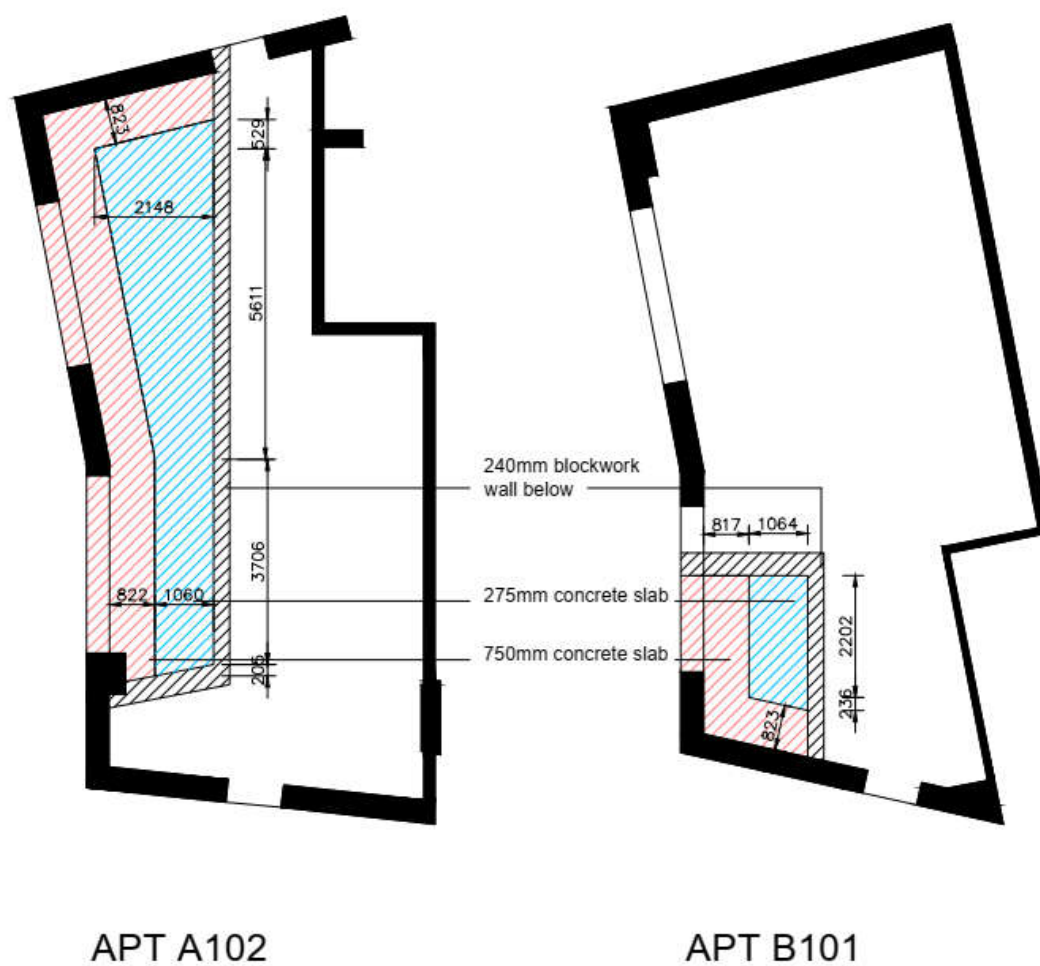
3.0 Ground floor retail unit

The ground floor unit is to be occupied by a supermarket. Noise transfer from the supermarket into apartments above must meet Planning Condition 27. The minimum requirement is to satisfy Part E of the Building Regulations, which stipulates only an airborne sound insulation performance requirement between apartments and "other parts of the building which is not also an apartment" (i.e. retail units). The required sound insulation is $D_{nTw} + C_{tr} \geq 45$ dB.

Decision notice to discharge planning condition 42 (opening hours) requires that the shop must close at 23:00 so noise break-in into the apartments above only needs to meet the daytime noise criteria

Figure 2 presents a section of the floor separating the retail unit and a bedroom above. Figure 2 shows that bedrooms in apartment A102 share the greatest common area with the retail unit.

Figure 2 Areas of slab common to retail unit and apartments



The proposed party floor between the apartment and the retail unit is a concrete slab with a thickness of at least 275mm. This build-up is capable of achieving an on-site performance of $D_{nTw} + C_{tr}$ 45 dB to satisfy Part E of the Building Regulations. Based on the expected sound insulation performance of the slab, the following noise in the retail unit can be generated and still meet L_{Aeq} 30 dB in the bedrooms above:

Table 2 Noise level in retail unit to achieve L_{Aeq} 30 dB in apartments above

Octave band noise level, Hz							dBA
63	125	250	500	1k	2k	4k	
89	85	73	73	72	69	71	78

The noise levels presented in the table above are comparable to that of a busy pub or restaurant. As the unit will be a supermarket, noise levels are expected to be significantly lower than those shown and so the operational noise of the supermarket will be highly unlikely to exceed MCC internal noise level criteria in apartments above.

Yours sincerely,

Jago Edwards

For and on behalf of

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