

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

Our Ref:- ADT 3046/AML

24 June 2020

Hannah Bolton
DK Architects
26 Old Haymarket
LIVERPOOL
L1 6ER

Dear Hannah

Re:- X1 The Plaza, Great Ancoats Street, Manchester – Planning Condition 13

Further to our recent discussions, we are writing to provide the additional information requested by Manchester City Council in respect of the discharge of condition 13 of the planning permission.

Introduction

There is a residents' gym located on the ground floor of the south block. It is a double height space with residential flats above and on the other side of the corridor.

Condition 13 of the planning permission reads:-

"Notwithstanding the noise report prepared by ADT (2251/ENIA) stamped as received by the City Council, as Local Planning Authority, on the 10 September 2015, prior to the first use of the gym (as indicated on drawing 1141-P04 Rev F stamped as received by the City Council, as Local Planning Authority, on the 9 October 2017), details of the acoustic insulation of the gym to prevent noise transfer to the residential hereby approved shall be submitted for approval in writing by the City Council, as Local Planning Authority. The approved details shall be implemented prior to the first use of the gym and thereafter retained and maintained for as long as the development remains in use."

In their response to the information submitted to date, the Council have said that *"...we need to know what mitigation measures have been installed and whether the daytime and night time criteria are being achieved for the living rooms and bedrooms above the gym."*

Discussion

The gym is located in the ground floor of the south block, and is for residents' use only. There will be no amplified music or group classes, so it will be a relatively quiet area. Although the gym is not yet fitted out, the intention is that the equipment will be limited to cardiovascular machines (treadmills, cycles etc.), and a small, free weights area.

Since our original report did not mention the gym, and there are no noise limits stipulated in the planning permission, it is not clear what the Council mean when they refer to the *"... daytime and nighttime criteria "*. But in any event, as the gym will only be open for use during the daytime period, there will be no nighttime impact on the residential accommodation, so it is only the daytime period that requires consideration.

In our original report, we proposed a daytime noise limit of 40 dB $L_{Aeq,16hour}$ for the residential accommodation for external noise intrusion. The planning condition refers to our report and therefore tacitly accepts this as the appropriate criterion. However, in their note dated 17 June 2020, the Council said that they require this criterion to be changed to 35 dB $L_{Aeq,16hour}$.

Noise Mitigation Measures

The architects' drawing 1141/C772 (copy attached) shows a section through the structure which separates the gym from the flats above. Basically, it comprises a 250mm thick solid concrete slab with 500 deep concrete downstand beams and a suspended ceiling below, creating a void of around 750mm between the ceiling and the underside of the concrete slab.

Additionally, the room has full height glazing to the front, comprising 6.4mm laminate and a 6.8mm laminate panes of glass separated by a 16mm cavity. The manufacturer's acoustic performance datasheet is appended to this letter.

Sound Transfer to the Flats Above

On 13 May 2020, Sitma undertook two airborne sound insulation tests of the structure which separates the gym from the second floor flats 206 and 207 directly above. The results are summarised in the following table:-

	Octave Band Centre Frequency (Hz)								$D_{nT,w} + C_{tr}$
	63	125	250	500	1k	2k	4k	8k	
gym to flat 206 bedroom – D_{nT}	40	59	59	66	72	74	64	(65)	66
gym to flat 207 living room – D_{nT}	44	56	54	65	67	68	71	(70)	62
lower value	40	56	54	65	67	68	64	65	66

Note: figures in brackets are estimated

Airborne Sound Transmission through the Floor

As we do not have access to the detailed test data, we cannot accurately calculate the sound level difference (D) from the D_{nT} values tabulated above. However, for the purposes of this discussion, it is reasonable to assume that they are approximately numerically equal, as the reverberation time in a domestic living room or bedroom is likely to be in the order of 0.5 seconds.

The following table therefore adds the measured level difference to the daytime noise criterion for the flats to arrive at the maximum permissible noise level in the gym directly below.

	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
daytime noise level in flat	55	44	35	29	25	22	20	18	35
level difference (from above)	40	56	54	65	67	68	64	65	
permissible level in gym	95	90	89	84	82	90	84	83	93

This demonstrates that the construction will control noise levels of over 90 dB $L_{Aeq,T}$ in the gym to no more than 35 dB $L_{Aeq,T}$ in the flats directly above.

Measurements in commercial gyms around the country have shown that in the absence of any amplified music and group classes, the noise level is typically no higher than 70 dB $L_{Aeq,T}$. At this level, the resultant noise level in the flats above would be below 20 dB $L_{Aeq,T}$, the level commonly taken to correspond to the threshold of audibility. In other words, noise generated in the gym is unlikely to be audible in the flats above.

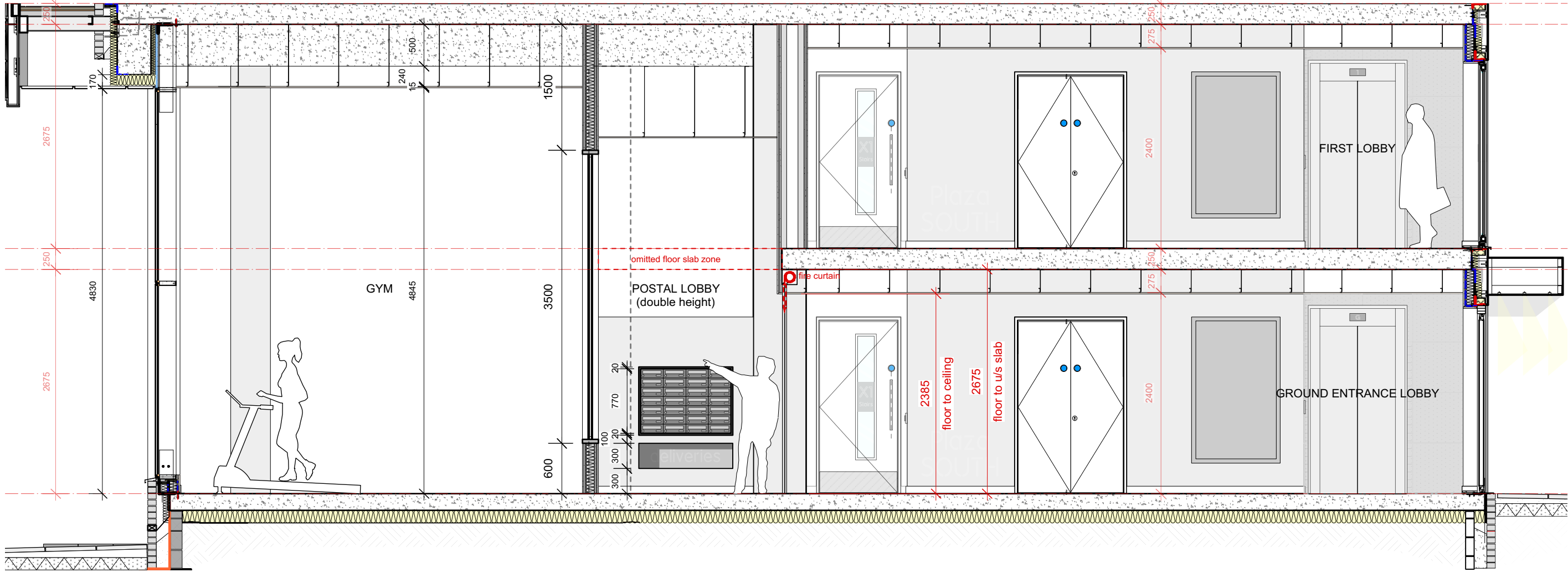
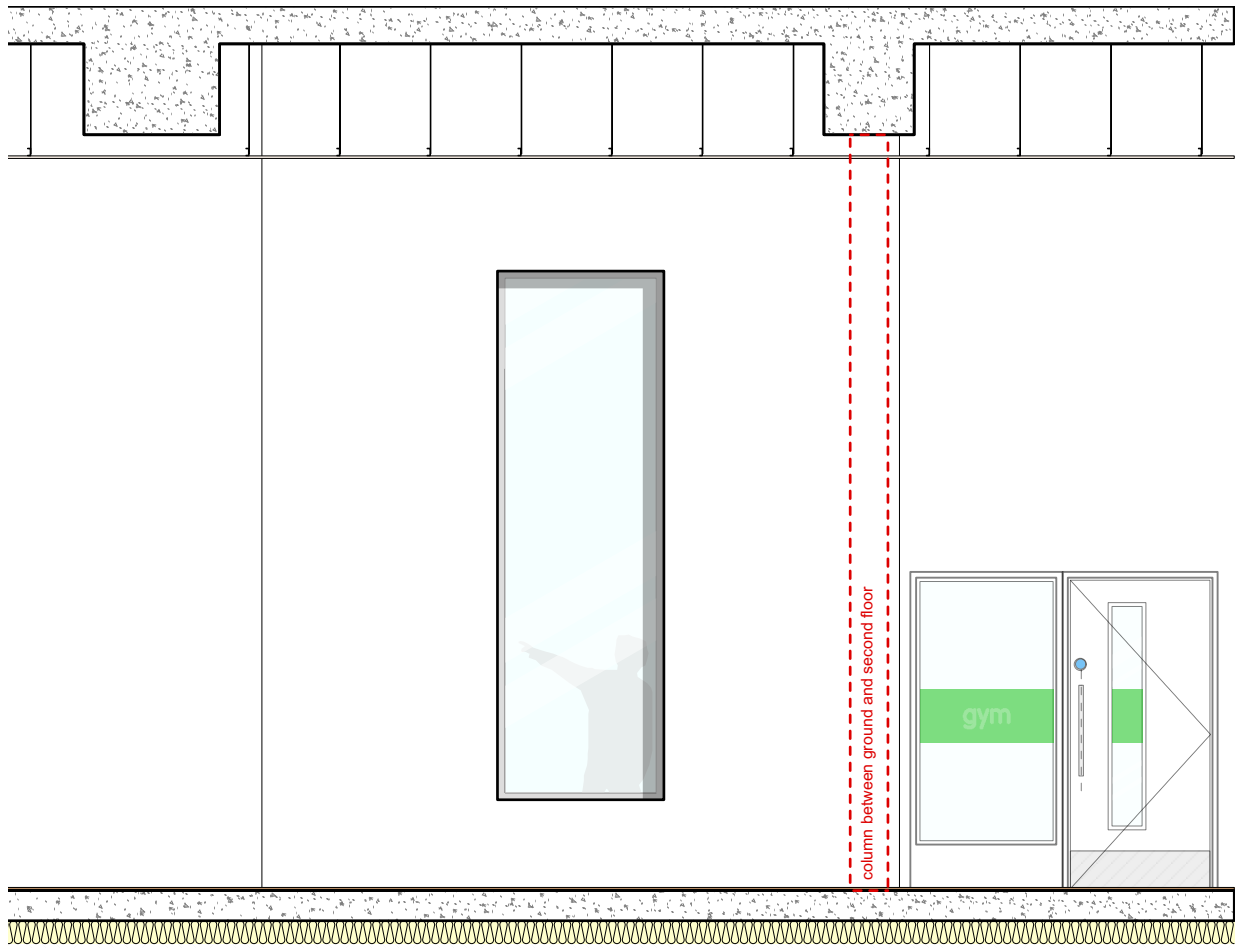
This analysis therefore demonstrates that the separating structure will provide ample sound insulation against gym usage not only during the daytime, but during the nighttime as well, were this ever to occur in the future.

We trust this now provides you with the additional information required to discharge the planning condition. However, please do not hesitate to contact me if I may be of any further assistance.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Andrew', written in a cursive style.

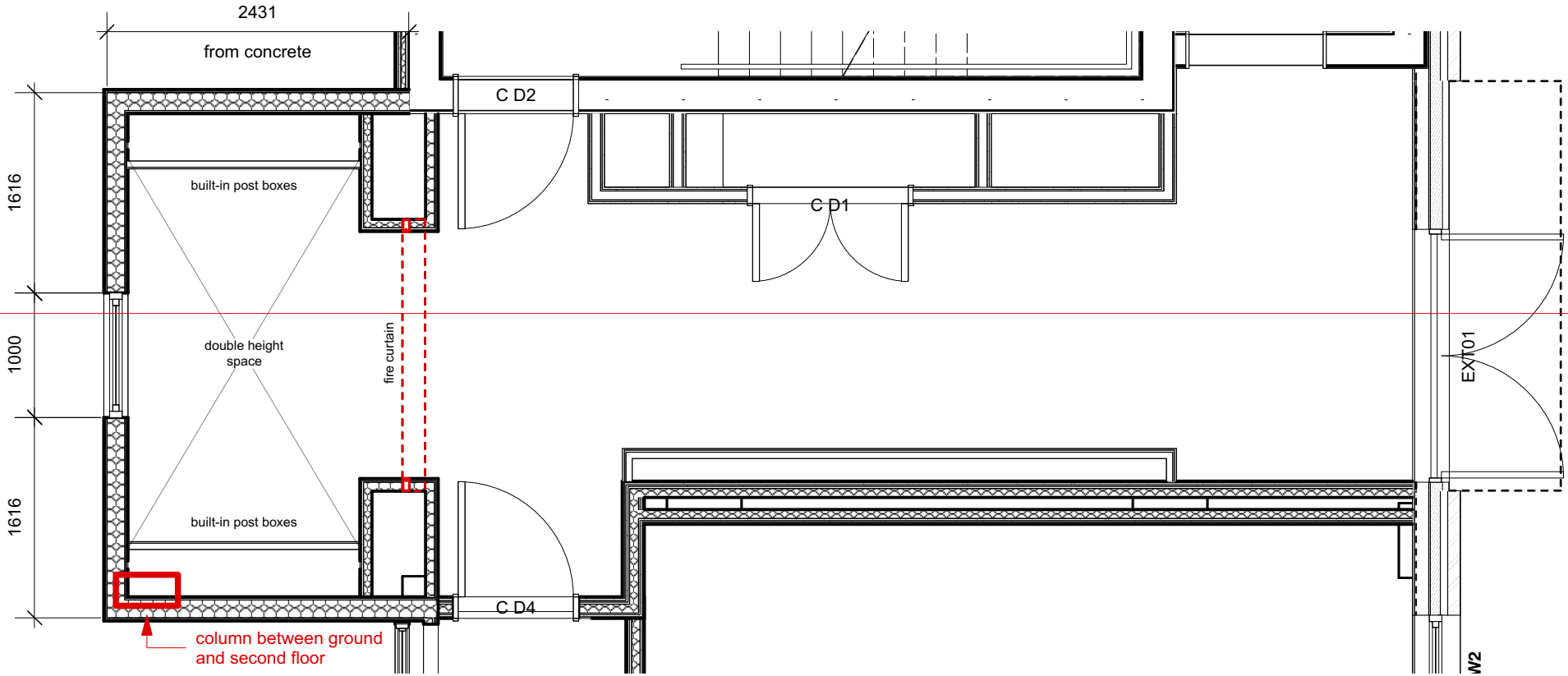
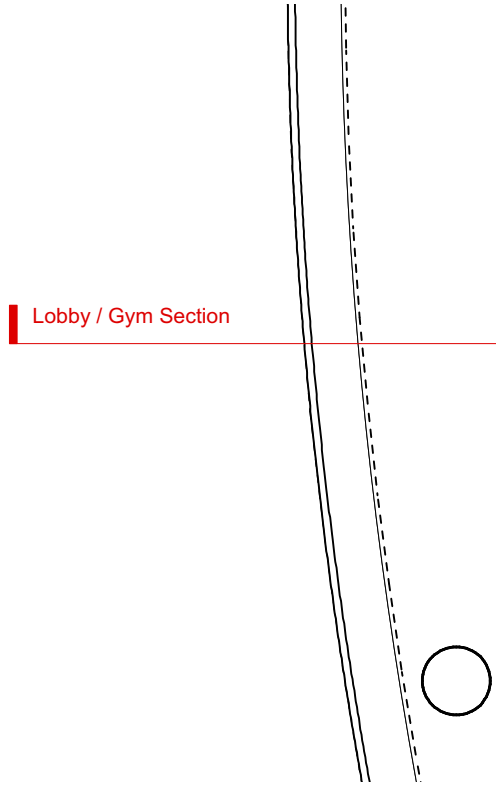
Andrew Lockwood B.Sc.(Hons.), M.I.O.A.
Director



SOUTH BLOCK
Gym Section

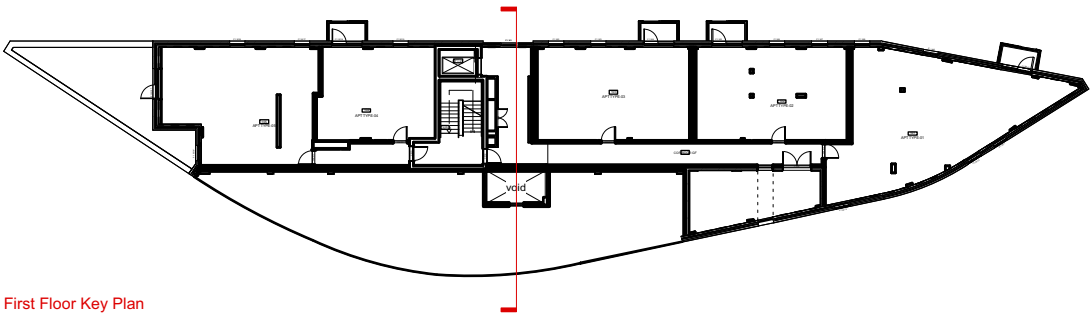
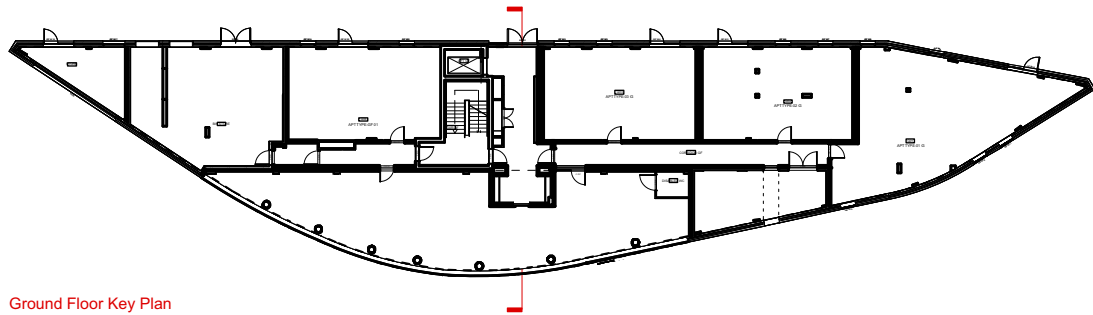
Acoustic Separation between Gym and Residential Accommodation:

Gym Floor - Ceiling 4845mm
Ceiling 15mm soundbloc board set 740mm to U/S of Structural Slab
Structural solid concrete slab 250mm with 500mm deep solid concrete downstand beams as shown



NOTE:

Completion sound testing to be carried out to confirm acoustic performance



Revision	Date	Description
PLANNING		
DK-Architects		
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Job:	X1 The Plaza	
Client:	X1 The Developments	
Drawing Title:	South - Entrance Lobby Section Detail	
Date:	27.06.2017	
Drawing no:	1141-C772	revision: E
Scale:	1:50	
Drawn:	HB	



Acoustic Calculation

Glass Configuration

10/3/2018

6.76mm (33.2) LamiGlass Sound Reduction

16mm Cavity

6.38mm (33.1) LamiGlass (PVB)

Glass Weight: 30.12kg/m²

Unit Thickness: 29.14mm

The acoustic performance data within this document is determined by calculation, based on factors derived from certified data. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 140-3 and/or ASTM E90, some variation in the calculated performance can also be expected. As such, the weighted performance, R_w , and adaptation terms, C and C_{tr} , should typically be considered to be accurate within ± 2 dB. However, wider deviations can occur.

Sound Reduction Indices - dB

Frequency - Hertz					R_w	C	C_{tr}	OITC	STC
125	250	500	1000	2000	40	-2	-6	31	41
23	30	38	45	45					

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