

MPF/PR0635/L02

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Dear James

UNION T2, MANCHESTER

I write to confirm the results of the internal noise measurements conducted within the apartments and studios of Union T2, Manchester. The measurements have been conducted to determine the internal noise levels due to external and internal noise sources and to compare the measurement results to the requirements of the planning condition relating to external noise ingress.

INTRUSIVE NOISE CRITERIA - PLANNING CONDITION 16

Planning condition 16 of the planning approval for Union T2, reference 132952/JO/2022, dated 30 March 2022, states:

- *a) Before the development commences, other than enabling works comprising piling and construction of the sub structure commences, a scheme for acoustically insulating the proposed co-living accommodation against noise from the nearby road network shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise insulation scheme shall be completed before any of the co-living dwelling units are occupied.*

Noise survey data must include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary.

The internal noise criteria are as follows:

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

Due to the proximity of the development to the Ordsall Chord it will be necessary for vibration criteria to apply which can be found in BS 6472: 2008 "Guide to evaluation of human exposure to vibration in buildings". Groundborne noise/re-radiated noise should also be factored into the assessment and design.

Additionally, where entertainment noise is a factor in the noise climate the sound insulation scheme shall be designed to achieve internal noise levels in the 63Hz and 125Hz octave centre frequency bands so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

b) Prior to first occupation of the residential units, a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that the internal noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the internal noise criteria.

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance, pursuant to policy DM1 of the Core Strategy for the City of Manchester.

The pre-commencement element of condition 16a was discharged on 14 August 2024 (planning reference CDN/23/0444).

The discharge notice states:

- *Co-Living Noise*

The following information has been submitted for consideration in respect of this planning condition:

- Co-Living Noise Technical Report prepared by Matt Fisher Acoustics

The above information submitted has been considered and is acceptable. The development shall now be carried out in accordance with the above.

Condition 16a is now formally discharged.

The applicable internal noise criteria for apartments are reproduced in Table 1.

Room Type	Time of day	
	07:00 to 23:00	23:00 to 07:00
Living room	35 dB LAeq, 16 hours	-
Bedroom	35 dB LAeq, 16 hours	30 dB LAeq, 8 hours Individual noise events should not normally exceed 45 dB (LAmax) more than 15 fifteen times a night

Table 1: Intrusive noise criteria

MEASUREMENT METHODOLOGY

The measurement methodology, as agreed with Manchester City Council, to demonstrate compliance with the criteria identified in Table 1 above is as follows:

- 1) 10% of apartments/studios are to be tested in the daytime only. The location of the apartments and studios under test will be selected by Fisher Acoustics on the basis of apartments that are most exposed to the surrounding road traffic noise sources and with reference to any change in the glazing specification to apartments.
- 2) Night-time noise levels within bedrooms and studios will be interpolated from the daytime noise levels, based on daytime and night-time external noise measurements.
- 3) Install sound level meters in a living room and bedroom of one apartment, or within a studio, between the hours of approx. 4.30pm and 7.30 pm (i.e. at a time when construction noise at T2 has ceased but road traffic levels can be assumed to be typical).
- 4) Measure the noise level in the rooms for approximately 5 minutes without MVHR running (as the planning condition relates to external noise only). If the average (LAeq) noise level in the room has not settled after 5 minutes, continue the measurement until a consistent (LAeq) noise level has been established (up to approx. 10 minutes if required).
- 5) Measure the reverberation time in the rooms to allow the measured noise levels to be corrected to allow for the reduction in internal noise level that will occur upon furnishing of the rooms.
- 6) Analyse the data to determine the daytime noise level in the rooms. With reference to the results of external noise survey measurements, determine the expected night-time internal noise levels within bedrooms and Studios based on the change in external noise levels between the daytime and night time.
- 7) Repeat the above measurements and analysis for a further 36 apartments/studios.
- 8) Issue a letter report that confirms the results of the above measurements relating to external noise ingress.

In addition, the internal noise levels have been measured with the MVHR (mechanical ventilation and heat recovery) unit operating in continuous 'background' ventilation mode within each assessed room.

The measurements were conducted by Fisher Acoustics Ltd between the following times:

- 1700 hours and 1920 hours on Thursday 28 November 2024
- 1640 hours and 1930 hours on Tuesday 3 December 2024
- 1645 hours and 1815 hours on Wednesday 4 December 2024
- 1550 hours and 1710 hours on Monday 16 December 2024

There was no notable construction activity within the building during the internal measurements. Road traffic flows on Trinity Way were found to be typical for the duration of the internal noise measurements. There were occasional train movements on the Ordsall Chord during the measurement periods.

The measurements were undertaken with the windows closed. The tested rooms had some furniture but were not fully furnished.

The measurements were conducted in general accordance with 'ANC Guidelines -Noise Measurements in Buildings, Part 2: Noise from External Sources (e.g. traffic noise) within Buildings'.

The measurements were conducted in rooms on various levels of the building with a bias to measuring apartments and studios on the closest elevations of the building to Trinity Way and the Ordsall Chord, as these are the most dominant noise sources in the area.

MEASUREMENT TOLERANCE

As described in the ANC Guidelines, BS EN 61672-1: 2013 'Electroacoustics. Sound level meters – Specifications' gives the tolerance limits that are applicable to noise level measurements carried out using Class 1 sound level meters. These tolerance limits are given in 1/3 octave bands (ie across the sound spectrum), from which it is possible to determine the influence of the tolerance limits on an overall dB(A) measured noise level.

Using the 1/3 octave band data, the overall measurement tolerance on the measured internal noise levels is +/- 1.2 dB(A). It follows that a measured noise level within 1.2dB(A) of the applicable criterion could be compliant with the criterion.

MEASURED INTERNAL NOISE LEVELS

The reverberation times of the rooms were greater than will be the case when the rooms are fully furnished. Therefore, the measured noise levels have been corrected to allow for the expected reduction in reverberation time following the full furnishing of the rooms.

The measured reverberation times have been corrected to 0.5 seconds for living rooms and 0.45 seconds for bedrooms. In addition, a correction must also be applied to the measured 5-minute daytime internal noise levels in order to determine the expected 16-hour daytime internal noise levels within bedrooms. In order to determine the correction, reference has been made to external noise survey data gathered at the same time as the internal noise measurements and to the results of a full 16-hour daytime external noise survey.

The measured daytime noise levels were determined by road traffic on Trinity Way (A6042) and to a lesser degree by road traffic on Liverpool Road and Water Street.

Table 2 shows the measured, RT-corrected average ($L_{Aeq,16h}$) daytime noise levels in living rooms and bedrooms with the MVHR switched off.

Apartment Number	Corrected Average Daytime Noise Level, dB ($L_{Aeq,16h}$)	
	Living Room/ Kitchen (Limit = 35 dB $L_{Aeq,16h}$)	Bedroom (Limit = 35 dB $L_{Aeq,16h}$)
5.06 (Studio)	-	30.0 (MVHR on)
5.11	34.1 (MVHR on)	25.0 (MVHR on)
6.03 (Studio)	-	28.1
6.08	33.8	27.4
6.12 (Studio)	-	24.9
7.02 (Studio)	-	25.4
7.10	15.9	20.3
8.09 (Studio)	-	21.3
8.11	22.4	23.1
9.05	22.1	21.0
9.07 (Studio)	-	24.6
9.09 (Studio)	-	21.9
10.04	25.3	25.0
10.09 (Studio)	-	25.4
10.11	26.3	26.6
11.02 (Studio)	-	23.2
11.08	30.7	24.8
11.11	26.8	25.1
12.05	26.8	23.4
12.12 (Studio)	-	23.5
13.09 (Studio)	-	27.1
13.10	25.8	25.3
14.03 (Studio)	-	24.0
14.11	27.4	26.1
15.01	28.7	22.6
15.07 (Studio)	-	27.0
16.04	30.5	25.8
16.12 (Studio)	-	24.5
17.02 (Studio)	-	26.2
17.11	26.0	25.6
18.07 (Studio)	-	19.5
18.10	26.5	23.1
20.11	26.7	26.2
22.07 (Studio)	-	26.3
24.10	25.0	28.1
26.09 (Studio)	-	30.4
28.10	26.6	27.0
30.09 (Studio)	-	29.6

Table 2: Measured, RT-corrected average ($L_{Aeq,5mins}$) daytime noise levels in apartment rooms – MVHR Off

It can be seen that compliance with the daytime internal noise criterion for living rooms and bedrooms has been achieved in all tested rooms due solely to external noise sources (ie with the MVHR unit switched off).

Table 3 shows the measured, RT-corrected average ($L_{Aeq,16h}$) daytime noise levels in living rooms and bedrooms with MVHR switched on. Data shown in red highlights an exceedance above the permissible noise limit.

Apartment Number	Corrected Average Daytime Noise Level, dB ($L_{Aeq,16h}$)			
	Living Room/ Kitchen		Bedrooms	
	Limit = 35 dB ($L_{Aeq,16h}$)	MVHR Only, dBA	Limit = 35 dB ($L_{Aeq,16h}$)	MVHR Only, dBA
5.06 (Studio)	-	-	30.0	N/A
5.11	34.1	N/A	25.0	N/A
6.03 (Studio)	-	-	31.4	28.7
6.08	34.0	20.6	28.8	23.2
6.12 (Studio)*	-	-	N/A	N/A
7.02 (Studio)	-	-	29.4	27.1
7.10	30.1	29.9	22.4	18.0
8.09 (Studio)	-	-	30.0	29.3
8.11	26.8	24.8	23.8	15.6
9.05	29.9	29.1	22.4	16.5
9.07 (Studio)	-	-	29.6	27.9
9.09 (Studio)	-	-	25.6	23.2
10.04	34.0	33.3	25.8	17.9
10.09 (Studio)	-	-	27.0	22.0
10.11	32.7	31.5	29.0	25.4
11.02 (Studio)	-	-	27.7	25.8
11.08	34.5	32.2	26.1	20.1
11.11	32.8	31.5	25.4	14.1
12.05	29.9	26.9	25.2	20.6
12.12 (Studio)	-	-	30.4	29.5
13.09 (Studio)	-	-	30.6	28.1
13.10	27.6	22.9	26.1	18.2
14.03 (Studio)	-	-	30.5	29.5
14.11	30.6	26.4	26.3	14.2
15.01	33.0	30.9	23.2	14.0
15.07 (Studio)	-	-	29.0	24.8
16.04	31.7	25.8	26.3	16.5
16.12 (Studio)	-	-	30.3	28.9
17.02 (Studio)	-	-	28.3	24.0
17.11	30.3	28.3	26.2	17.5
18.07 (Studio)	-	-	27.6	26.9
18.10	31.3	29.5	28.2	26.6
20.11	29.2	25.6	27.8	22.9
22.07 (Studio)	-	-	31.7	30.2
24.10	35.5	35.1	29.6	24.2
26.09 (Studio)	-	-	36.4	35.1
28.10	34.5	33.7	27.1	4.7
30.09 (Studio)	-	-	31.7	27.4

Table 3: Measured, RT-corrected average ($L_{Aeq,5mins}$) daytime noise levels in apartment rooms – MVHR On

**MVHR not operational in this apartment*

It can be seen that compliance with the daytime internal noise criterion for living rooms and bedrooms has been achieved in all but one of the rooms under test with the MVHR switched on. (The measured noise level in the living room of apartment 24.10 is only 0.5 dB in excess of the internal noise criterion and is therefore within measurement tolerance of the criterion).

The non-compliant measured noise level in Studio 26.09 was solely due to noise from the MVHR unit. In particular the MVHR unit has a fault and will be replaced. As replacement will take some time, a compliant test for this room cannot currently be reported. However, based on the measured noise levels in the other Studios in the building that are the same size and layout and that are served by same MVHR model with the same air flow settings as Studio 26.09, it is fully expected that upon replacement of the MVHR unit, full compliance with the internal noise criteria will be achieved with the MVHR operational.

A correction must be applied to the measured daytime noise levels in order to determine the expected night time internal noise levels within bedrooms. In order to determine the correction, reference has been made to external noise survey data gathered at the same time as the internal noise measurements.

The measurements show that that the external night time noise level ($L_{Aeq,8hrs}$) is 5 dB lower than the external daytime noise level ($L_{Aeq,16hrs}$).

Table 4 shows the interpolated night time average noise levels in bedrooms with the MVHR switched on and off. The specific contribution from the MVHR only is also shown. Data shown in red highlights an exceedance above the permissible noise limit.

Apartment Number	Estimated Average Night Time Noise Level, dB (L _{Aeq,8h})		
	MVHR OFF (Limit = 30 dB L _{Aeq,8h}),	MVHR On (Limit = 30 dB L _{Aeq,8h}),	MVHR Only, dBA
5.06 (Studio)	N/A	28.0	N/A
5.11 Bedroom	N/A	19.8	N/A
6.03 (Studio)	22.8	29.7	28.7
6.08 Bedroom	22.2	25.7	23.2
6.12 (Studio)*	19.6	N/A	N/A
7.02 (Studio)	20.2	27.9	27.1
7.10 Bedroom	15.1	19.8	18.0
8.09 (Studio)	16.1	29.5	29.3
8.11 Bedroom	17.9	19.9	15.6
9.05 Bedroom	15.8	19.2	16.5
9.07 (Studio)	19.4	28.5	27.9
9.09 (Studio)	16.7	24.1	23.2
10.04 Bedroom	19.8	21.9	17.9
10.09 (Studio)	20.2	24.2	22.0
10.11 Bedroom	21.3	26.9	25.4
11.02 (Studio)	18.0	26.4	25.8
11.08 Bedroom	19.6	22.9	20.1
11.11 Bedroom	19.9	20.9	14.1
12.05 Bedroom	18.1	22.6	20.6
12.12 (Studio)	18.2	29.8	29.5
13.09 (Studio)	21.9	29.0	28.1
13.10 Bedroom	20.0	22.2	18.2
14.03 (Studio)	18.8	29.8	29.5
14.11 Bedroom	20.8	21.7	14.2
15.01 Bedroom	17.3	19.0	14.0
15.07 (Studio)	21.7	26.5	24.8
16.04 Bedroom	20.6	22.0	16.5
16.12 (Studio)	19.2	29.4	28.9
17.02 (Studio)	21.0	25.8	24.0
17.11 Bedroom	20.3	22.1	17.5
18.07 (Studio)	14.2	27.1	26.9
18.10 Bedroom	17.9	27.1	26.6
20.11 Bedroom	20.9	25.0	22.9
22.07 (Studio)	21.1	30.7	30.2
24.10 Bedroom	22.8	26.6	24.2
26.09 (Studio)	25.1	35.5	35.1
28.10 Bedroom	21.8	21.9	4.7
30.09 (Studio)	24.4	29.2	27.4

Table 4: Measured, RT-corrected average (L_{Aeq,8h}) noise levels in bedrooms

*MVHR not operational in this apartment

It can be seen that compliance with the night time internal noise criterion for bedrooms and studios has been achieved in all tested rooms due solely to external noise sources (ie with the MVHR unit switched off).

However, the measured noise level in Studio 26.09 with the MVHR switched on was non-compliant. As discussed above, it is fully expected that upon replacement of the MVHR unit, full compliance with the internal noise criteria will be achieved with the MVHR operational.

The expected night time average noise level within all other assessed bedrooms and Studios complies with the night time noise criterion of 30dB LAeq,8hr with the MVHR switched on.

During the daytime measurements within bedrooms and Studios, there were no excesses over the night time internal noise criterion of 45dB LAmax given maximum noise events generated by trains and road traffic. Compliance with the night time maximum internal noise criterion is therefore expected in all of the assessed bedrooms due to 'normal' external night time noise events.

CONCLUSION

Compliance with the daytime and night time internal noise criteria for living rooms and bedrooms has been achieved in all tested rooms due solely to external noise break-in.

Only one room has not complied with the daytime and night time internal noise criteria with the MVHR unit switched on. The non-compliance is due to a faulty MVHR unit which is to be replaced. Based on the measured noise levels in the other Studios in the building that are the same size and layout and that are served by same MVHR model with the same air flow settings as Studio 26.09, it is fully expected that upon replacement of the MVHR unit, full compliance with the internal noise criteria will be achieved with the MVHR operational.

It is therefore considered that full compliance with planning condition 16b will be achieved upon replacement of the MVHR unit in Studio 26.09.

Yours sincerely



MATT FISHER BEng(Hons) CEng MIOA
For and on behalf of Fisher Acoustics Limited