

Apartment Building, Oldham Road, New Cross, Manchester M4 5PS

Testing Summary Report

for GMI Construction, Carvers Warehouse, 77 Dale Street, Manc., M1 2HG

Our Reference
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Executive Summary

Environoise Consulting Limited have been commissioned by GMI Construction to provide ANC accredited sound insulation testing of the new apartment development on Oldham Road, New Cross, Manchester, M4 5PS. Testing was required to demonstrate compliance with The Building Regulations 2010: Approved Document E 'Resistance to the passage of sound 2003'ⁱ (ADE) requirements for sound insulation within residential buildings.

90No. sound insulation test measurements were carried out between Wednesday 18th and Thursday 19th January, and between Monday 6th and Wednesday 8th February 2023.

Airborne Sound Insulation Testing

Airborne sound insulation test results met the ADE requirements for all tested spaces.

Impact Sound Insulation Testing

Impact sound insulation test results met the ADE requirements for all tested spaces.

Internal Noise Levels

External noise ingress measurements met BS8233:2014 and WHO Guidelines targets for all tested spaces.

Building Services Noise Levels

Building services noise levels met our recommended NR20 target in 5 of the 8 tested bedrooms. The NR20 target was exceeded by up to 5dB in other tested bedrooms.

1 Criteria

1.1 Sound Insulation

Approved Document E

- 1.1.1 Tests are required to demonstrate that Approved Document E: Resistance to the Passage of Soundⁱⁱ targets, and proposed targets between residential spaces are met, see Tables 1.1 and 1.2 for relevant criteria.

Table 1.1: ADE sound insulation criteria – on-site performance.

Rooms	On-site sound insulation performance
Between Apartments	$\geq 45\text{dB } D_{nT,w} + C_{tr}$ (walls and floors)

Table 1.2: Impact ADE sound insulation criteria – on-site performance.

Rooms	On-site sound insulation performance
Between Apartments	$\leq 62\text{dB } L'_{nT,w}$

1.2 Internal Noise Levels

- 1.1.2 Internal noise level measurements are required to be taken to demonstrate that BS8233ⁱⁱⁱ targets and WHO Guidelines^{iv} targets are met, see Table 1.3.

Table 1.3: BS8233 and WHO Guidelines external noise ingress targets.

Room type	Internal noise level target
Bedrooms (night-time [23.00 – 07.00hrs])	30dB $L_{Aeq,T}$ 45dB $L_{Amax,fast}$ *

*not to be exceeded more than 10 times during the night-time period (23.00 – 07.00hrs).

1.3 Building Services Noise Levels

- 1.3.1 A building services noise level target of NR20 L_{eq} has been set in bedrooms.

2 Sound Insulation Test Results

2.1 Walls

2.1.1 The airborne sound insulation performances of tested separating walls are given in Table 2.1 alongside relevant targets.

Table 2.1: ADE airborne wall sound insulation performance test results.

ANC Test No.	Spaces		Airborne sound insulation [$D_{nT,w} + C_{tr}$ (dB)]		Pass/Fail
	Source Room	Receiving Room	Target	Result	
75896/31	Apartment 311 bedroom, 3 rd Floor	Apartment 312 bedroom, 3 rd Floor	≥45	52	Pass
75896/32	Apartment 312 bedroom, 3 rd Floor	Apartment 313 bedroom, 3 rd Floor		53	
75896/33	Apartment 411 bedroom, 4 th Floor	Apartment 412 bedroom, 4 th Floor		53	
75896/34	Apartment 412 bedroom, 4 th Floor	Apartment 413 bedroom, 4 th Floor		51	
75896/35	Apartment 509 living room, 5 th Floor	Apartment 508 bedroom, 5 th Floor		52	
75896/36	Apartment 510 living room, 5 th Floor	Apartment 509 bedroom, 5 th Floor		53	
75896/37	Apartment 510 bedroom, 5 th Floor	Apartment 511 bedroom, 5 th Floor		52	
75896/38	Apartment 502 living room, 5 th Floor	Apartment 503 bedroom, 5 th Floor		50	
75896/39	Apartment 503 living room, 5 th Floor	Apartment 504 bedroom, 5 th Floor		50	
75896/40	Apartment 504 living room, 5 th Floor	Apartment 505 bedroom, 5 th Floor		52	
75896/41	Apartment 610 living room, 6 th Floor	Apartment 609 bedroom, 6 th Floor		51	
75896/42	Apartment 611 living room, 6 th Floor	Apartment 610 bedroom, 6 th Floor		59	
75896/43	Apartment 614 living room, 6 th Floor	Apartment 601 bedroom, 6 th Floor		57	
75896/44	Apartment 601 living room, 6 th Floor	Apartment 602 bedroom, 6 th Floor		51	
75896/45	Apartment 602 living room, 6 th Floor	Apartment 603 bedroom, 6 th Floor		50	
75896/46	Apartment 603 living room, 6 th Floor	Apartment 604 bedroom, 6 th Floor		51	
75896/47	Apartment 604 living room, 6 th Floor	Apartment 605 bedroom, 6 th Floor		51	

Table 2.1 (continued): ADE airborne wall sound insulation performance test results.

ANC Test No.	Spaces		Airborne sound insulation [$D_{nT,w} + C_{tr}$ (dB)]		Pass/Fail
	Source Room	Receiving Room	Target	Result	
75896/48	Apartment 605 living room, 6 th Floor	Apartment 606 bedroom, 6 th Floor	≥45	46	Pass
75896/49	Apartment 710 living room, 7 th Floor	Apartment 709 bedroom, 7 th Floor		52	
75896/50	Apartment 711 bedroom, 7 th Floor	Apartment 710 bedroom, 7 th Floor		51	
75896/51	Apartment 711 living room, 7 th Floor	Apartment 712 bedroom, 7 th Floor		54	
75896/52	Apartment 702 living room, 7 th Floor	Apartment 703 bedroom, 7 th Floor		51	
75896/53	Apartment 703 living room, 7 th Floor	Apartment 704 bedroom, 7 th Floor		53	
75896/54	Apartment 704 living room, 7 th Floor	Apartment 705 bedroom, 7 th Floor		52	
75896/55	Apartment 810 living room, 8 th Floor	Apartment 809 bedroom, 8 th Floor		53	
75896/56	Apartment 811 living room, 8 th Floor	Apartment 810 bedroom, 8 th Floor		49	
75896/57	Apartment 811 bedroom, 8 th Floor	Apartment 812 bedroom, 8 th Floor		54	
75896/58	Apartment 802 bedroom, 8 th Floor	Apartment 803 bedroom, 8 th Floor		49	
75896/59	Apartment 803 bedroom, 8 th Floor	Apartment 804 bedroom, 8 th Floor		50	
75896/60	Apartment 804 bedroom, 8 th Floor	Apartment 805 bedroom, 8 th Floor		51	

2.2 Floors – Airborne

2.2.1 The airborne sound insulation performances of tested separating floors are given in Table 2.2 alongside relevant targets.

Table 2.2: ADE airborne floor sound insulation performance test results.

ANC Test No.	Spaces		Airborne sound insulation [$D_{nT,w} + C_{tr}$ (dB)]		Pass/Fail
	Source Room	Receiving Room	Target	Result	
75896/61	Apartment 412 bedroom, 4 th Floor	Apartment 312 bedroom, 3 rd Floor	≥45	64	Pass
75896/62	Apartment 412 living room, 4 th Floor	Apartment 312 living room, 3 rd Floor		66	
75896/63	Apartment 509 living room, 5 th Floor	Apartment 409 living room, 4 th Floor		61	

Table 2.2: ADE airborne floor sound insulation performance test results.

ANC Test No.	Spaces		Airborne sound insulation [$D_{nT,w} + C_{tr}$ (dB)]		Pass/Fail
	Source Room	Receiving Room	Target	Result	
75896/64	Apartment 509 bedroom, 5 th Floor	Apartment 409 bedroom, 4 th Floor	≥45	58	Pass
75896/65	Apartment 503 living room, 5 th Floor	Apartment 403 living room, 4 th Floor		64	
75896/66	Apartment 504 bedroom, 5 th Floor	Apartment 404 bedroom, 4 th Floor		61	
75896/67	Apartment 504 living room, 5 th Floor	Apartment 504 living room, 4 th Floor		62	
75896/68	Apartment 503 bedroom, 5 th Floor	Apartment 403 bedroom, 4 th Floor		57	
75896/69	Apartment 610 living room, 6 th Floor	Apartment 510 living room, 5 th Floor		61	
75896/70	Apartment 610 bedroom, 6 th Floor	Apartment 510 bedroom, 5 th Floor		63	
75896/71	Apartment 601 living room, 6 th Floor	Apartment 501 living room, 5 th Floor		61	
75896/72	Apartment 601 bedroom 1, 6 th Floor	Apartment 501 bedroom 1, 5 th Floor		60	
75896/73	Apartment 601 bedroom 2, 6 th Floor	Apartment 501 bedroom 2, 5 th Floor		58	
75896/74	Apartment 602 living room, 6 th Floor	Apartment 502 living room, 5 th Floor		65	
75896/75	Apartment 602 bedroom, 6 th Floor	Apartment 502 bedroom, 5 th Floor		60	
75896/76	Apartment 603 living room, 6 th Floor	Apartment 503 living room, 5 th Floor		61	
75896/77	Apartment 603 bedroom, 6 th Floor	Apartment 503 bedroom, 5 th Floor		60	
75896/78	Apartment 604 living room, 6 th Floor	Apartment 504 living room, 5 th Floor		61	
75896/79	Apartment 604 bedroom, 6 th Floor	Apartment 504 bedroom, 5 th Floor		60	
75896/80	Apartment 605 living room, 6 th Floor	Apartment 505 living room, 5 th Floor		61	
75896/81	Apartment 605 bedroom, 6 th Floor	Apartment 505 bedroom, 5 th Floor		59	
75896/82	Apartment 606 living room, 6 th Floor	Apartment 506 living room, 5 th Floor		62	
75896/83	Apartment 710 living room, 7 th Floor	Apartment 610 living room, 6 th Floor		63	
75896/84	Apartment 710 bedroom, 7 th Floor	Apartment 610 bedroom, 6 th Floor		62	
75896/85	Apartment 704 living room, 7 th Floor	Apartment 604 living room, 6 th Floor		64	
75896/86	Apartment 704 bedroom, 7 th Floor	Apartment 604 bedroom, 6 th Floor		64	
75896/87	Apartment 810 living room, 8 th Floor	Apartment 710 living room, 7 th Floor		63	

Table 2.2 (continued): ADE airborne floor sound insulation performance test results.

ANC Test No.	Spaces		Airborne sound insulation [$D_{nT,w} + C_{tr}$ (dB)]		Pass/Fail
	Source	Receive	Target	Result	
75896/88	Apartment 810 bedroom, 8 th Floor	Apartment 710 bedroom, 7 th Floor	≥45	65	Pass
75896/89	Apartment 804 living room, 8 th Floor	Apartment 704 living room, 7 th Floor		61	
75896/90	Apartment 804 bedroom, 8 th Floor	Apartment 704 bedroom, 7 th Floor		62	

2.3 Floors - Impact

2.3.1 The impact sound insulation performances of tested separating floors are given in Table 2.3 alongside relevant targets.

Table 2.3: ADE impact sound insulation performance test results.

ANC Test No.	Spaces		Impact sound insulation [$L_{nT,w}$ (dB)]		Pass/Fail
	Source Room	Receiving Room	Target	Result	
75896/1	Apartment 412 bedroom, 4 th Floor	Apartment 312 bedroom, 3 rd Floor	≤62	35	Pass
75896/2	Apartment 509 bedroom, 5 th Floor	Apartment 409 bedroom, 4 th Floor		42	
75896/3	Apartment 503 bedroom, 5 th Floor	Apartment 403 bedroom, 4 th Floor		36	
75896/4	Apartment 504 bedroom, 5 th Floor	Apartment 404 bedroom, 4 th Floor		36	
75896/5	Apartment 610 bedroom, 6 th Floor	Apartment 510 bedroom, 5 th Floor		38	
75896/6	Apartment 601 bedroom 1, 6 th Floor	Apartment 501 bedroom 1, 5 th Floor		40	
75896/7	Apartment 601 bedroom 2, 6 th Floor	Apartment 501 bedroom 2, 5 th Floor		36	
75896/8	Apartment 603 bedroom, 6 th Floor	Apartment 503 bedroom, 5 th Floor		34	
75896/9	Apartment 604 bedroom, 6 th Floor	Apartment 504 bedroom, 5 th Floor		36	
75896/10	Apartment 605 bedroom, 6 th Floor	Apartment 505 bedroom, 5 th Floor		40	
75896/11	Apartment 602 bedroom, 6 th Floor	Apartment 502 bedroom, 5 th Floor		49	
75896/12	Apartment 710 bedroom, 7 th Floor	Apartment 610 bedroom, 6 th Floor		39	
75896/13	Apartment 704 bedroom, 7 th Floor	Apartment 604 bedroom, 6 th Floor		37	
75896/14	Apartment 810 bedroom, 8 th Floor	Apartment 710 bedroom, 7 th Floor		37	

Table 2.3 (continued): ADE impact sound insulation performance test results.

ANC Test No.	Spaces		Impact sound insulation [$L_{nT,w}$ (dB)]		Pass/Fail
	Source Room	Receiving Room	Target	Result	
75896/15	Apartment 804 bedroom, 8 th Floor	Apartment 704 bedroom, 7 th Floor	≤62	40	Pass
75896/16	Apartment 412 Living Room, 4 th Floor	Apartment 312 Living Room, 3 rd Floor		36	
75896/17	Apartment 509 Living Room, 5 th Floor	Apartment 409 Living Room, 4 th Floor		39	
75896/18	Apartment 503 Living Room, 5 th Floor	Apartment 403 Living Room, 4 th Floor		36	
75896/19	Apartment 504 Living Room, 5 th Floor	Apartment 404 Living Room, 4 th Floor		37	
75896/20	Apartment 610 Living Room, 6 th Floor	Apartment 510 Living Room, 5 th Floor		36	
75896/21	Apartment 601 Living Room, 6 th Floor	Apartment 501 Living Room, 5 th Floor		39	
75896/22	Apartment 603 Living Room, 6 th Floor	Apartment 503 Living Room, 5 th Floor		35	
75896/23	Apartment 604 Living Room, 6 th Floor	Apartment 504 Living Room, 5 th Floor		36	
75896/24	Apartment 605 Living Room, 6 th Floor	Apartment 505 Living Room, 5 th Floor		39	
75896/25	Apartment 602 Living Room, 6 th Floor	Apartment 502 Living Room, 5 th Floor		35	
75896/26	Apartment 606 Living Room, 6 th Floor	Apartment 506 Living Room, 5 th Floor		48	
75896/27	Apartment 710 Living Room, 7 th Floor	Apartment 610 Living Room, 6 th Floor		37	
75896/28	Apartment 704 Living Room, 7 th Floor	Apartment 604 Living Room, 6 th Floor		37	
75896/29	Apartment 804 Living Room, 8 th Floor	Apartment 704 Living Room, 7 th Floor		39	
75896/30	Apartment 810 Living Room, 8 th Floor	Apartment 710 Living Room, 7 th Floor		37	

2.4 Discussion of Results

- 2.4.1 All tested separating walls and floors met ADE airborne and impact sound insulation performance targets. Therefore, the requirements of ADE are satisfied.

3 External Noise Ingress Measurements

3.1 Overview

- 3.1.1 Internal noise level measurements were taken for part of the daytime period (18.00 – 23.00hrs) to exclude any construction site noise sources. Measurements were taken for the whole night-time period (23.00 – 07.00hrs). The noise meter was set to measure overall fast 'A' weighted maximum and ambient noise levels for contiguous one-minute periods (i.e., $L_{Amax,fast}$ and $L_{Aeq,1min}$). All meter clocks were synchronised, and the meters were set to record all instantaneous noise levels over 45dBA. The Type 1 meter was fixed to a tripod and placed at a position representative of the bed head 1.2m above the floor level.
- 3.1.2 The sound level meters were calibrated at the start and end of the noise surveys to 94dB at 1kHz. There was a recorded drift of up to ≤ 0.1 dB across the noise surveys which is acceptable.

3.2 Noise Data Summary

- 3.2.1 Measured hourly ambient noise levels ($L_{Aeq,T}$) have been compared with criteria given in Table 1.3 for night-time (23.00hrs – 07.00hrs) period, see Table 3.1. Noise level time histories are given in Appendix B.

Table 3.1: Measured daytime and night-time internal noise levels within bedrooms.

Date	Apartment	Night-time (23.00hrs – 07.00hrs)	
		Ambient noise level [$L_{Aeq,8hour}$ (dB)]	No. of valid excesses over 45dB $L_{Amax,fast}$
06.02.2023 – 07.02.2023	102, 1 st Floor	26	6
	210, 2 nd Floor	22	2
07.02.2023 – 08.02.2023	408, 4 th Floor	23	0

3.3 Discussion of Internal Ambient Noise Results

- 3.3.1 As shown in Table 3.1, internal ambient noise levels were below the 30dB $L_{Aeq,8hour}$ night-time target in all tested bedrooms.

3.4 Discussion of Internal Maximum Noise Results

- 3.4.1 The night-time maximum noise level target of 45dB $L_{Amax,fast}$ was not exceeded more than ten times in any tested bedroom and therefore the requirements have been met.

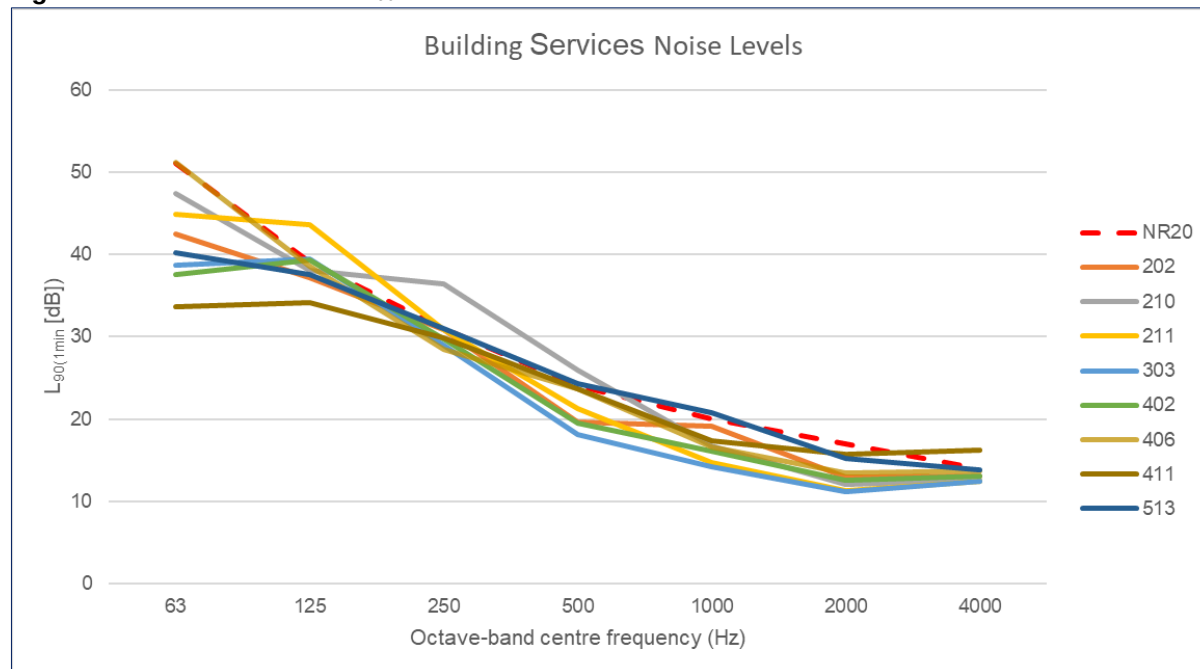
4 Building Services Noise Levels

4.1 Results

Air Conditioning

- 4.1.1 Measurements mechanical ventilation (MVHR) unit noise were taken in 10 bedrooms at locations representative of the bed head for durations of 1-minute measurements.
- 4.1.2 It can be assumed that the ambient L_{eq} of mechanical services noise is equivalent to the background L_{90} for continuously operating plant absent of extraneous noise. To minimise the level of contribution from other noise sources on site (e.g., construction activity, road traffic), we have reported the L_{90} values which are considered representative of the L_{eq} values.
- 4.1.3 The results of the noise level measurements with MVHR in operation are shown in Figure 4.1 together with the NR20 criterion curve.

Figure 4.1: Measured MVHR L_{90} noise levels.



1.4 Discussion of Results

- 1.4.1 Measured building services noise levels in the bedrooms of apartments 202, 303, 402, 406 and 513 were below the NR20 target, see Figure 4.1.
- 1.4.2 In the bedroom of apartment 210, the NR20 target was exceeded by 5dB at 250Hz and by 2dB at 500Hz. In the bedroom of apartment 211, the NR20 target was exceeded by 5dB at 125Hz. In the bedroom of apartment 411, the NR20 target was exceeded by 3dB at 4kHz.

Appendix A: Instrumentation

Details of instrumentation used are given in Table A1.

Table A1: Instrumentation used for testing.

Manufacturer	Description of instrumentation	Serial Number	Laboratory calibration date
Rion	NA-28 sound level meter	501403	12th September 2022
	NH-23 preamplifier	22018	
	UC-59 microphone	7542	
Rion	Model NC-74	34904967	10 th October 2022
Norsonic	Tapping Machine 211A	31454	10 th June 2021
Hartke	Transient Attack 120W speaker	H122XCIH023	N/A
N/A	0.5m and 1m high 'X' stands	N/A	N/A

All measurement instrumentation was calibrated before and after each test. The calibration chain is traceable to national standards held at the National Physical Laboratory (NPL).

References

- i The Building Regulations 2010, Approved Document E 'resistance to the passage of sound 2003'
- ii The Building Regulations Approved Document E: Resistance to the Passage of Sound, 2010.
- iii BS8233:2014 'Guidance on sound insulation and noise reduction for buildings', 2014.
- iv World Health Organisation 'Guidelines for community noise', 1999.