

12-18 Crown Street, Reading

Preliminary Design Report

12 September 2024

Client: Marson Property Ltd
15-16 Margret Street
London
W1W 8RW

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For Information

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1.0 INTRODUCTION

- 1.1 It is proposed to redevelop the existing building at 12-18 Crown Street, Reading from the current use of serviced apartments to private apartments. Quantum Acoustics Ltd has been commissioned by Marson Property Ltd to undertake indicative sound insulation testing across a sample of party wall and floor constructions.
- 1.2 The report details the results from the sound insulation tests and provides preliminary guidance from the findings.

2.0 SOUND INSULATION CRITERIA

Condition 16

- 2.1 The following condition provided is as follows:

"No development shall commence on site until details of an internal sound insulation scheme to minimise sound transfer between dwellings has been submitted in writing to and approved by the Local Planning Authority. The approved scheme shall be retained thereafter."

- 2.2 It is assumed the above planning condition performance standards are in line with the Building Regulations Approved Document E: 2003 (incorporating 2004-2015 amendments). The above planning condition is sufficient to comply with Building Regulations.

Table 0.1a Dwelling-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function

	Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Purpose built dwelling-houses and flats		
Walls	45	-
Floors and stairs	45	62
Dwelling-houses and flats formed by material change of use		
Walls	43	-
Floors and stairs	43	64

- 2.3 We understand the criteria applicable to this development would be “Dwelling-houses and flats formed by material change of use”.

3.0 TEST PROCEDURE

- 3.1 Airbourne and impact sound insulation tests were carried out on 30 May 2024.
- 3.2 The building was partially occupied during the time of testing, it was not possible to test each wall/floor therefore a sample of walls and floors were tested.
- 3.3 The Building Regulations Approved Document E requires that impact and airborne sound insulation tests are undertaken in accordance with:
- BS EN ISO 16283-1:2014 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation.
 - BS EN ISO 16283-2:2020 'Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound insulation.
 - BS EN ISO 717-1:2020 'Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation'
 - BS EN ISO 717-2:2020 'Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation'
 - BS EN ISO 354:2003 'Acoustics – Measurement of sound absorption in a reverberation room.

Airborne Noise Test Procedure

- 3.4 Measurements of airborne sound insulation between rooms were undertaken by generating a broad band, diffuse sound field within the source areas.
- 3.5 A thirty second spatial average of the 1/3 octave band noise levels within both the source and receive rooms were then measured together with background noise levels. The receive levels were corrected for the background noise level and subtracted from the source noise levels to calculate the Level Difference (D).

- 3.6 The calculated 1/3 octave band Level difference results were then compared with a standard weighting curve as defined in BS EN ISO 717-1: 2020 to establish the single figure Weighted Level Difference (D_w).
- 3.7 A low frequency correction Ctr is calculated from the same values, this value is added to the previous value to give $D_{nT,w+Ctr}$ for comparison with the values in ADE 2003.
- 3.8 The reverberation time (RT) was measured in each receive room, in order to correct for room reverberant characteristics.

Impact Noise Test Procedure

- 3.9 A tapping machine was used to create a standardised impact pattern on the upper floor.
- 3.10 A thirty second spatial average of the 1/3 octave band noise levels receive rooms were then measured together with background noise levels. The receive levels were corrected for the background noise level and subtracted from the receive noise levels. These were then compared with a standard weighting curve as defined in BS EN ISO 717-2: 2020 to establish the single figure Weighted Level Difference ($L'_{nT,w}$).
- 3.11 The reverberation time (RT) was measured in each receive room, in order to correct for room reverberant characteristics.

Site Inspection

- 3.12 A visual survey has been undertaken by Osel Architecture and the following details have been provided.

Construction Summary - Party Walls (Original Building)

- 3.13 Metal stud partitions with plasterboard (140-145mm thick), with blockwork around staircases and entrance lobbies.
- 3.14 Exact construction details for the number of boards and frame types were not determined.

Construction Summary - Floor Construction (Original Building)

- 3.15 Long-span concrete planks with perimeter concrete downstand beams.
- 3.16 Potential intermediate steel beams may be present in certain areas, particularly where extensions or secondary supports have been introduced.
- 3.17 Flooring includes a composite timber laminate floor beneath LVT flooring (possible hardboard or screed underneath).

Construction Summary Extensions (3rd and 4th Floor Extension)

Floors

- 3.18 Steel frame with timber joisted floors.
- 3.19 Plant room floor is concrete, lower than adjacent corridors/apartments, with a raised floor supported by timber joists (possibly for a steel transfer structure).

Wall Construction

- 3.20 Plant room: Inner walls are two layers of plasterboard with staggered joints (not filled in the plant room).

Other areas: Block walls around the lift and staircase.

- 3.21 Metal stud partitions with plasterboard linings (160-165mm thick), but the specific number of boards and metal frame types could not be determined without intrusive investigation.

Ceiling

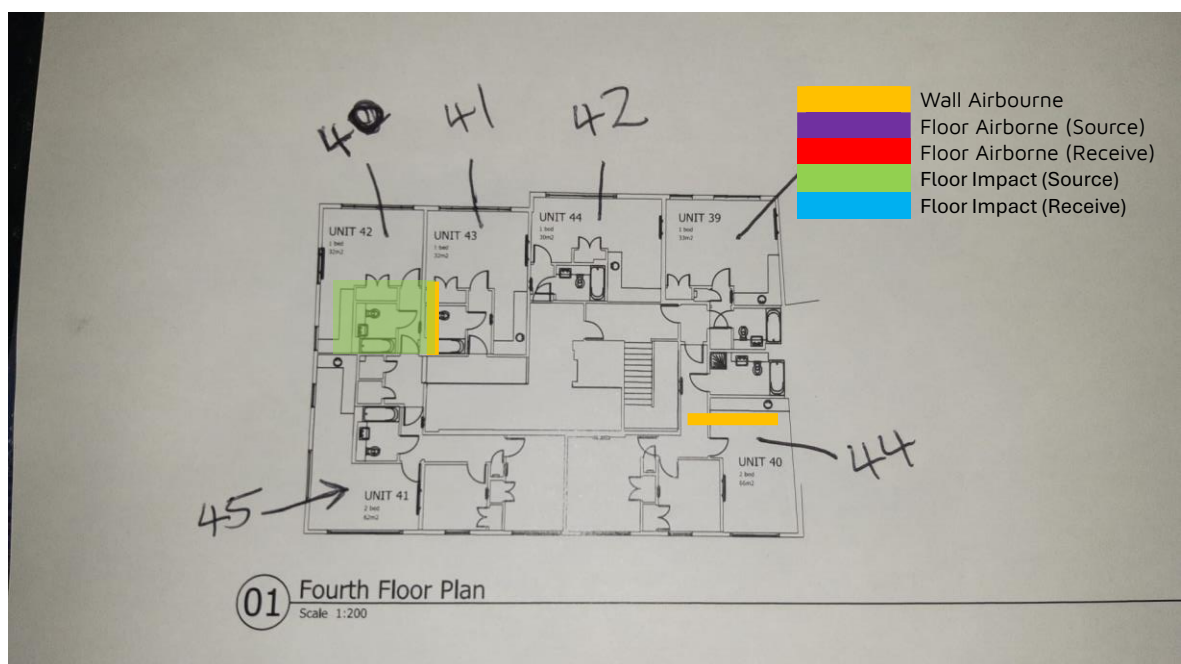
- 3.22 Steel beams visible in the ceiling voids, clad with a fire lining board.
- 3.23 Soffits are also clad with plasterboard.
- 3.24 To fully identify the constructions, a full intrusive survey should be conducted. This would allow for a detailed examination of the structural elements, ensuring accurate identification of all materials, connections, and assemblies in both walls and floors.

Equipment Summary

- 3.25 Details of the equipment used for the survey are summarised below.

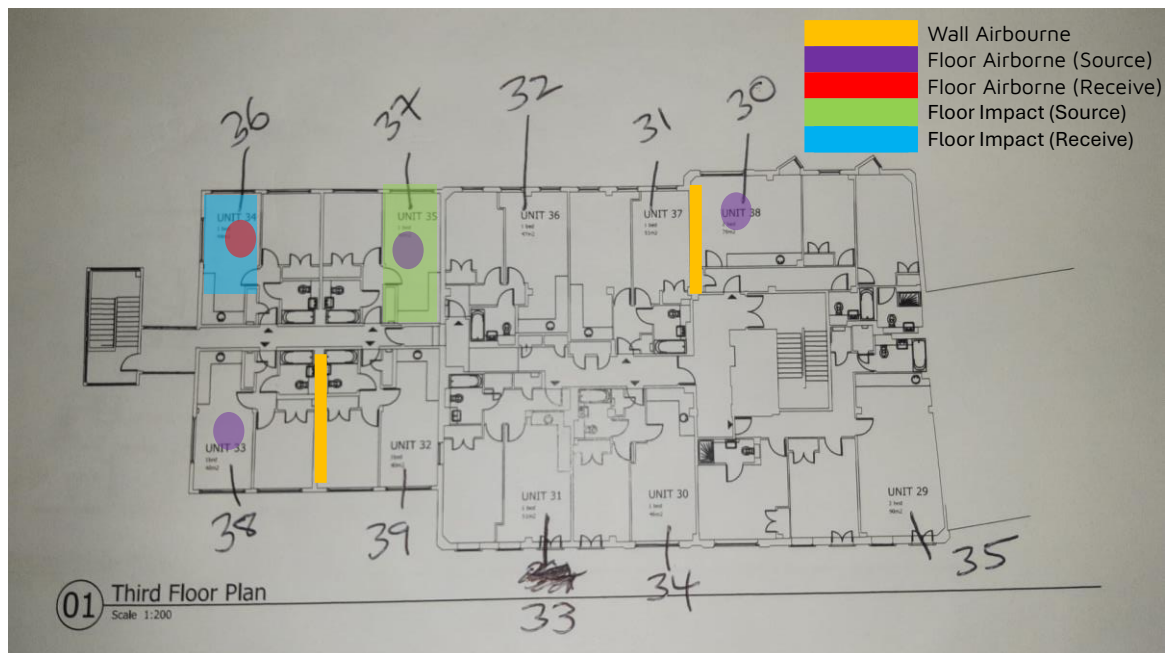
Equipment			
Description	Manufacturer	Type	Serial Number
Sound Level Meter	Svantek	977	36431
Sound Source	Behringer	B112	-
Tapping Machine	Norsonic	211A	251215
Calibrator	B&K	4231	2513115

4.0 TEST LOCATIONS

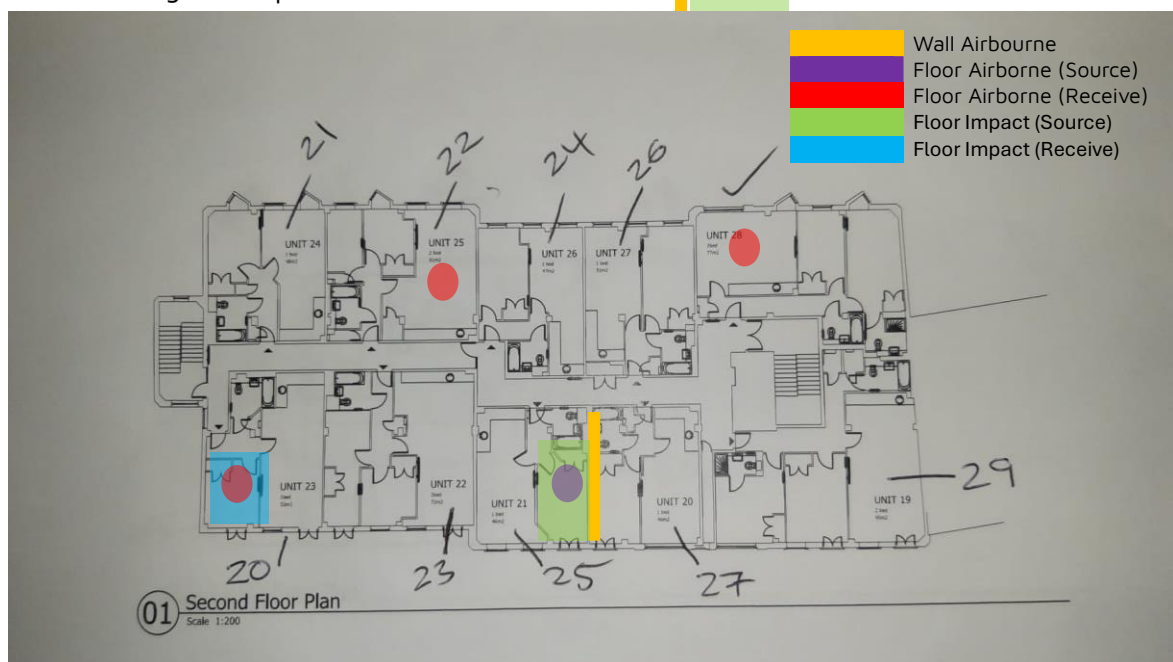


4.1 The following markup shows the test locations on Floor 4.

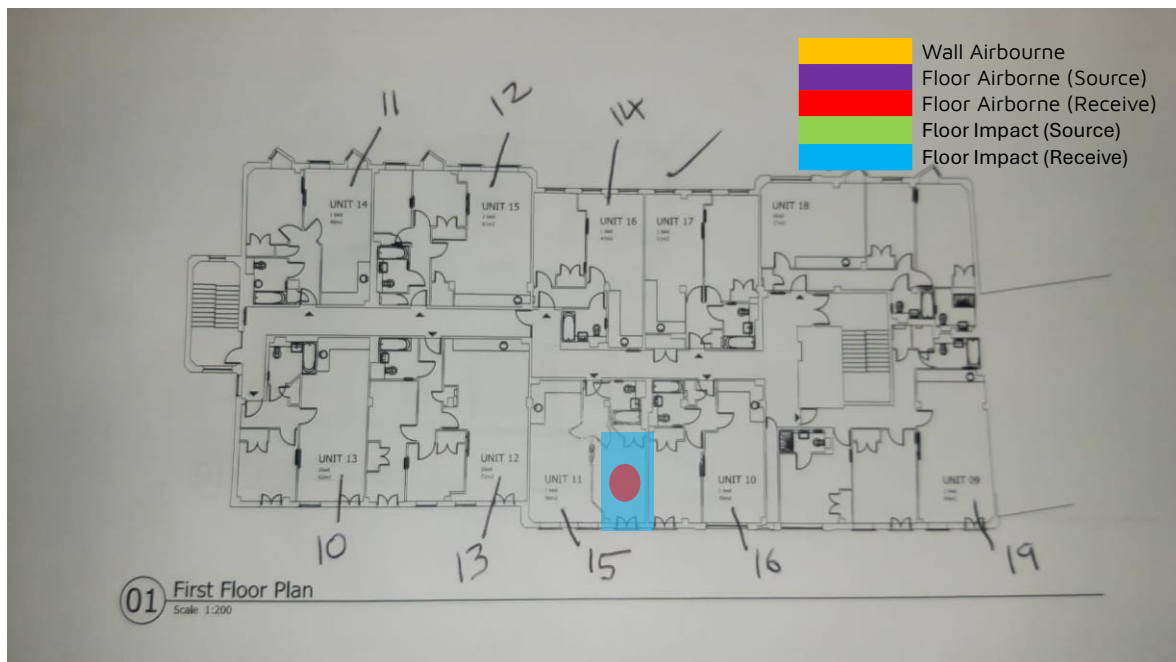
4.2 The following markup shows the test locations on Floor 3.



4.3 The following markup shows the test locations on Floor 2.



4.4 The following markup shows the test locations on Floor 1.



5.0 RESULTS SUMMARY

5.1 The following airborne sound insulation test results were measured:

Airbourne Sound Insulation Test Results					
Source Dwelling	Receive Dwelling	Test Element	Result $D_{nT,w}+C_{tr}$	Criterion $D_{nT,w}+C_{tr}$	Pass/Fail
44	43	Wall	45 dB	≥ 43 dB	Pass
40	41	Wall	42 dB	≥ 43 dB	Fail
38	39	Wall	41 dB	≥ 43 dB	Fail
37	32	Wall	50 dB	≥ 43 dB	Pass
38	20	Floor	53 dB	≥ 43 dB	Pass
37	22	Floor	52 dB	≥ 43 dB	Pass
30	31	Wall	47 dB	≥ 43 dB	Pass
25	27	Wall	46 dB	≥ 43 dB	Pass
30	28	Floor	44 dB	≥ 43 dB	Pass
25	15	Floor	48 dB	≥ 43 dB	Pass

5.2 The following impact sound insulation test results were measured:

Impact Sound Insulation Results						
Source Room	Receive Room	Test Element	Result $L'_{nT,w}$	Criterion $L'_{nT,w}$	Pass/Fail	Construction
40	36	Floor	41 dB	≤ 64 dB	Pass	Smoothed Floor with Vinyl Finish.
38	20	Floor	40 dB	≤ 64 dB	Pass	
37	22	Floor	49 dB	≤ 64 dB	Pass	
30	28	Floor	47 dB	≤ 64 dB	Pass	
25	15	Floor	39 dB	≤ 64 dB	Pass	

Discussion

5.3 Airborne Sound Insulation Tests – Party Walls

A total of 4 of the 6 partitions tested for airborne sound insulation achieved the proposed minimum airborne sound insulation requirement (margin ranging between 2-4dB) detailed in Section 2.0.

Two of the six party walls fell marginally short (1-2dB) of the proposed minimum sound insulation requirement and will require remedial work to be undertaken to comply with the minimum performance criteria.

5.4 Airborne Sound Insulation Tests – Floors

All 4 of the floors tested achieved the proposed minimum performance requirement (margin ranging 1-10dB) detailed in Section 2.0.

5.5 Impact Sound Insulation – Floors

All 5 of the floors tested complied with the proposed maximum impact sound transmission level criteria detailed in Section 2.0. It should however be noted that the impact test results will be affected by the floor finish. All proposed floor build-ups/finishes should be reviewed/assessed by a suitably qualified acoustic consultant.

6.0 RECOMMENDATIONS

6.1 Upon reaching the design stages, we recommend that a full intrusive survey be undertaken to identify all constructions. This will ensure that the structural elements of both walls and floors are accurately identified and appropriately designed to comply with sound insulation regulations.

6.2 Prior to these works, the following initial advice is provided for each separating element.

Walls

6.3 It is recommended that all partition types between dwellings are presented on drawings, along with the proposed minimum on-site sound insulation requirements to comply with Approved Document E and the Local Authority's guidance, as noted above. From an initial inspection the walls appear to be metal stud and plasterboard partitions.

6.4 No specific comments can be made on the construction details without further analysis, however, an example partition capable of achieving the proposed party wall airborne sound insulation requirements between dwellings may comprise the following:

- 2x British Gypsum 15mm Gyproc SoundBloc each side.
- Gypframe 48 S 50 'C' Stud frameworks
- 50mm Isover Acoustic Partition Roll (APR 1200)
- Gypframe 48 S 50 'C' Stud frameworks
- Gypframe 99 FC 50 Fixing Channel

6.5 It is important that construction detailing (particularly abutments and interface detailing with other structures) is appropriately specified to minimise flanking sound transmission and sound leakage.

6.6 Further analysis, including flanking sound transmission between dwellings, will be required. This includes all party walls and floors will require a full intrusive inspection. Additional recommendations can be provided once the building is opened for inspection.

Floors

- 6.7 The current floor construction / floor finishes, within the tested rooms, meet the proposed minimum criterion for sound insulation, as it passed initial sound insulation testing complying with the requirements of Approved Document E. Within the extension, the floor is reported to be a steel and timber suspended structure, with some retained concrete areas in the extension. In the original building, the floors consist of concrete planks with laminate timber flooring.
- 6.8 Should any changes occur to the floor (including floor finishes / suspended ceiling) it is recommended that these changes are reviewed by an acoustician.
- 6.9 At this stage, the exact alignment of the floor and party wall/corridor wall elements is not known and not all floors have been tested however, it will be important to develop robust head and base detailing to minimise flanking sound transmission. Such details should aim, as far as practicable to target a suitable level of sound insulation across party walls however the potential complexity of delivering is required to meet the acoustic performance specification as necessary to secure compliance with the proposed minimum requirements outlines in Approved Document E.
- 6.10 To better help control structure borne noise due to footfall, furniture movement, etc it is recommended a resilient layer shall be incorporated within all floors above residential areas. The resilient layer should achieve an improvement in impact sound insulation of ΔL_w 17 dB. This can typically be achieved with a 5 mm thick resilient layer. Potential suppliers include Regupol (www.regupol.com) and Mason UK (www.mason-uk.co.uk).

Lift Shaft and Risers

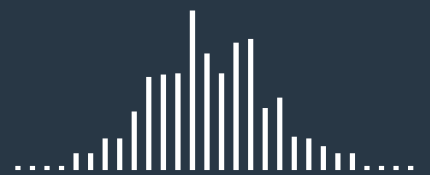
- 6.11 It is understood that the staircases comprise solid blockwork and the lift shaft appears to be of metal stud with plasterboard construction. It is recommended that the existing constructions are determined and reviewed by a suitably qualified acoustic consultant during the design stage to ensure a suitable level of sound insulation is achieved.

Flanking Sound Insulation

- 6.12 Where internal walls abut the facade, the sound insulation achieved between horizontally adjacent rooms should not undermine the sound insulation provided by internal walls.
- 6.13 Acoustically rated walls should break/penetrate any internal plasterboard linings and abut structural elements behind to help control horizontal flanking.
- 6.14 Where internal floors abut the facade, the sound insulation between vertically adjacent rooms should not undermine the sound insulation provided by separating floors.
- 6.15 The facade interface details shall be reviewed during the detailed design stages by a suitably qualified acoustic consultant.

7.0 CONCLUSIONS

- 7.1 Six party wall sound insulation tests have been undertaken. Two party walls fell slightly short of the proposed minimum airborne sound insulation criteria. Remedial work will be necessary to ensure they comply with the specified performance standards in Approved Document E.
- 7.2 Each of the airborne sound insulation tests undertaken across the floors comply with the proposed minimum requirements detailed in Approved Document E of the Building Regulation 2010 (as amended). It is recommended to review each floor design/build-up in detail to ensure future compliance with the proposed minimum sound insulation requirements.
- 6.1 All impact sound insulation test results on the sample of floors comply with the proposed maximum impact sound transmission requirements in Approved Document E. However, any changes to the floor constructions / floor finishes are likely to alter the level of impact sound insulation. It is therefore recommended to review each floor design/build-up in detail to ensure future compliance with the maximum impact sound transmission requirements.



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