

Embassy Village, Manchester

RIBA Stage 3 Acoustic Design Report

Embassy Village

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1.0

Introduction

1.0 Introduction

Cundall has been commissioned by Embassy Village to prepare an Acoustics Design Report for the Embassy Village development in Manchester (hereafter referred to as 'the Development')

The Development looks to redevelop a site beneath railway arches between the Bridgewater Canal and River Irwell into 40 homes for homeless people in the City.

Information and guidance detailed within this report is provided on the understanding that there are no additional Employer's Requirements over and above the minimum standards of Approved Document E of the Building Regulations 2010.

This report addresses the following acoustic issues relating to the development:

- Noise and vibration levels in rooms;
- Sound insulation between rooms;
- Impact sound insulation; and
- Reverberation control.

Details within this report are believed to be accurate at the time of writing. It is strongly recommended, however, that confirmation should be sought from specific manufacturers to see that the minimum performance requirements, as stated within this document, will be achieved by the chosen system / product / installation method.

2.0

Design criteria

2.0 Design criteria

This section of the report outlines the key legislation and guidance relevant to the assessment of noise for a development of this type.

2.1 Approved Document E of the Building Regulations and Employer's Requirements

This section sets out the acoustic performance requirements for 'purpose-built dwelling-houses and flats', as contained within Building Regulations 2010, Approved Document E 2003 [incorporating 2004, 2010, 2013 and 2015 amendments] (ADE).

It is understood that there are no additional Employer's Requirements over and above Part E standards.

2.1.1 ADE Requirement E1 – Sound insulation of party walls / floors

Requirement E1 of ADE applies to the sound insulation of party walls and floors to dwelling-houses and flats. Separating elements are required to be constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjacent buildings.

The following table shows the minimum performance requirements for new build dwellings (ref. ADE, Table 0.1a):

ADE design criteria	Element	Airborne sound insulation $D_{nT,w} + C_{tr}$ dB	Impact sound transmission $L'_{nT,w}$
Purpose built dwelling-houses and flats	Walls	≥ 45	-
	Floors and stairs	≥ 45	≤ 62

Table 1 – ADE sound insulation performance requirements

2.1.2 ADE Requirement E2 – sound insulation of internal partitions

Requirement E2 of ADE does not apply to:

- an internal wall which contains a door;
- an internal wall which separates an en-suite toilet from the associated bedroom;

These are the only partition types that occur within the dwellings and as such ADE Requirement E2 is not applicable to the development.

2.1.3 ADE Requirement E3 – reverberation design in common parts of building

Requirement E3 only applies to the control of reverberation in corridors, stairwells, hallways and entrance halls which give access to a flat or room for residential purposes. ADE Requirement E2 is therefore not applicable to the development.

2.2 Local authority noise policy

2.2.1 Planning conditions

Manchester City Council have provided the following planning conditions (Planning Ref: 129923/F0/2021) in relation to noise and the proposed development.

Planning conditions 18 and 19 relate to acoustic insulation and fixed plant items respectively and state the following.

“17 – Village Hall – Acoustic Insulation

- a. *The The 'Village Hall' premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority. Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 10dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.*
- b. *Prior to occupation of the development a verification report will 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 acceptable 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 agreed noise criteria.”*

18 – Residential – Acoustic Insulation

- a. *The residential accommodation shall be acoustically insulated against noise from the nearby road network and overhead train and Metrolink lines, and any other actual or potential sources of noise, in accordance with the Environmental Noise and Vibration Study dated March 2021 by Fisher Acoustics to achieve the following noise criteria within apartments:
Bedrooms (night time 23:00 to 07:00) - 30 dB LAeq (individual noise events shall not exceed 45 dB L AmaxF by more than 15 minutes);
Living rooms (daytime 07:00 to 23:00) - 35 dB L Aeq Gardens and terraces (daytime) - 55 dB L Aeq.
Due to the proximity of the development to the train and Metrolink lines above the development 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 shall also be factored into the assessment and design.*
- b. *The approved noise insulation scheme shall be completed and a post-completion verification report (including validation that the work undertaken throughout the development conforms to the recommendations and requirements of the above approved acoustic report by Fisher Acoustics and including the results of postcompletion testing to confirm that the internal noise criterion have been met) shall be submitted to and approved in writing by the City Council as local planning authority before any of the dwelling units are first occupied. Any instances of non-conformity with the above approved acoustic report by Fisher Acoustics shall be detailed within the post-completion report along with any measures required to ensure compliance with internal noise criteria. Those measures shall be implemented in full before any of the dwelling units are first occupied.”*

“19 – External Mounted Ancillary Equipment (Acoustics)

- a. *Before first occupation of the development the buildings, together with any externally mounted ancillary equipment, shall be acoustically insulated in accordance with the Environmental Noise and Vibration Study dated March 2021 by Fisher Accoustics in order to secure a reduction in the level of noise emanating from the equipment to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.*
- b. *Prior to occupation of the development a verification report to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report shall be submitted to and approved in writing by the City Council as local planning authority. The verification report shall also undertake post completion testing to confirm that acceptable criteria has 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 agreed noise criteria and timescales for the implementation of those measures.*

2.3 BS 6472:2008 'Guide to evaluation of human exposure to vibration in buildings'

BS 6472:2008 'Guide to evaluation of human exposure to vibration in buildings' describes how to determine the vibration dose value, VDV, from frequency-weighted vibration measurements. The vibration dose value is used to estimate the probability of adverse comment which might be expected from human beings experiencing vibration in buildings.

The significance of effect of VDV is given in terms of probability that the determined vibration dose might result in adverse comment by those who experience it. Table 1 of the document quantifies these values and is reproduced below.

Place and time	Low probability of adverse comment $\text{m}\cdot\text{s}^{-1.75}$	Adverse comment possible $\text{m}\cdot\text{s}^{-1.75}$	Adverse comment probable $\text{m}\cdot\text{s}^{-1.75}$
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.4 to 0.8	0.4 to 0.8

Table 2 - Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings

3.0

Noise and vibration surveys

3.0 Noise and vibration survey

In order to determine the level of noise incident upon the proposed building façade, an environmental noise and vibration survey has been undertaken by Cundall. The findings of this survey are presented in the following sub-sections.

3.1 Site Context

The site is located at Embassy Village, Egerton St, Manchester, M15 4NU and is bounded immediately to the north, west and south by the Bridgewater Canal and Egerton Street to the east. There are rail and tram lines running over the site on viaducts, all of which is shown on the in Figure 1 below, with the proposed site layout overlaid.

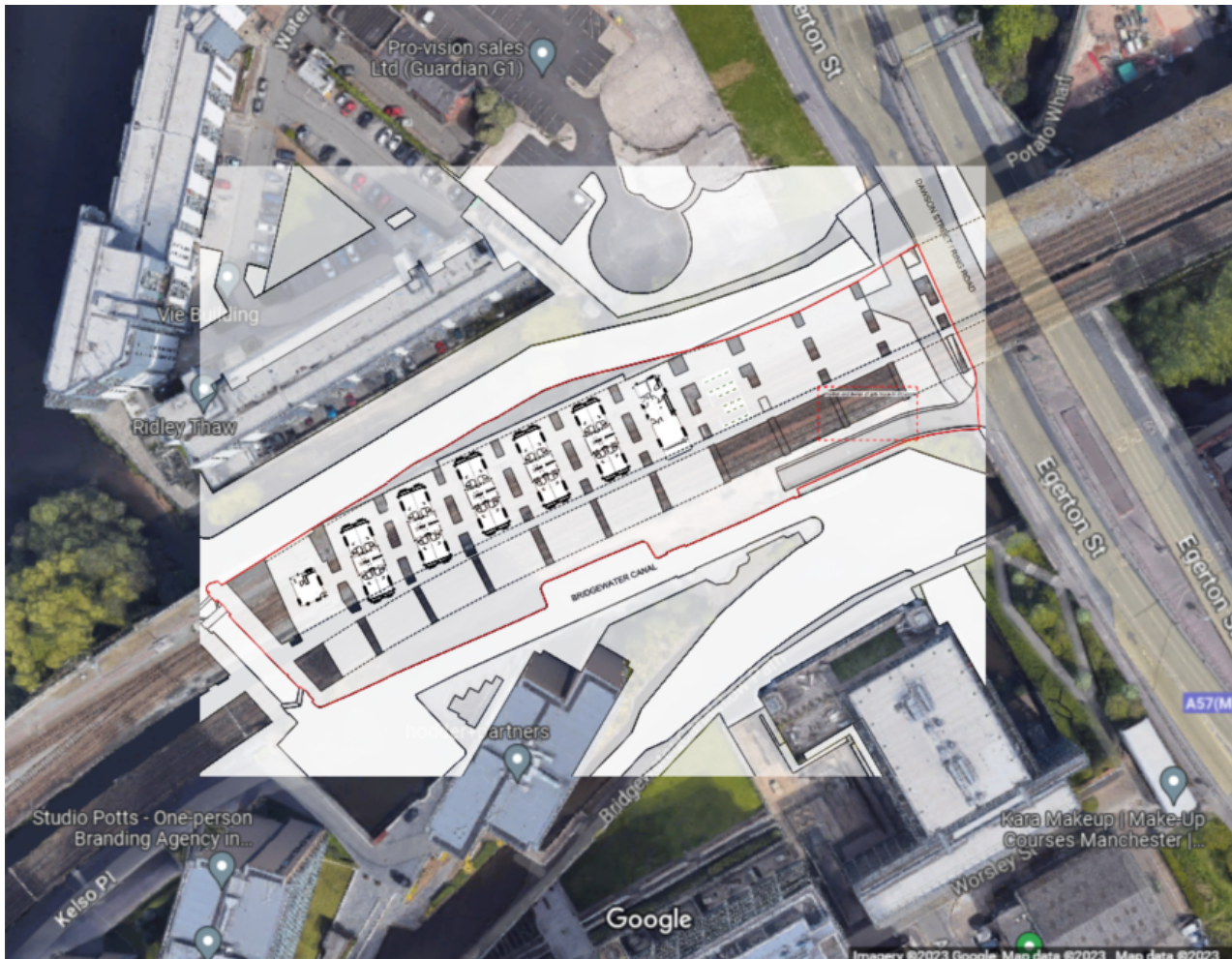


Figure 1 – Site location and layout

The primary noise sources at the site are Egerton Street to the east, and the rail and tram lines over the site. Due to the proximity of the viaducts, vibration measurements have been undertaken at the site to measure the potential vibration levels on site.

3.2 Survey

To assess the prevailing levels of environmental noise and vibration affecting the development site, day- and night-time noise measurements have been undertaken at two positions, assumed to represent typical locations at the site. The two approximate measurement positions are highlighted in Figure 2 below, where the measurement positions were below the railway arches:

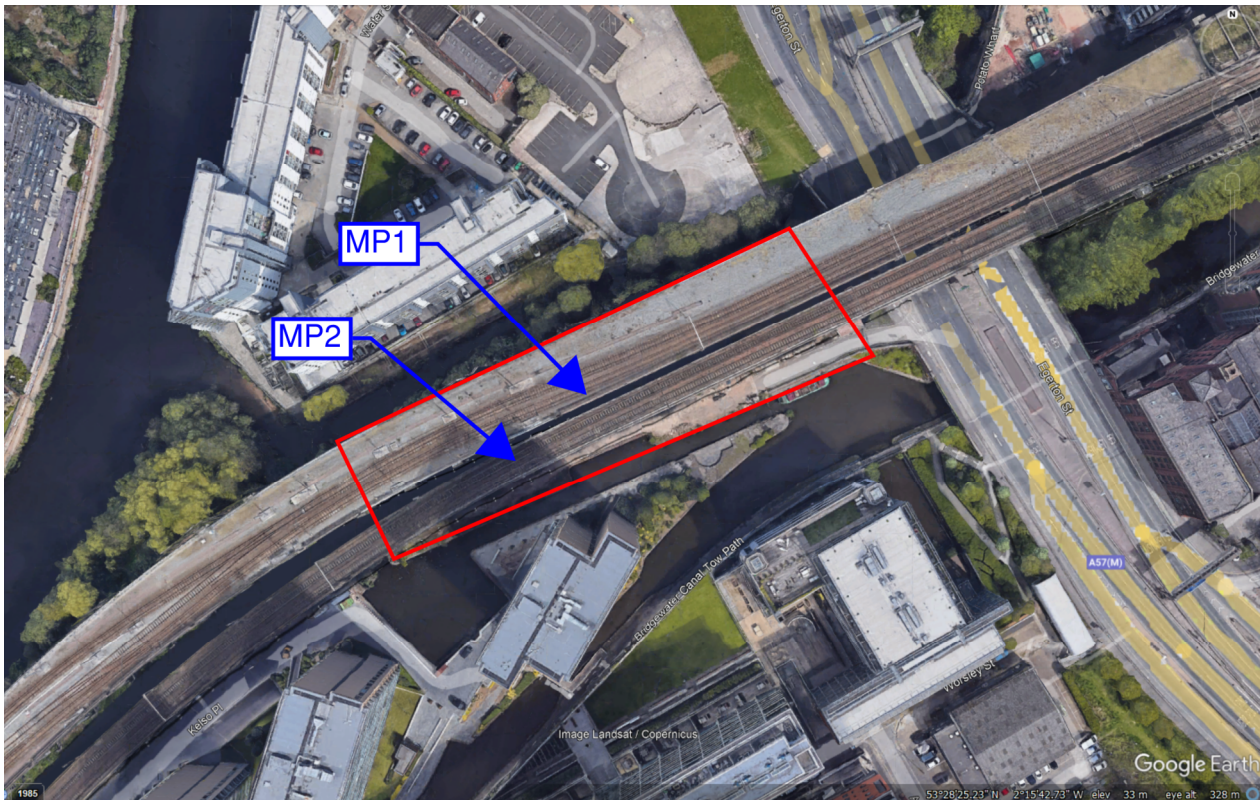


Figure 2 - Approximate measurement positions

Measurements were undertaken between approximately 13:00 on 30 January and 16:30 on 31 January 2023. This period was selected to quantify the loudest and quietest parts of a typical day- and night-time period across the site.

The weather conditions throughout all measurements were cold, dry, still and overcast. All noise measurements were undertaken using an NTi Audio XL2 (serial number: A2A-16315-E0) Class 1 sound level meter and a CEL-633 (serial number: 1211405) Class 1 sound level meter in general accordance with BS EN 60651 and BS 7445. Both microphones were extended with a cable and fitted within a weatherproof enclosure with the microphone at MP1 being mounted on a pole approximately 4 m above local ground level, while the microphone at MP2 was at approximately 1.6m above local ground level.

Both meters were field calibrated before and after all measurement periods, with no significant drift being witnessed. Calibration certificates for all equipment are available upon request.

Monitoring equipment was set up by competently trained Cundall staff, and all measurements have been reported in free-field conditions. Subjective impressions from the site were that the noise climate was dictated by road traffic Egerton Street to the east, with significant intermittent noise from overhead rail movements and occasional noise from the buildings to the north.

Additional to the noise measurements, vibration measurements were undertaken at MP1 between approximately 14:15 and 16:30 on 31 January 2023 to capture a reasonable cross-section of rail movements passing by the site.

Measurements were undertaken using a 01dB Orion (serial number: 10257) with an external battery, which was set flat and level directly on the concrete foundations adjacent to the viaduct.

3.3 Results summary

3.3.1 Noise

A summary of the ambient noise levels recorded in the various time periods are detailed within Table 3 below. The values are the range of logarithmically averaged $L_{Aeq,15min}$, the 10th highest night-time maximum $L_{AFmax,2min}$ and the range

of $L_{A90,15min}$ and $L_{A10,15min}$ values measured. All values have been rounded to the nearest integer value (as fractions of a decibel are imperceptible) and were measured as free-field in dBA.

Monitoring position	Date	Measurement period	Range $L_{Aeq,15min}$ (dB)	10 th Highest Night-time $L_{AFmax,2min}$ (dB)	Range $L_{A10,15min}$ (dB)	Range $L_{A90,15min}$ (dB)
MP1	30 January 2023	12:00 – 23:00	59 – 66	n/a	61 – 68	55 – 58
	30 January 2023 / 31 January 2023	23:00 – 04:30	54 – 62	n/a*	57 – 64	47 – 55
MP2	30 January 2023	13:00 – 23:00	55 – 65	n/a	53 – 77	48 – 72
	30 January 2023 / 31 January 2023	23:00 – 07:00	50 – 65	75	49 – 79	47 – 61
	31 January 2023	07:00 – 16:10	57 – 66	n/a	56 – 77	53 – 67
*Battery failure on site meant full night-time data not available and as such 10 th highest maximum level not deemed relevant						

Table 3 - Summary of noise measurement data

3.3.2 Vibration

The following vibration measurements were undertaken between approximately 14:15 and 16:30 on 31 January 2023. The table below gives the total Vibration Dose Value (VDV) measured over the survey period.

Vibration Axis	Maximum Vibration Dose Value $m/s^{-1.75}$
X axis	0.00255
Y axis	0.00395
Z axis	0.0237

Table 4 - Summary of vibration measurement data

4.0

External façade

4.0 External façade

4.1 Building envelope requirements

Based on Planning Condition 18 as detailed in Section 2.2.1, the external building fabric for all residential dwellings should be designed such that a maximum steady-state internal night-time noise level of $L_{Aeq,8hours}$ 30 dB and a daytime level of $L_{Aeq,16hour}$ 35 dB can be achieved within habitable rooms. Individual noise events in bedrooms should not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night.

4.1.1 Ventilation Strategy

It is understood that the accommodation pods will be ventilated via an attenuated passive inlet duct with extract fans located in the kitchenette and ensuite spaces.

4.1.2 Glazing specification

Calculation procedures follow the “more rigorous calculation method” outlined in BS 8233:2014.

Within the vast majority of traditionally-built façades, the weakest elements of the external elevation are the glazing and any ventilation openings. Normally, the specification of these elements will be the primary factor in determining the internal ambient noise level within residential rooms due to noise ingress from outside. A copy of full detailed BS 8233 break-in calculations is available at request.

The worst-case survey levels between the two positions for each of the relevant parameters is displayed below, alongside the corresponding minimum recommended glazing and ventilation acoustic performance requirements.

Period	Noise Impact (dB)	Internal noise criteria (dB)	Minimum recommended glazing acoustic performance requirements	Minimum recommended ventilation acoustic performance requirements
Daytime	$\leq 62 L_{Aeq,T}$	$\leq 35 L_{Aeq,T}$	Double glazing rated at minimum $R_w + C_{tr}$ 32 dB e.g. 10 mm pane 6 to 20mm air gap 6 mm pane	Ventilation element rated at minimum $\geq D_{n,e,w}$ 37 dB
Night-time	$\leq 58 L_{Aeq,T}$	$\leq 30 L_{Aeq,T}$	This construction is rated at $R_w + C_{tr}$ 32 dB by BS 12354	
	$\leq 71 L_{AF,max}$	$\leq 45 L_{AF,max}$		

Table 5 - Proposed glazing and ventilation 'Conditions'

4.1.3 General glazing and ventilation notes

All windows should be well sealed when closed. It is imperative that the frame does not compromise the performance of the glazing. It is therefore recommended that the frames be of uPVC, hardwood or aluminium constructions and be well sealed into the apertures. Softwood windows could also be used, providing guarantees are given by the manufacturer that acoustic properties will be maintained for the life of the windows.

Although opening windows will not be necessary to provide whole dwelling ventilation, windows will still be openable for occasional purge ventilation as defined in Part F (for example following painting or accidental burning of food).

In these instances, internal ambient noise levels may exceed the proposed internal limits given in Section 2.2 however, this would be considered acceptable due to the infrequent occurrence of this situation, where the requirement to purge takes precedence over low internal ambient noise levels.

4.2 Approved Document O

Approved Document O of the Building Regulations came into force in June 2022 and specifically covers the control of overheating and suitable mitigation for new residential buildings.

The acoustic limits set within the document relate to the use of opening windows as a mitigation strategy against overheating. It is understood the proposed development will not rely on opening windows for Approved Document O compliance and as such acoustic criteria for external noise ingress during periods of overheating are complied with by default.

5.0

Entertainment noise limits

5.0 Entertainment noise limits

As per Planning Condition 17 detailed in Section 2.2.1, it will be necessary to see that amplified music break-out impacts will be suitably controlled.

To meet the requirements of the planning condition, sound levels attributable to amplified music should be limited to 10 dB below the background noise level (L_{A90}) at nearby sensitive receptors. It is understood that no residential accommodation is structurally adjoined and as such limits described for this scenario in Planning Condition 17 have not been considered.

The octave spectrums of the modal measured $L_{A90,15min}$ periods as measured at Position MP2 have been used to define these limits. The following noise limits are proposed which are not to be exceeded at 1 m from the façade of the noise-sensitive receptors:

	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime & Evening (07:00 – 23:00)							
Existing background level, dBA	37	40	45	49	52	48	37
MCC noise limits, dBA	27	30	35	39	42	38	27
Night-time (23:00 – 23:00)							
Existing background level, dBA	23	29	33	38	44	43	37
MCC noise limits, dBA	13	19	23	28	34	33	27

Table 6 – Limiting entertainment noise levels

To see that amplified music noise levels do not exceed the above criteria at the nearest sensitive receptors, it will be necessary to install a suitable limiter within any amplified music systems installed at the development.

6.0

Plant noise emission limits

6.0 Plant noise emission limits

Based on the Planning Condition 19 as detailed in Section 2.2.1, the following plant noise rating limits are proposed, which are not to be exceeded at 1m from the nearest noise sensitive receptor in daytime and night-time hours.

Time period	Representative background sound level, L_{A90} dB*	Plant noise rating level not to be exceeded at 1 m from nearest noise-sensitive receptor - $L_{A,r,Tf}$ (dB)
Daytime (07:00 – 23:00)	56	51
Night-time (07:00 – 23:00)	48	43
*Based on modal L_{A90} occurrences at position MP2. Background levels were consistently lower at this location with full night-time data also available so considered the most suitable for this assessment		

Table 7 - Limiting plant noise rating level

The above limit is applicable to the cumulative noise level from all new items of plant when running under normal operation. Where applicable, acoustic feature corrections should be applied to the specific plant noise level to account for any distinguishable acoustic characteristics (e.g. tonality, impulsivity, intermittency).

It will be necessary to whether items of plant will meet the rating limits set out above once finalised plant selections have been determined.

7.0

Vibration assessment

7.0 Vibration assessment

As detailed in Section 2.2.1 Planning Condition 18 states a vibration assessment should be undertaken in line with BS 6472:2008 'Guide to evaluation of human exposure to vibration in buildings'. This standard describes how to determine the vibration dose value, VDV, from frequency-weighted vibration measurements. The vibration dose value is used to estimate the probability of adverse comment which might be expected from human beings experiencing vibration in buildings.

Where vibration conditions are constant or repeated regularly, a representative sample can be used to extrapolate the likely VDV for a whole daytime period. In the case of the vibration survey as detailed in Section 3.3.3, this can be calculated with Equation (2) in BS 6472 as follows.

$$VDV_{b/d,day} = \left(\frac{t_{day}}{t_{\tau}} \right)^{0.25} \times VDV_{b/d,\tau}$$

Where: $VDV_{b/d,\tau}$ is the VDV measured over the survey period, t_{τ} is the time length of the survey period, t_{day} is the time of the total day assessed over and $VDV_{b/d,day}$ will be the predicted total VDV over the day.

This gives the following estimated daytime values for each vibration axis, and the resultant corresponding probability of adverse comment as per the value ranges given in Table 2.

Vibration Axis	Survey Vibration Dose Value $m/s^{-1.75}$	16 hour Vibration Dose Value $m/s^{-1.75}$	8 hour Vibration Dose Value $m/s^{-1.75}$	BS 6472 Probability of adverse comment
X axis	0.00255	0.00416	0.00350	Low probability of adverse comment
Y axis	0.00395	0.00645	0.00542	
Z axis	0.02370	0.03870	0.03254	

Table 8 - Summary of vibration measurement data

These levels were measured during the day-time period with additional sources of vibration present and no corrections have been made for limited tram movements during the night-time period, these levels represent a worst-case scenario.

As can be seen from the worst-case results shown in Table 7 above, even with the concrete breaking occurring during the measurement period at MP1, the 16-hour and 8-hour VDV levels are compliant with the requirements of the Hilton Brand Standards and below the guideline values in BS 6472.

8.0

Partitions and floors

8.0 Partitions and floors

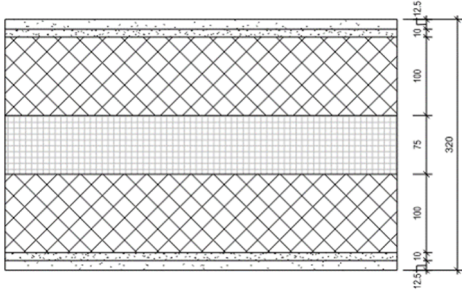
All calculations and designs in this report have been undertaken and assessed based on the following information and assumptions:

- All specifications have been assessed in light of meeting the requirements of Approved Document E;
- The performance of suggested wall specifications has been based on experience of similar construction types available via data provided in relevant manufacturers' literature;
- A good standard of workmanship has been assumed throughout the build phase of the project. Incorrectly or poorly built acoustic elements may result in a significant reduction in performance and potential failure to meet the required standards upon commissioning;
- It has been assumed that flanking sound transmission will be adequately controlled between all sensitive spaces.

Separating walls between adjacent dwellings, and from dwellings to corridors / circulation spaces are required to achieve the Approved Document E minimum airborne sound insulation values.

8.1 Party wall constructions (ADE Requirement E1)

It is understood that the party walls proposed comprise the following build-up.

Party wall build-up	
▪ One layer 12.5mm Gypsum Wallboard ▪ 10mm dot and dab layer ▪ 100mm Innerleaf Blockwork ▪ 75mm Cavity with 75 mm Isover Roll ▪ 100mm Innerleaf Blockwork ▪ 10mm dot and dab layer ▪ One layer 12.5mm Gypsum Wallboard Overall thickness: ≥ 320 mm	

The above wall build-up is based on Robust Detail E-WM-17. Given that Robust Details are designed to ensure compliance with Approved Document E, it is expected that this build-up will meet the minimum acoustic requirements. Further details of the elements of the build-up should be reviewed, with the following parameters providing a guide that is line with details provided in the Robust details document.

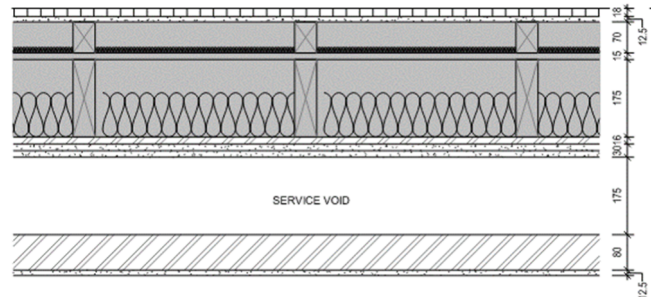
- Block density 1350 to 1600 kg/m³
- Wall ties to follow Approved Document E specifications for 'Tie Type A'
- Gypsum based board minimum 8 kg/m²

8.2 Party floor construction (ADE Requirement E1)

It is understood that the proposed party floors comprise the following build-up.

Party floor build-up

- 18mm T&G Flooring Board
 - 12.5mm Gypsum based Board
 - 70mm fft1 resilient composite deep battens
 - Mineral Wool Quilt laid between battens 13mm (min) 33-36kg/m³, or 25mm (min) 10-36 kg/m³
 - 15mm thick (11mm min) Wood based Board, density 600 kg/m³ (min) or walker timber perforated deck system
 - 50x175 c24 Timber Joists
 - 100mm Mineral Wool Quilt Insulation (or Collecta micro 50)
 - 16mm (min) Metal Resilient Ceiling Bars mounted at right angles to the joists at 400mm centres
 - 2 layers of 15mm Gypsum based Board
 - Minimum 145mm service void
 - 80mm mf Ceiling Frames
 - 12.5mm gypsum board
- Overall thickness: ≥ 420 mm



The above wall build-up is based on Robust Detail E-FT-1, with floor type E-FT-2 and ceiling type CT2. Given that Robust Details are designed to ensure compliance with Approved Document E, it is expected that this build-up will meet the minimum acoustic requirements.

8.3 Junction detailing

Appropriate detailing of the party wall at the following junctions is critical in ensuring that the acoustic performance is maintained on site.

- Partition head detail
- Partition base detail
- Abutment to external façade

The Architects Stage 3 details for the head junctions, base junctions and party floor to external façade junctions are provided overleaf (from AEW Architect's Drawing 13095-AEW-B1-XX-DR-A-6002 Rev P02).

These details are considered suitable for the control of noise flanking.

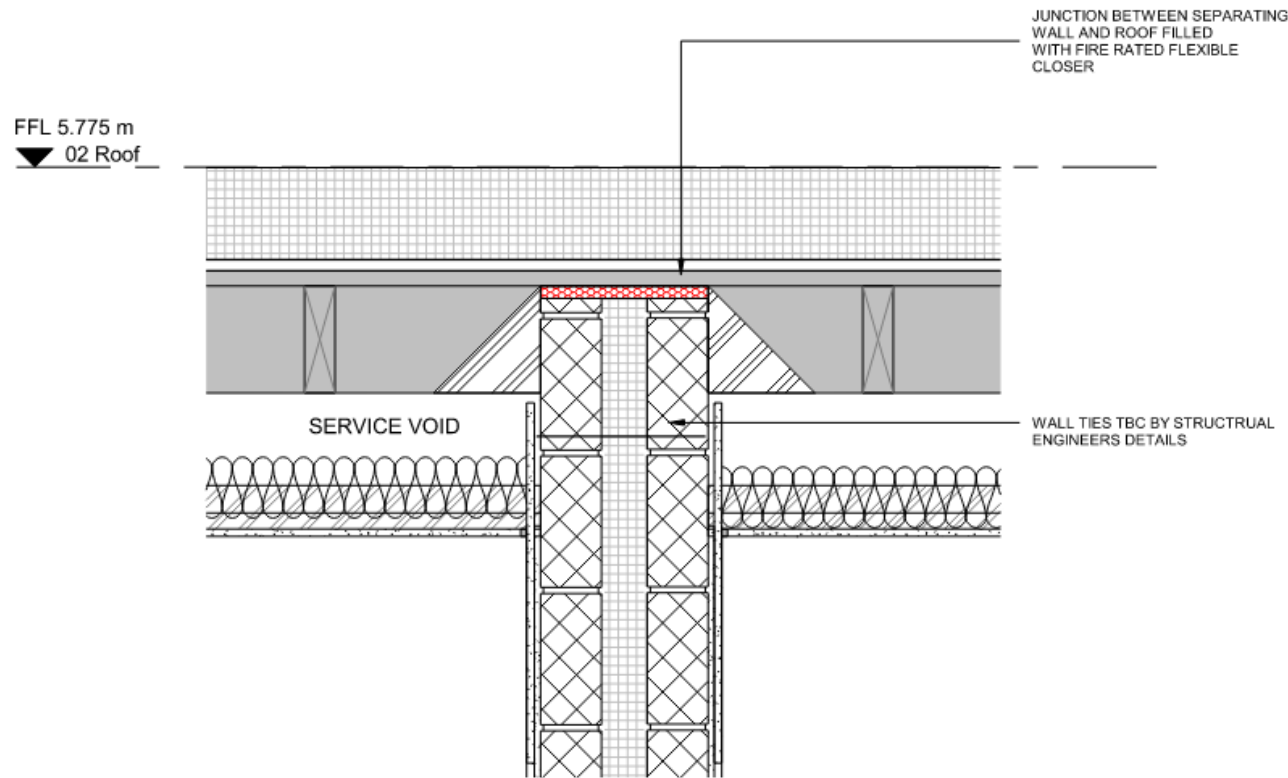


Figure 3 - Party wall head detail

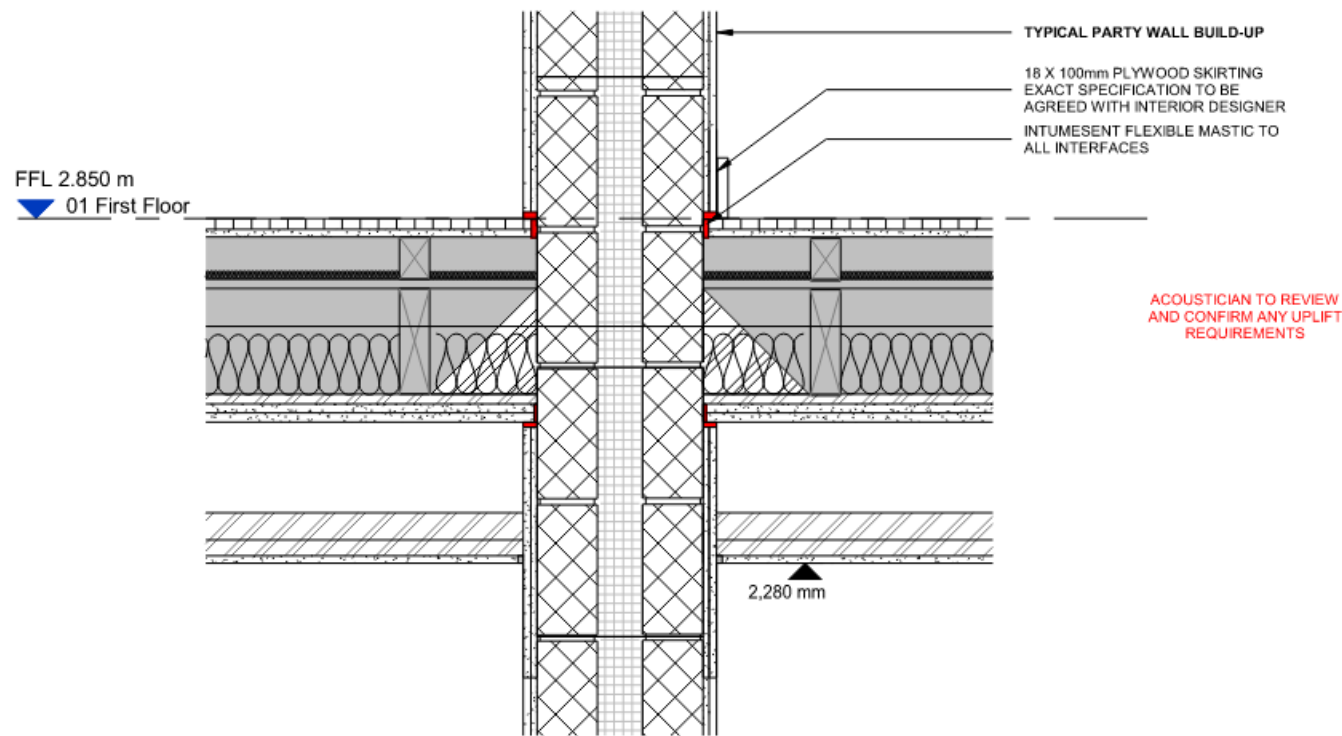


Figure 4 - Party wall / party floor junction detail

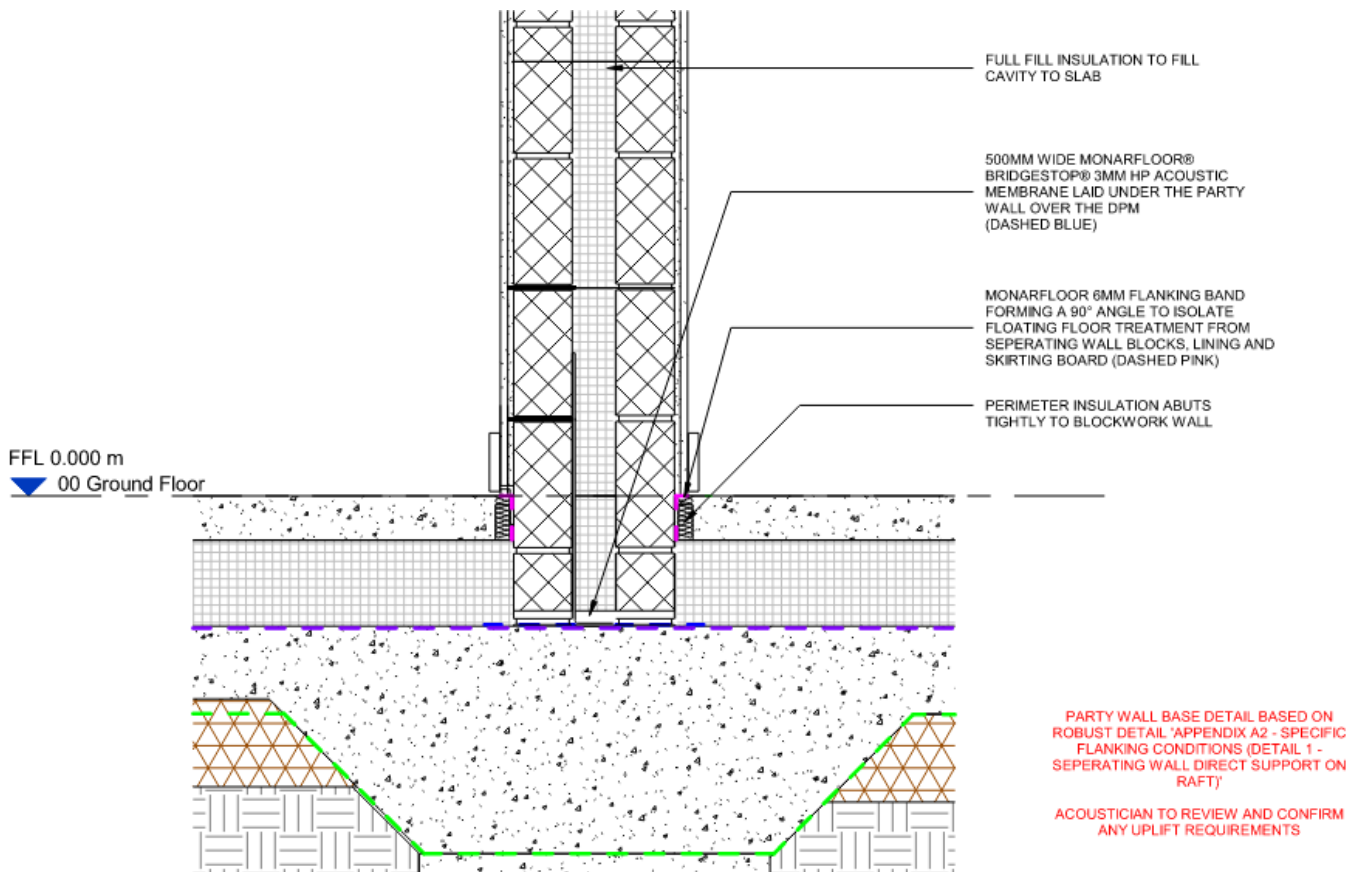


Figure 5 - Party wall base detail

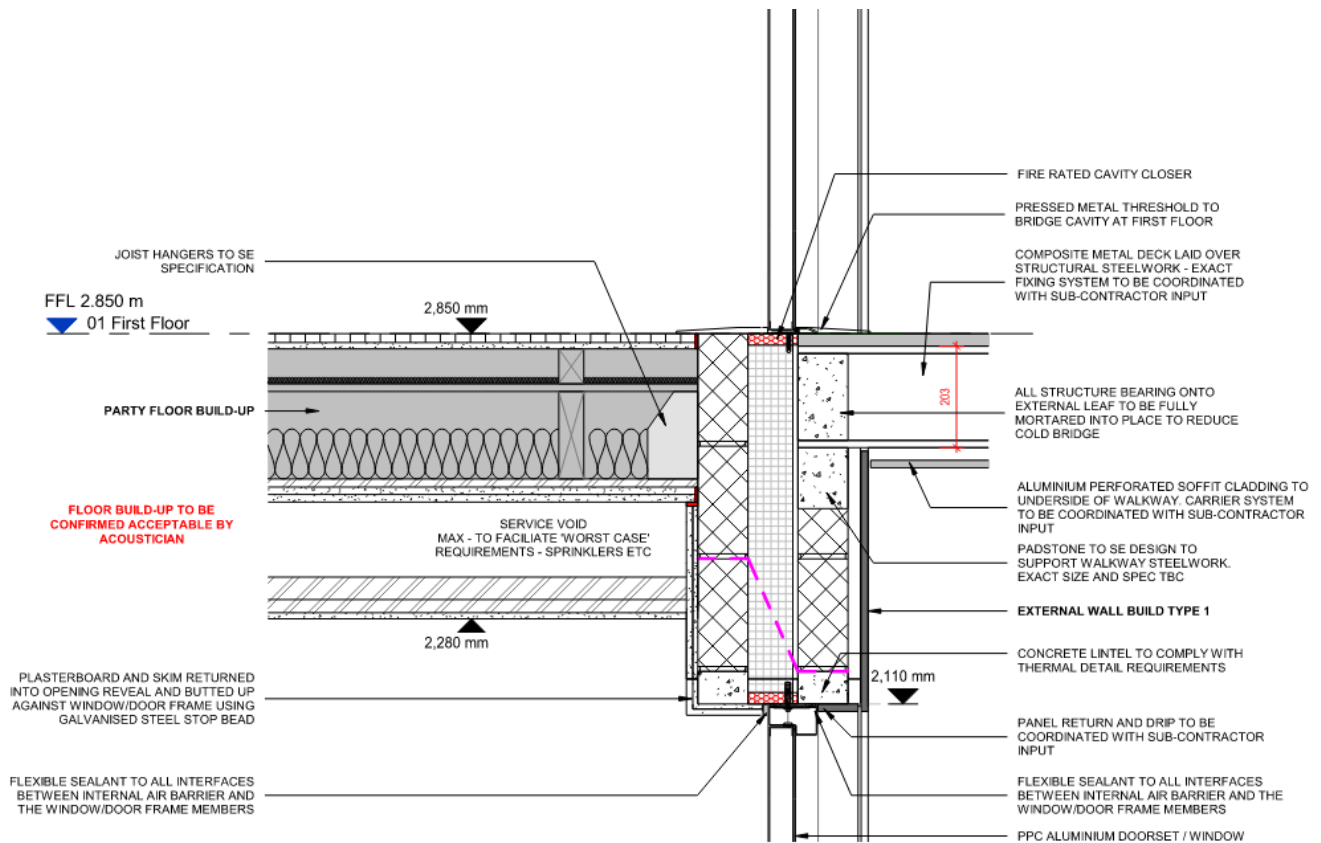


Figure 6 - Party floor / external facade junction detail

Details have not been provided in the architect's Stage 3 pack showing the construction where party walls will abut the external façade.

It is suggested that principles highlighted in Robust Details are followed when considering the design of this junction, as reproduced in the figure below.

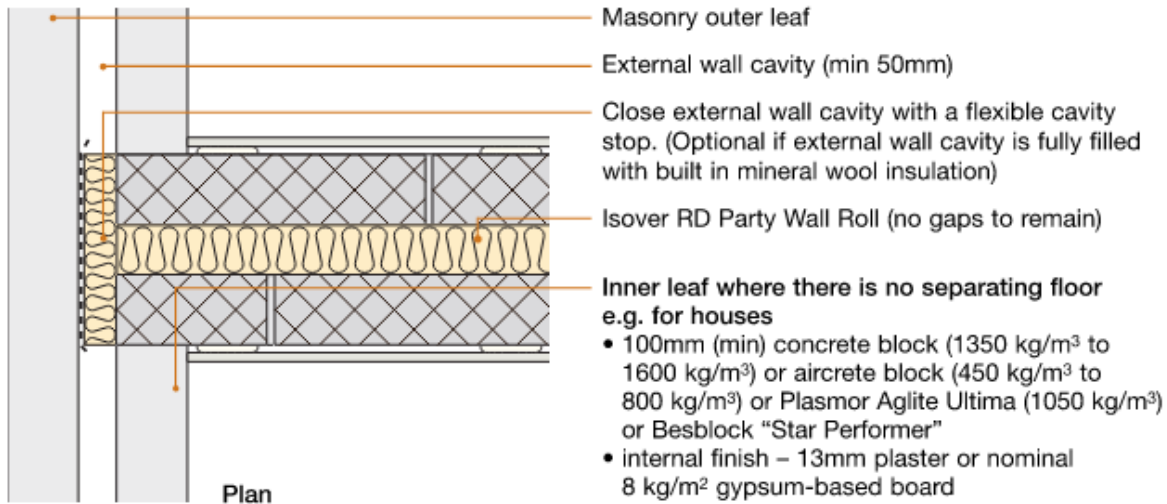


Figure 7 - Robust details external wall / party wall junction detail

The above serves as a guide only, exact details should be forwarded to Cundall for review when available.

9.0

Other details

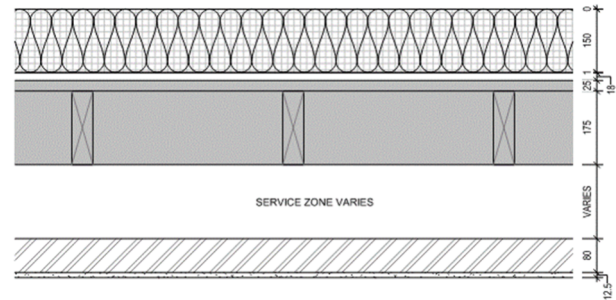
9.0 Other details

9.1 Roof construction

It is understood that the roof proposed comprises the following build-up.

Party wall build-up

- Single ply Membrane Layer
- 150mm Insulation
- Vapour control layer laid on top 18mm WBP Ply
- Timber Furling Layer to accommodate roof slope (25mm)
- 50x175 c24 timber joists
- 80mm MF Ceiling Frame
- 1 layer 12.5mm Gypsum Board



It is considered that the construction may not adequately protect against the ingress of environmental noise in relation to matching the performance of the external wall and glazing / ventilation elements. It is suggested that to suitably control against the ingress of environmental and rain drumming noise, the ceiling finish be upgraded to:

- Two layers 15 mm Gyproc SoundBloc Board
- 50 mm Isover Insulation Roll laid on top of ceiling board

9.2 Services

All soil and vent pipes (SVP) and rainwater pipes (RWP) should ideally be contained within risers and should not run vertically through apartments.

Any fire stopping where SVPs / RWPs passes through each party floor shall be flexible and prevent rigid contact between the service and floor construction.

Should SVPs / RWPs run horizontally through ceiling voids, it is considered that a single layer of boarding would be sufficient (i.e. the MF plasterboard ceiling providing the additional attenuation). Such SVPs / RWPs would require lagging with 25 mm mineral wool insulation strapped in place. Note: this assumes that the SVP / RWP in the adjacent space is similarly treated.

There should be no services passing through party walls.

Items of mechanical plant should be fitted with appropriate vibration isolation measures, selected specifically for the point loading and speed of moving parts within the item of plant. All anti-vibration mounts shall provide at least 95% efficiency.

It is advised that all access doors to risers should be rated at 29 dB R_w . This requirement relates to the acoustic performance of the doorset as a whole i.e. including any perimeter seals.

10.0

Pre-completion testing

10.0 Pre-completion testing

All dividing element constructions specified above have been selected to provide appropriate levels of sound insulation and transmission, based on manufacturer's literature, and relevant previous experience.

Actual acoustic performance of dividing elements will be dictated by quality of workmanship and detailing. Performance of dividing elements cannot be guaranteed and shall be verified by an appropriate testing regime.

The performance standards that should be demonstrated by pre-completion testing are set out within Section 2.1. These sound insulation values have a built-in allowance for testing uncertainty, therefore if any test shows that one of these values has not been achieved by any margin, the test has failed.

Tests should be carried out between living spaces that share a common area of separating wall or floor, once the rooms are essentially complete but undecorated.

Building Control will generally require 10% of a residential development to be tested, based on homogeneous construction of separating wall and floor elements. Results apply only to the particular constructions tested, but are assumed by Building Control to be indicative of the performance of others of the same type in the same development. The construction of flanking elements and their junctions are also important. Where there are significant differences between flanking details, further testing will be necessary.

In traditional residential dwellings and apartments, one 'set' of tests should comprise six individual tests (four airborne and two impact tests).

In the event of a failed set of tests, appropriate remedial treatment should be applied to the rooms that failed the test. A failed set of tests raises questions over the sound insulation between other rooms sharing the same separating element type. Building Control will need to be satisfied that such rooms meet the required standards. This could be achieved as follows:

- Additional testing, and/or
- Applying the appropriate remedial treatment to the other affected rooms, and/or
- Demonstrating that the cause of failure does not occur in other rooms.
- After a failed set of tests, Building Control may require additional testing until satisfied that the problem has been solved.

Following completion of the agreed testing programme, a report should be issued detailing test procedures, other information required by Approved Document E, and individual test results to demonstrate compliance with the performance standards given above.

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