Plot H, Manchester

Commercial Units and Resident's Gym Noise and Vibration Impact Assessment

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1. Introduction

This Technical Note presents a noise and vibration assessment undertaken to support the Proposed Development at Plot H, located within Manchester City Centre.

The Proposed Development comprises the redevelopment of the Plot H site for Purpose Built Student Accommodation, with ancillary commercial uses, landscaping, access and associated works.

The assessment addresses the potential for noise break-out from the three proposed commercial units and a residents' gymnasium, considering their effect on the nearest on-site and off-site sensitive receptors.

In addition, the assessment considers sound transmission between the ground-floor commercial units and the student residential accommodation located directly above, to ensure that internal noise levels are appropriately controlled.

Finally, this Technical Note sets out noise and vibration design limits and associated guidance for the proposed residents' gymnasium, focusing on the protection of on-site receptors, including adjoining student living spaces and other noise-sensitive areas within the development.

2. The Site

2.1. Site Location

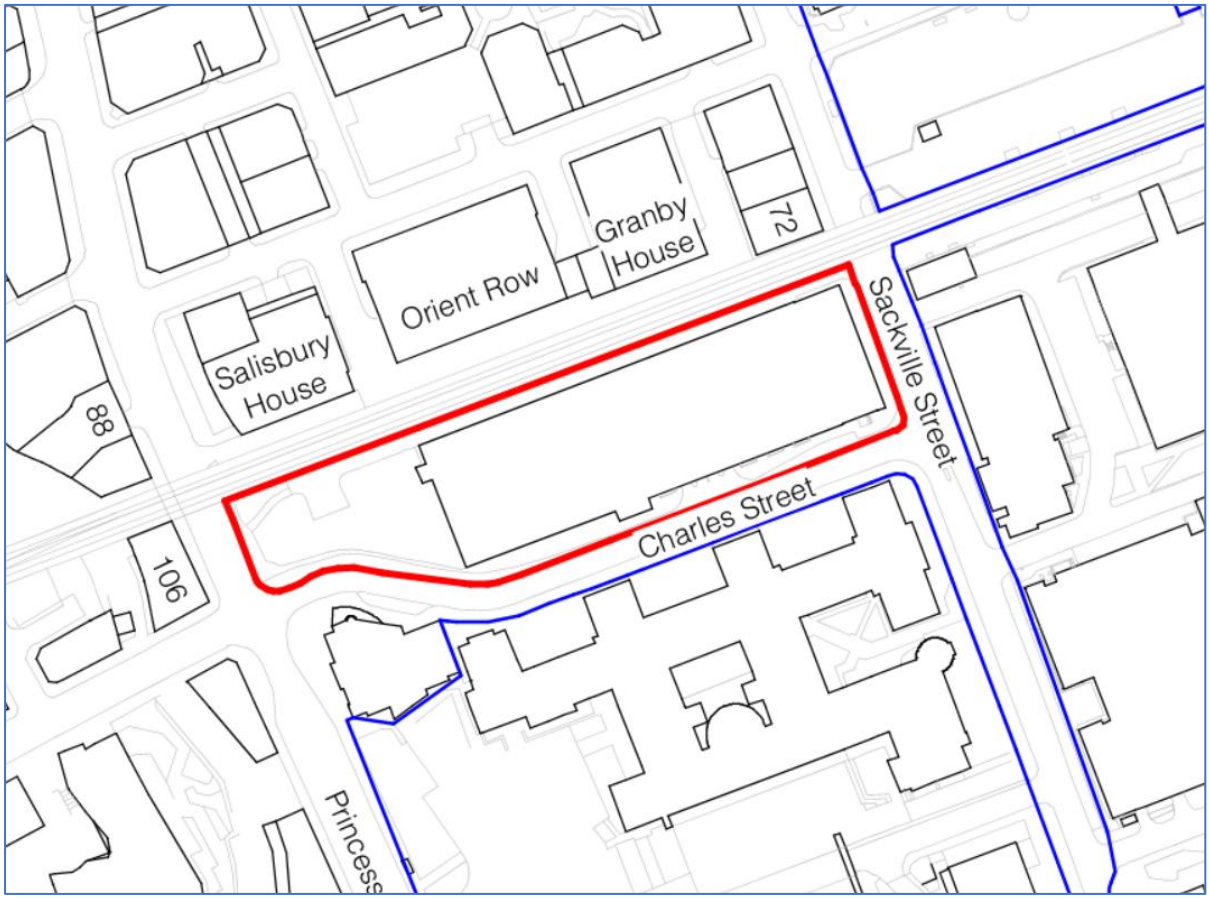
The Site is in Manchester City Centre and is bound by Charles Street to the south, Manchester South Junction and Altrincham Railway Viaduct and Granby Row to the north, Sackville Street to the east and Princess Street to the west. The red line encompasses all highways works proposed as part of the Proposed Development.

The Site currently comprises the vacant Charles Street multi-storey car park and three ancillary commercial uses, all of which are now vacant. As of today (October 2025) the buildings are in situ.

While the Site is not located within a Conservation Area, the Site's northern boundary lies adjacent to the Whitworth Street Conservation Area.

The Site location is illustrated in Figure 1 below.

Figure 1: Site Location



2.2. Proposed Development and Proposed Commercial/Gym Uses

The Proposed Development comprises Purpose Built Student Accommodation (PBSA) with ground floor flexible commercial floorspace across three buildings of 8, 11 and 38 storeys, connected by a five-storey podium.

The Proposed Development includes three ground-floor commercial units and a residents' gymnasium located at first floor level. The relevant ground and first floor GA Layouts are presented in Figures 2 and 3 below.

Figure 2: Ground Floor GA Layout

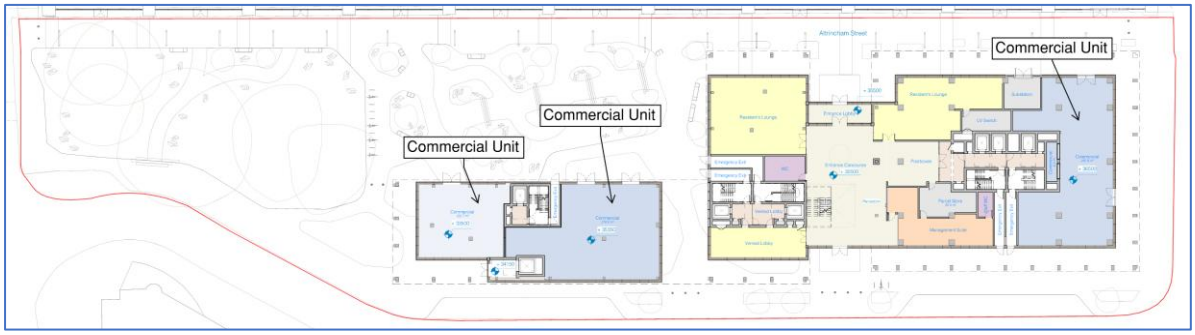


Figure 3: First Floor GA Layout



Commercial Units

The three proposed commercial units will fall within Use Class E (Commercial, Business and Service), specifically:

- E(a) Display or retail sale of goods, other than hot food
- E(b) Sale of food and drink for consumption (mostly) on the premises – excluding hot food
- E(c) Provision of:
    - E(c)(i) Financial services,
    - E(c)(ii) Professional services (other than health or medical services), or
    - E(c)(iii) Other appropriate services in a commercial, business or service locality
- E(g) Uses which can be carried out in a residential area without detriment to its amenity: (i, ii, iii).

For the purpose of this assessment, worst-case internal noise levels are considered representative of restaurant or café-type environments, involving typical customer activity, light catering operations, background music, and general hospitality noise.

First Floor Resident's Gym

The residents' gymnasium, serving on-site student residents only, is expected to generate low-level amplified music and activity noise, together with impact and structure-borne vibration from fitness equipment use.

The assessment therefore considers both airborne and structure-borne sound transmission from gym activities to adjoining and underlying residential areas, ensuring that internal noise and vibration levels remain within acceptable limits for student living accommodation.

2.3. Sensitive Receptors

2.3.1. Off-site Receptors

The surrounding area contains a variety of off-site noise and vibration-sensitive receptors, primarily comprising private residential properties, Purpose Built Student Accommodation (PBSA), hotels, and educational or research buildings. These receptors have been identified and considered within the subsequent noise and vibration assessment.

The receptors listed below represent the nearest and most relevant to the proposed ground-floor commercial units and first-floor residents' gymnasium, ensuring a focused and proportionate assessment of potential effects impacts:

Private Residential:

- North-west: Salisbury House – residential apartments
- North: Orient House – residential apartments
- North: Granby House – residential apartments
- North: Fairbairn Building – residential apartments

PBSA Residences/Hotels:

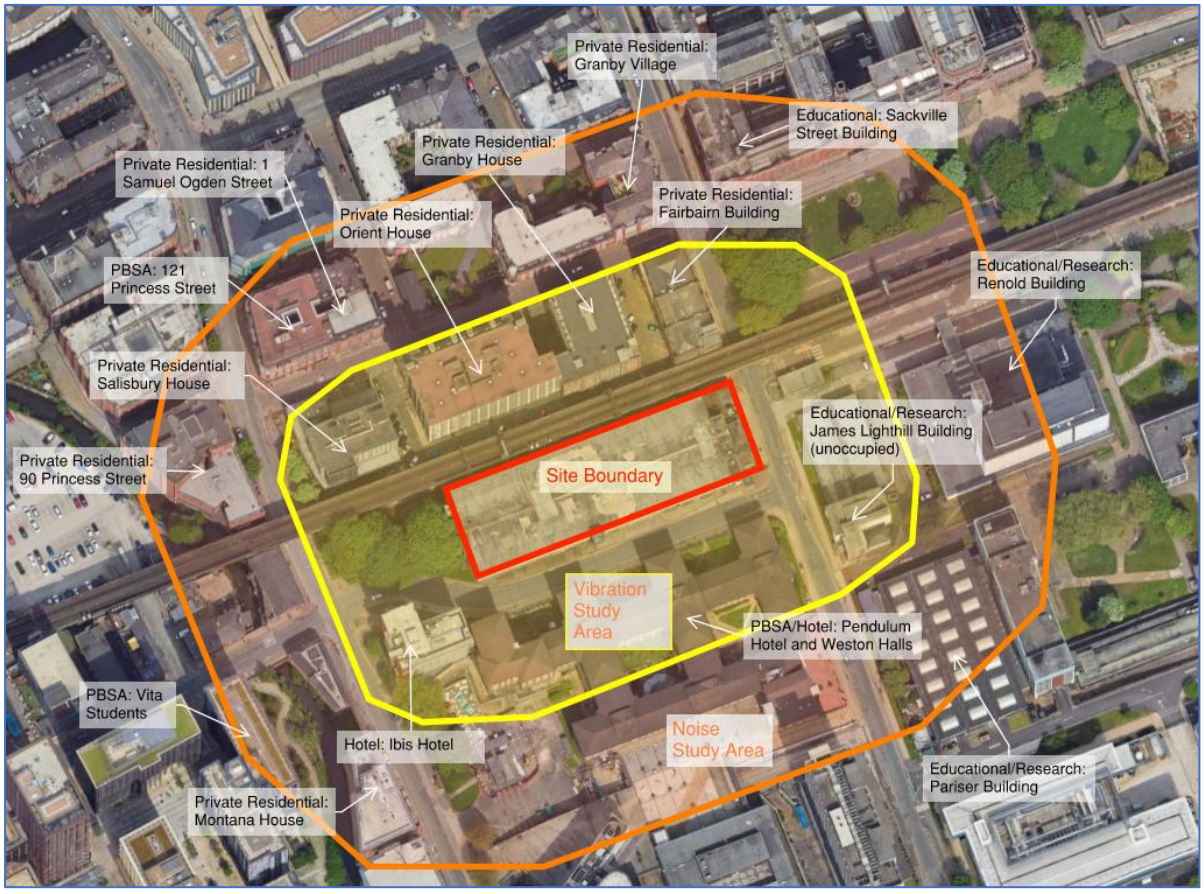
- South: Pendulum Hotel / Weston Hall (PBSA)
- South-west: Ibis Hotel

Educational/Research Buildings:

- East: James Lighthill Building (understood to be currently unoccupied)

Figure 4 below illustrates the Site boundary, study areas, and identified sensitive receptors.

Figure 4: Site Boundary, Study Areas and Sensitive Receptors



2.3.2. On-site Receptors

In addition to the above, the assessment also considers on-site receptors, specifically the proposed student residential accommodation located directly above and adjacent to the commercial units and residents' gymnasium.

3. Commercial Units – Noise Impact Assessment

3.1. Assessment of Internal Activity Noise Break-out

3.1.1. Legislative and Policy Context

This Technical Note supports the Noise and Vibration Chapter of the Environmental Statement (ES) submitted with the full planning application for the Proposed Development at Plot H, Manchester City Centre, prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

In line with these Regulations, the assessment of noise effects accords with the national planning policy framework for noise, comprising:

- National Planning Policy Framework (NPPF, 2025): Requires that planning policies and decisions aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development, to mitigate and reduce to a minimum other adverse impacts, and to recognise that development will often create some noise.

- Noise Policy Statement for England (NPSE, 2010): Sets the long-term vision to promote good health and quality of life through the effective management of noise, with aims to avoid significant adverse impacts, mitigate and minimise adverse impacts, and where possible contribute to improvement.

- Planning Practice Guidance (PPG: Noise): Expands on the NPPF, introducing the Noise Exposure Hierarchy (NOAEL – LOAEL – SOAEL) and advising on how planning can identify and manage noise to protect health and amenity.

At the local level, the Manchester Core Strategy Development Plan Document (2012 – 2027) provides the statutory planning framework. The following policies are relevant to this assessment:

- Policy DM1 – Development Management: Requires that all development has regard to its effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation, and that proposals which would be sensitive to existing environmental conditions, such as noise, demonstrate appropriate consideration of those effects.

- Policy H12 – Purpose Built Student Accommodation: Requires that consideration should be given to the design and layout of the student accommodation and siting of individual uses within the overall development in relation to adjacent neighbouring uses. The aim is to ensure that there is no unacceptable effect on residential amenity in the surrounding area through increased noise, disturbance or impact on the streetscene, either from the development itself or when combined with existing accommodation.

- Policy C10 – Employment and Industry: States that the proposed use should not create an unacceptable impact on neighbouring uses in terms of noise, traffic and disturbance.

These policies are supported by Saved Policy DC26: Development and Noise, which confirms the Council's intention to use the development control process to reduce the impact of noise on people living and working in, or visiting, the City and to require mitigation where new development could generate or be exposed to high noise levels.

To implement these policies, Manchester City Council's Planning and Noise Technical Guidance (October 2022) sets out the approach for assessing and controlling noise in development proposals.

Section 3.7.1.5 – Industrial / Commercial Developments states that:

"BS 4142 should be used to assess the likely impact of noise from industrial and commercial sources at noise sensitive premises… The design objective should be that the development is designed so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

This criterion forms the basis of the design standard applied to the assessment of internal activity noise break-out from the proposed commercial units.

3.1.2. Assessment Criteria

Following BS 4142: 2014 + A1: 2019 (Methods for rating and assessing industrial and commercial sound) and the MCC Technical Guidance, the assessment adopts the requirement that noise emissions associated with internal activity within the three proposed Use Class E units shall not exceed a level equivalent to 5 dB below the representative background sound level (L_{A90}) at the façades of the nearest noise-sensitive receptors.

Although the commercial units will not include fixed plant, applying this criterion provides a robust and precautionary benchmark consistent with both local policy and national planning guidance.

For on-site residential receptors, every effort should be made to achieve the same acoustic standard where practicable. However, these future occupants will reside within a mixed-use city-centre environment and will do so with an understanding of the existing and anticipated activity levels typical of such a setting.

The assessment assumes the commercial units will operate during daytime and evening hours only (07:00 – 23:00), consistent with typical planning expectations for city-centre mixed-use developments.

3.1.3. Prediction Methodology

Noise break-out from internal activities within the three proposed commercial units was modelled using Cadna/A environmental noise prediction software, implementing the calculation procedures set out in ISO 9613-2:2024 – Acoustics: Attenuation of sound during propagation outdoors.

The model accounted for distance attenuation, façade reflections, screening, and diffraction effects associated with existing and proposed buildings and structures within and surrounding the Site. Ground absorption, atmospheric attenuation and building orientation were also incorporated in line with good acoustic modelling practice.

For the purpose of this assessment, internal activity noise levels within the commercial units were assumed to represent a reasonable worst-case scenario equivalent to a busy café or restaurant environment, consistent with the proposed Use Class E.

These reference levels are derived from measurements at comparable premises and are considered both representative and robust for planning assessment purposes.

Table 1: Assumed Maximum Internal Activity Noise Levels $L_{p,rev}$

Internal Reverberant Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
73	71	73	72	71	68	64	53	75

The proposed façades are expected to comprise predominantly glazed elevations. A conservative assumption was adopted, treating the entire façade as standard thermal double glazing, with minimum sound reduction indices as shown below.

Table 2: Minimum Façade Sound Reduction Performance

Sound Reduction Performance R (dB) at Octave Band Centre Frequency (Hz)								$R_w + C_{tr}$ (dB)
63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
19	24	20	25	34	37	35	35	27

Each unit was represented in the model as an area source corresponding to its external glazed façades.

The internal source levels from Table 1 were assigned to these façades, reduced by the frequency-dependent sound insulation values from Table 2. The resulting predicted façade-emitted sound power levels were then propagated to all identified off-site and on-site receptors to determine compliance with the design criterion of 5 dB below background (L_{A90}) as defined by the Manchester City Council Planning and Noise Technical Guidance (2022).

3.1.4. Predictions and BS 4142 Assessment

Specific Sound Level Results

Using the prediction methodology and assumptions outlined in Section 3.1.3, the specific sound level at the façades of the nearest off-site and on-site noise-sensitive receptors was determined.

Predictions represent the worst-affected window or façade of each receptor, assuming simultaneous operation of all three commercial units under the maximum internal activity conditions.

Table 3: Predicted Specific Noise Levels at the Nearest Noise Sensitive Receptors

Receptor	Predicted Specific Noise Level dB
	Daytime (07:00 to 23:00) $L_{Aeq,1hour}$
Residential flats at Salisbury House	21
Residential flats at Orient House	22
Residential flats at Granby House	23
Residential flats at Fairbairn Building	19
Pendulum Hotel/Weston Halls PBSA	28
Ibis Hotel	21
Nearest proposed habitable room (on the first floor)	37

Feature Correction Applicability

In accordance with BS 4142: 2014 + A1: 2019 – Methods for rating and assessing industrial and commercial sound, the identified specific sound levels were reviewed for characteristic acoustic features that could increase the perceptibility of the source, including tonality, impulsivity, intermittency and distinctiveness.

- **Tonality**: The predicted activity noise from the proposed Use Class E commercial units will comprise broad-band, low-level human activity and light catering sounds. Such sources are not expected to exhibit any distinct tones. On this basis, no tonality correction has been applied.

- **Impulsivity**: The anticipated sound sources (e.g. conversation, background music, crockery, and equipment use) are not impulsive in nature, and therefore no impulsivity correction has been applied.

- **Intermittency**: Customer activity and internal noise levels may fluctuate during operating hours, and periods of relative quiet may occur between busy times. To account for potential perceptible variations in activity, a +3 dB correction has been applied for intermittency, consistent with BS 4142 guidance.

Accordingly, a +3 dB feature correction has been added to the predicted specific noise levels to determine the rating levels ($L_{Ar,T}$) for comparison with the prevailing background sound levels.

BS 4142 Noise Impact Assessment

The resultant rating levels were compared with the measured typical background sound levels ($L_{A90,T}$) obtained by Blackbird Acoustics during the July 2025 baseline survey (referenced within the Noise Impact Assessment, report ref. 2151.Rep.AAR dated 19th November 2025).

Table 4: BS4142 Commercial Noise Impact Assessment (Daytime Only)

Location	Typical Background Sound Level, $L_{A90,T}$, dB	Predicted Specific Sound Level dB $L_{Aeq,1hour}$	Applicable Feature Correction dB	Predicted Rating Level dB $L_{Ar,1hour}$	Rating against Typical Background Sound Level (dB)
Residential flats at Salisbury House	46 (P1)	21	21	24	**-22**
Residential flats at Orient House	46 (P1)	22	22	25	**-21**
Residential flats at Granby House	46 (P1)	23	23	26	**-20**
Residential flats at Fairbairn Building	46 (P1)	19	19	22	**-24**
Pendulum Hotel/Weston Halls PBSA	47 (P2)	28	28	31	**-16**
Ibis Hotel	48 (P3)	21	21	24	**-24**
Nearest proposed habitable room (on the first floor)	46 (P1)	37	37	40	**-6**

All off-site receptors experience predicted rating levels at least 16 – 24 dB below the prevailing background sound level, significantly exceeding the MCC Technical Guidance design objective of 5 dB below background for industrial and commercial noise.

For the nearest on-site receptor (student accommodation directly above the commercial units), the predicted rating level is 6 dB below background, also satisfying the low-impact threshold defined in BS 4142, and comfortably within the criteria of the Manchester City Council Planning and Noise Technical Guidance (Section 3.7.1.5).

Accordingly, the predicted contribution of commercial activity noise is negligible, representing a low impact in BS 4142 terms and an acceptable outcome in planning and EIA terms. No further mitigation is required beyond standard good-practice building and fit-out measures.

3.2. Sound Insulation Between Commercial and Residential Separating Structures

3.2.1. Legislative and Policy Context

This assessment forms part of the Noise and Vibration Chapter of the Environmental Statement (ES) for the Proposed Development and should be read in conjunction with Section 3.1.1, which sets out the relevant national and local policy framework (NPPF, NPSE, PPG, and Manchester Core Strategy Policies DM1, H12, and C10).

In addition, Manchester City Council's Planning and Noise Technical Guidance (October 2022) provides specific requirements for mixed-use developments in Section 3.7.1.3, which states that:

"Where a planning application includes a proposal to contain a potentially noisy development within the same building as a noise-sensitive use or vice versa, the noise survey should consider the transfer of noise between the noisy and noise-sensitive uses. Consultants should demonstrate that the structure of the development will be sufficient to adequately contain the noise generated within the development."

The guidance further advises that assessments must take into account:

- Flanking and structure-borne noise transmission;
- The overall level and character (L_{Aeq}, tonality, impulsivity) of the noise source; and
- The acoustic performance of separating constructions, including floors, walls, doors, and ventilation systems.

This section of the Technical Note therefore evaluates the adequacy of the proposed separating floor and wall constructions between the ground-floor commercial units and the residential accommodation directly above, ensuring compliance with local policy and good acoustic design practice.

3.2.2. Assessment Criteria

Operation of the proposed commercial units is expected to generate activity noise levels characteristic of café and restaurant-type environments, including customer conversation, movement, light equipment operation, and background music.

There are no explicit performance standards within Approved Document E (2022 edition) for separating structures between non-domestic (commercial) and domestic (residential) uses, other than the basic requirement to achieve the minimum airborne sound insulation standards applicable between two residential dwellings. However, Approved Document E notes that a higher standard may be required where non-domestic activity occurs adjacent to noise-sensitive residential spaces.

To ensure that noise from commercial activities remains indiscernible within the residential accommodation, it is considered appropriate to design separating elements to achieve at least 10 dB below the prevailing ambient L_{Aeq} level within the receiving room.

Based on BS 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings, the internal ambient noise targets for residential dwellings are:

- Bedrooms (daytime / resting): 35 dB $L_{Aeq,16hour}$
- Living / dining rooms: 35–40 dB $L_{Aeq,16hour}$

Accordingly, the target internal activity noise level (IANL) from commercial spaces, when transmitted into the residential units above, should not exceed 25 dB L_{Aeq}, corresponding approximately to NR20.

To achieve this, the separating partitions (floors and any shared walls) must provide a minimum in-situ airborne sound insulation performance sufficient to reduce the assumed commercial source levels to this target value.

3.2.3. Prediction Methodology

The sound insulation requirement was derived using the following procedure:

- **Source Levels:** Internal activity noise spectra for the commercial units were adopted from Section 3.1.2, representing a reasonable worst-case "busy café/restaurant" condition with an overall reverberant level of approximately 75 dB(A).

- **Calculation Method:** The airborne sound transmission between the commercial and residential spaces was analysed in accordance with BS EN ISO 12354-1:2017 – Building acoustics: *Estimation of acoustic performance of buildings from the performance of elements – Airborne sound insulation between rooms*, which enables estimation of the resulting standardised level difference (D_{nT}) for given source and receiver conditions.

- **Assumptions:** The calculations are based on the current proposed room areas, an assumed floor-to-ceiling height of 2.4 m, and a completed reverberation time (T_{60}) of 0.4 seconds within bedrooms, studios, and other habitable spaces, consistent with furnished residential conditions. The resulting sound-insulation values are normalised to a reference reverberation time T_0 = 0.5 s as required by the standard.

- **Rating Convention:** The single-number rating $D_{nT,w} + C_{tr}$ was determined following BS EN ISO 717-1:2020 – Rating of sound insulation in buildings and of building elements.

Table 5: Commercial/Residential Separations: Activity Noise & Sound Reduction Requirement

Design Parameter	Sound Pressure Level (dB)/Reduction Index at Octave Band Centre Frequency (Hz)								dBA/$D_{nT,w}$ + C_{tr}
	63	125	250	500	1k	2k	4k	8k	
Commercial Units' Internal Activity Noise Level*	73	71	73	72	71	68	64	53	75 dBA
Target IANL in Residential Units	42	32	25	19	16	15	15	17	25 dBA
Minimum Required SRI of Separating Elements	31	39	49	53	55	53	50	40	50 dB $D_{nT,w}$ + C_{tr}

3.2.4. Assessment and Discussion

The analysis indicates that the separating floor and wall elements between the ground-floor commercial units and the residential accommodation above should achieve a minimum in-situ airborne sound insulation of approximately $D_{nT,w}$ + C_{tr} 50 dB.

This requirement is consistent with good acoustic practice for mixed-use buildings and satisfies the intent of MCC Planning and Noise Technical Guidance Section 3.7.1.3, ensuring that activity noise from commercial spaces should be barely perceptible within the student accommodation above.

The required sound-reduction index is readily achievable using a range of common floor and wall construction types. Subject to appropriate detailed design, including junction detailing, material selection, and flanking-path control, the separating structures will be capable of providing sufficient acoustic attenuation to protect residential amenity and meet the identified design targets.

It is noted that the assumed activity noise levels represent limiting design conditions. Should operational levels exceed these assumptions (for example, due to amplified music or late-evening trading), the specification of the separating elements should be re-evaluated to ensure that the internal target of 25 dB L_{Aeq} remains satisfied.

4. Resident's Gym – Noise and Vibration Assessment

4.1. Assessment of Internal Activity Noise Break-out

4.1.1. Legislative and Policy Context

This assessment forms part of the Noise and Vibration Chapter of the Environmental Statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended). It should be read in conjunction with Section 3.1.1, which summarises the relevant national and local policy context (NPPF, NPSE, PPG and Manchester Core Strategy Policies DM1, H12 and C10).

Further guidance is provided in Manchester City Council's Planning and Noise Technical Guidance (October 2022), particularly Section 3.7.1.2 – Entertainment Venues, which requires that:

"A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

Entertainment noise ($L_{Aeq,\ 5\ min}$) should be controlled to 5 dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise-sensitive location."

Although the residents' gym is not an entertainment venue, certain activities (such as fitness classes accompanied by amplified music) may produce comparable sound levels. To adopt a robust, precautionary approach, this same criterion has been applied to ensure that potential noise from the gym remains inaudible or effectively imperceptible at surrounding noise-sensitive receptors, consistent with MCC policy and good acoustic design practice.

4.1.2. Assessment Criteria

In accordance with MCC Technical Guidance Section 3.7.1.2, the assessment criterion is that the entertainment-type noise level, expressed as $L_{Aeq,5\ min}$, should be at least 5 dB below the typical background noise level (L_{A90}) in each octave band at the façades of the nearest noise-sensitive receptors.

For on-site receptors located within the same building, the same target has been adopted where practicable. However, as these receptors form part of a purpose-built, mixed-use scheme, a marginally higher internal exposure may be acceptable provided overall amenity is not compromised.

The residents' gym is assumed to operate between 07:00 and 23:00 hours only.

4.1.3. Prediction Methodology

The Cadna/A environmental noise model described previously in Section 3.1.2 has been used to predict external noise levels arising from internal gym activities. The model incorporates building geometry, screening and reflection effects and uses the propagation method set out in ISO 9613-2:2024.

Internal activity noise levels within the gym have been based on measurements from comparable fitness facilities, representing a busy operational period with background music. These source levels are summarised below.

Table 6: Assumed Maximum L_{Aeq} Noise Levels Inside Proposed Resident's Gym

Internal Reverberant Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
63	125	250	500	1k	2k	4k	8k	
89	90	80	79	89	82	73	74	90

The gym includes two external façades, each comprising predominantly glazed elements. A worst-case assumption has been adopted, modelling both façades as standard thermal double glazing with the minimum sound-reduction performance shown in Table 7.

Table 7: Minimum Façade Sound Reduction Performance

Sound Reduction Performance R (dB) at Octave Band Centre Frequency (Hz)								$R_w + C_{tr}$ (dB)
63	125	250	500	1k	2k	4k	8k	
23	28	23	32	38	42	44	44	31

The façades were represented in the model as area sources assigned the internal sound levels from Table 6 and the façade sound reductions from Table 7. Predictions were made at the façades of all identified off-site and on-site receptors for comparison with the MCC criterion. Typical background levels (L_{A90}) were obtained from the July 2025 baseline survey undertaken by Blackbird Acoustics (Noise Impact Assessment Report Ref. 2151.Rep.AAR dated 19th November 2025).

4.1.4. Assessment and Discussion

The results are summarised in Table 8 below.

Table 8: Predicted Gym Activity Noise Break-out and Comparison with MCC Criterion

Receptor	Predicted Gym Noise Level dB $L_{Aeq,5mins}$	Typical Background Sound Level, $L_{A90,T}$, dB	Difference (dB)
Residential flats at Salisbury House	23	46 (P1)	**-23**
Residential flats at Orient House	31	46 (P1)	**-15**
Residential flats at Granby House	35	46 (P1)	**-11**
Residential flats at Fairbairn Building	33	46 (P1)	**-13**
Pendulum Hotel/Weston Halls PBSA	28	47 (P2)	**-19**
Ibis Hotel	18	48 (P3)	**-30**
Nearest proposed habitable room (on the first floor)	41	46 (P1)	**-5**

As shown in Table 8, predicted noise levels from the residents' gym are at least 5 dB below the prevailing background sound level (L_{A90}) at all off-site and on-site receptors. This confirms full compliance with the MCC Planning and Noise Technical Guidance (October 2022) Section 3.7.1.2 criterion, which requires that entertainment-type noise ($L_{Aeq,5min}$) be controlled to 5 dB below the typical background in each octave band.

The results demonstrate that, with the proposed upgraded façade specification, gym activity noise, including amplified music, will be inaudible or effectively imperceptible at all surrounding noise-sensitive locations. The assessment therefore concludes that the residents' gym will not materially alter the existing acoustic environment or give rise to any adverse effects on residential amenity, either within the Proposed Development or in the wider area.

Should subsequent design development or operational information confirm that internal noise levels within the gym are lower than the conservative values assumed in this assessment, it may be possible to relax the glazing specification accordingly while still maintaining compliance with the adopted –5 dB design criterion.

Overall, the assessment confirms that the residents' gym can operate without significant noise impact, subject to the final façade and fit-out design being implemented in line with the performance assumptions used in this assessment.

4.2. Internal Noise and Vibration Transfer Considerations

4.2.1. Legislative and Policy Context

This section considers potential internal noise and vibration transfer from operation of the residents' gym to other parts of the Proposed Development and any future sensitive spaces within the building envelope. Although no residential accommodation is located directly above or immediately adjacent to the gym, this assessment is included for completeness to demonstrate good practice acoustic design and ensure compliance with local and national policy objectives.

At the local level, Manchester City Council's Planning and Noise Technical Guidance (October 2022) provides specific advice in Section 3.7.1.3 – Mixed Use Developments, which states that where potentially noisy and noise-sensitive uses coexist within the same structure, the applicant must:

"Demonstrate that the structure of the development will be sufficient to adequately contain the noise generated within the development."

To evidence compliance with this requirement, the assessment references the ProPG: Gym Acoustics Guidance (2023) (Institute of Acoustics / ANC / CIEH), which provides recognised internal sound and vibration performance criteria for gyms and fitness spaces. The ProPG guidance offers a practical framework for assessing both airborne

sound and structure-borne vibration, enabling demonstration that the proposed design will meet the intent of MCC Guidance § 3.7.1.3.

4.2.2. Noise Criteria

The ProPG: Gym Acoustics Guidance (2023) introduces G-Curves, which define acceptable sound spectra across the 1/3-octave band range from 31.5 Hz to 8 kHz. The G-Curves are particularly effective at capturing low-frequency content typical of music playback and gym activity noise.

The guidance recommends that internal noise levels within residential areas adjacent to or above gyms fall within the ranges set out in Table 9. These limits represent design targets to achieve acceptable internal acoustic environments and are used here as benchmarks for demonstrating good practice under MCC § 3.7.1.3.

Table 9: Guidance Internal Sound Target Criteria for Gym Activity – Residential Areas

Receptor Type	Airborne Sound (e.g. music) $L_{eq,T}$ (31.5Hz to 8kHz) (dB)	Heavy Impact Sound $L_{max,F}$ (31.5Hz to 8kHz)
Residential Areas	G15 – G25 (day) G10 – G20 (night)	G20 – G25 (day) G15 – G20 (night)

Although the current design places no sensitive residential rooms adjacent to the gym, these criteria provide the appropriate performance standard that the separating structures and finishes should achieve to minimise structure-borne sound transmission throughout the building, thereby ensuring continuing compliance with MCC policy.

4.2.3. Vibration Criteria

Gym activities such as weight drops, cardio equipment operation, and group exercise can generate structure-borne vibration that may propagate through the building frame and re-radiate as audible sound in adjoining areas. The ProPG Gym Acoustics Guidance sets out tactile vibration limits to prevent disturbance, summarised in Table 10.

Table 10: Guidance Internal Vibration Target Criteria for Gym Activity – Residential Areas

Receptor Type	Tactile Vibration (point of entry to the body) Acceleration (mm/s^2)	
Residential Areas	rms 7 mm/s^2 W_b	Peak 21 mm/s^2 W_b

These targets represent typical acceptability thresholds for vibration within residential spaces adjoining gyms. Structural design should therefore ensure that the predicted vibration response at sensitive locations remains below these limits, consistent with the expectations of MCC § 3.7.1.3.

4.2.4. Design Recommendations

Although detailed structural and acoustic design for the residents' gym is at an early stage, the following measures are recommended to guide the Stage 4 design and ensure

that internal noise and vibration are controlled in accordance with ProPG 2023 and MCC Guidance § 3.7.1.3:

1. **Flooring and Isolation Systems**
   – Undertake early acoustic testing of proposed floor finishes under representative loading to verify compliance with the G-Curve and vibration criteria.
   – Incorporate resilient floor or isolation systems in zones of heavy activity or free-weights.
2. **Equipment Mounting**
   – Install treadmills and other cardio equipment on individual isolation pads to minimise structure-borne vibration.
   – Avoid directly fixing weight machines or resistance racks to the primary structural frame.
3. **Activity Management**
   – Where practicable, limit or locally isolate high-impact activities such as dropping heavy weights to protect against transient vibration peaks.
4. **High-Impact Activities**:
   - Activities such as medicine ball slams should be avoided or carefully managed to prevent excessive vibration.

By implementing the above measures, the Proposed Development will maintain robust internal noise and vibration control, satisfying both MCC Planning and Noise Technical Guidance § 3.7.1.3 and the ProPG: Gym Acoustics Guidance (2023), and ensuring that the residents' gym operates without adverse effects on existing or future sensitive uses.

5. Conclusion

This Technical Note has outlined key noise and vibration considerations for the Proposed Development at Plot H, Manchester City Centre, comprising Purpose Built Student Accommodation with ancillary commercial uses and a residents' gymnasium.

The assessment confirms that the approach adopted for the commercial units, residential separations, and residents' gymnasium has been developed in accordance with relevant national planning policy and Manchester City Council's Planning and Noise Technical Guidance (October 2022).
Specifically, the work demonstrates consistency with:

- Section 3.7.1.5 – Industrial / Commercial Developments
- Section 3.7.1.3 – Mixed Use Developments
- Section 3.7.1.2 – Entertainment Venues

The findings confirm that these elements of the Proposed Development can be designed to meet the requirements of the above guidance and relevant local planning policies. Where detailed design progresses, the final acoustic specifications should continue to reflect these principles to ensure ongoing compliance.

This Technical Note therefore confirms that the identified noise and vibration design aspects of the scheme are appropriate, policy-compliant, and suitable to support the planning application and Environmental Statement.