Azymuth Acoustics UK

Professional Acoustic Services

Noise Impact Assessment
Ref: AA0614 RevA

1no. Multi Gym Conversion
Sevendale House,
Dale Street,
Manchester

On behalf of

One XPS Fitness Limited





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1.0 Introduction

Azymuth Acoustics UK (henceforth Azymuth) has been contracted by One XPS Fitness Limited to perform a Noise Impact Assessment (NIA) in relation to the conversion of 2no. basement offices to 1no. multi-gym at Sevendale House, Manchester.

The main noise sources associated with the development are expected to originate from the use of gym equipment and sound system noise (music) breaking out of the 6no. external windows overlooking Lever Street.

External plant is expected but location and unit(s) have not yet been confirmed.

It is understood the premises opening hours will be:

- Monday to Friday 06:00hrs – 22:00hrs
- Saturday & Sunday 08:00hrs – 18:00hrs.

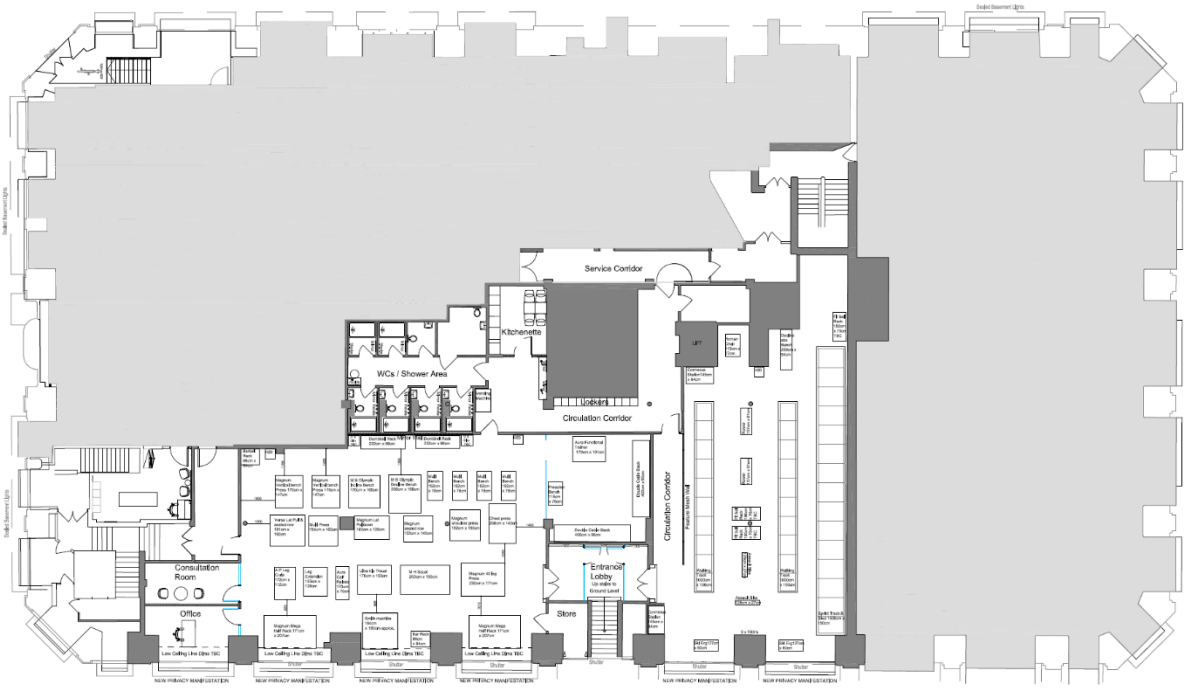


Figure 1 – Drawing of proposed development (ref. 25034_10_LG_ General Arrangment Plan_REV B)

This noise impact assessment is intended to provide information relating to potential noise levels emitting from the site in order to support the detailed planning application for the commercial development. In particular, the report sets out the following details:

- The results of a baseline noise survey undertaken in the vicinity of Sevendale House
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of development
- Recommendations to meet the targets as set out by the assessment criteria

It is assumed that all drawings and information provided by the client is up to date and correct.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the NIA consisted of a SvanTek 971 type 1 precision sound level meter. The equipment was calibrated before and after measurements. The sound level meter measured A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement record.

Daytime noise level measurements were undertaken between 14:27hrs and 16:03hrs on Wednesday 2nd July 2025. Evening noise level measurements were undertaken between 21:26hrs and 21:51hrs on Wednesday 2nd July 2025. Early morning noise level measurements were undertaken between 06:12hrs and 06:42hrs on Tuesday 8th July 2025.

The noise measurements were undertaken using the sound level meter at the position(s) shown in Figure 2 below:

- Position 1: Inside Sevendale House atrium
- Position 2: Outside proposed gym entrance/window, Lever Street (~3m from roadside)
- Position 3: Corner of Lever Street and Dale Street (~4m from roadside)



Figure 2 – Noise measurement position(s)

Additionally, near-field noise level measurements were taken inside the existing One XPS Fitness gym located in Ancoats, Manchester to establish a baseline for gym noise. This survey was undertaken at peak time between 17:01hrs and 17:18hrs on Wednesday 2nd July 2025 and included measurements of various equipment in the gym including a row machine, treadmill, epilator bike as well as inside the spin class area with music on.

NB the spin class measurements included sound system music as the main noise source as well as general noise from users on the treadmill, row machine and weights area.

2.2 Summary of Measurements

2.2.1 Environmental Noise Survey

The following table summarises the results of the noise measurements undertaken at the proposed site in terms of the average daytime, evening and early morning noise levels.

Location	Period	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
1) Inisde atrium	Day	71.1	52.7	54.8	48.0	45.3
2) Lever St	Day	80.9	66.2	68.4	63.4	59.6
2) Lever St	Evening	77.9	64.0	66.7	59.6	56.3
2) Lever St	Early Morning	77.9	64.3	66.2	55.1	51.6
3) Corner Lever St / Dale St	Day	82.4	66.9	69.7	63.2	58.6

Table 1 – Summary of environmental noise measurements

Azymuth assumes that all measured noise levels are typical of the surrounding environment.

Full results of the noise levels recorded during the course of the survey are included in Appendix B of this report.

2.2.2 Near-Field Measurements

The following table summarises the results of the near-field noise measurements undertaken at One XPS Fitness, Ancoats.

Unit	Centre Frequency Octave Band Sound Pressure Level (dB)								Total L_{Aeq} (dB)
	63	125	250	500	1k	2k	4k	8k	
Inside spin class room (music on)	75.4	77.1	72.5	67.9	65.8	62.3	58.5	56.6	71.4
Next to treadmill and row machine	60.5	65.3	58.3	60.3	60.1	57.7	55.8	54.0	65.1
Next to weights and epilator bike	57.4	62.1	59.5	60.5	59.1	58.1	56.4	51.9	65.8

Table 2 – Summary of near-field gym noise measurements

2.3 Description of Noise Climate

The noise climate in the vicinity of Sevendale House is dominated by traffic noise from road and foot traffic along the surrounding roads: Lever Street, Dale Street, Spear Street and Stevenson Square. Noise from buses pulling up/moving off from Lever Street was particularly prominent throughout all time periods measured. The overall area is mainly commercial with many restaurants, bars, shops, and offices in the units above ground floor. Within the ground floor of Sevendale House itself are Foundation Coffee House, Fred Aldous Ltd, Real Camera, Dusk Til Pawn and Noho. Moreover, the site is ~50m from Stevenson Square outside seating area which accommodates many restaurants/bars and is especially busy during the warmer months.

The weather during the assessment was warm and dry, with low wind speeds.

3.0 Assessment & Design Criteria

In order to assess the extent of any measures required in order to comply with suitable conditions relating to potential noise sources, Azymuth Acoustics UK has reviewed various guidance documents and standards, these include:

- National Planning Policy Framework 2024
- British Standard 8233: 2014
- World Health Organisation Guidelines on Community Noise 2018
- British Standard 4142:2014+A1: 2019
- Manchester City Council Planning Noise Technical Guidance 2022
- Manchester City Council Planning Application 143884/LO/2025
- British Standard 6472-1: 2008
- ProPG: Gym Acoustics Guidance 2023
- Sport England Framework Document Appendix 5 2023

3.1 National Planning Policy Framework 2024

The National Planning Policy Framework (NPPF) provides guidance to local authorities taking into account noise in making planning decisions. Paragraph 198 of the NPPF states that planning policies and decisions should aim to:

- Mitigate and reduce to a minimum to a minimum potential adverse impacts resulting from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life,
- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

Paragraphs 187-188 of the NPPF state that the planning system should distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework. In addition, the planning system should 'prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'.

Paragraph 200 of the NPPF states new developments should provide suitable mitigation measures to prevent adverse impact of existing business or community facilities, with responsibility for mitigation measures on the applicant or 'agent of change'.

3.2 British Standard 8233: 2014

"Guidance on sound insulation and noise reduction for buildings" (BS 8233) provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate internal ambient noise level criteria / limits for a variety of different situations including residential properties. The following table summarises the noise limits suggested by BS 8233 applying to residential properties:

Activity	Room	Good Design Range $L_{Aeq,\,T}$ dB	
		07:00-23:00hrs	23:00-07:00hrs
Resting	Living Room	35	-
Dining	Dining Room / Area	40	-
Sleeping / Resting	Bedroom	35	30

Table 3 – Noise Limits for Residential Properties Suggested in BS 8233

The following table summarises the internal noise limits suggested by BS 8233 applying to commercial premises and the resultant external noise limit assuming 13dB attenuation from a partly open window:

Commercial Premises Type	Design Range $L_{Aeq,T}$ dB	External Noise Limit (dB)
Restaurant	40 – 55	53
Open plan office	45 – 50	58
Public house	40 – 45	53
Department store / Cafeteria	50 – 55	63

Table 4 – Noise Limits for Commercial Premises Suggested in BS 8233

3.3 World Health Organisation Environmental Noise Guidelines 2018

The main purpose of the 2018 WHO guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from the following sources: transportation (road traffic, railway and aircraft), wind turbines and leisure activities.

The guidelines set out to define recommended exposure levels for environmental noise in order to protect population health. Exposure limits are average levels defined over a period of one year, measured outdoors in free field at the most exposed façade. It should be noted that the document does not provide guideline limit values for multiple noise sources in combination.

The 2018 Environmental Noise Guidelines (ENG) guidelines supersede the Community Noise Guidelines (CNG) from 1999. Nevertheless, the document recommends that all CNG indoor guideline values and any values not covered by the current guidelines should remain valid. As such, the following guidance would remain appropriate:

For protection against sleep disturbance inside dwellings, night-time noise levels should not exceed 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for typical single sound events (which are exceeded 15 times or more per night – see ProPG Appendix A.12 for more details).

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise (interpreted as noise from all sources combined) should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas.

It should be noted that exposure levels defined in ENG and CNG are for guidance purposes as relates potential adverse health impacts and should not be interpreted as absolute limits or regulations.

3.4 British Standard 4142:2014+A1: 2019

"Methods for assessing and rating industrial sound" (BS 4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described BS 4142 use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

- Typically, the greater the difference between background sound and industrial/commercial noise, the greater the magnitude of the impact.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

BS 4142 notes that: "Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

3.5 Manchester City Council Planning Noise Technical Guidance 2022

The Manchester City Council (MCC) Planning Noise Technical Guidance document provides developers with information related to MCC policy on discharging planning conditions imposed by the City Wide Environmental and Public Protection Team. The document has specific sections covering policy on noise from industrial/commercial developments, entertainment venues, fixed plant and equipment etc.

In relation to entertainment noise the document states:

"Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively."

"Entertainment noise (LAeq,5min) should be controlled to 5dB below the typical background noise level (LA90) in each octave band at the nearest noise sensitive location."

In relation to commercial noise the document states:

"The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location."

In relation to fixed plant noise the document states:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location."

3.6 Manchester City Council Planning Application 143884/LO/2025

3.6.3 Noise Planning Conditions

"a) The 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 in writing to and approved in writing by the City Council as the Local Planning Authority. The scheme shall be implemented in full before the use commences.

Where entertainment noise is proposed, the LAeq (entertainment noise) shall be controlled to 5dB 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 (Leq,5min), 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.

Reason - In interests of the amenities of the occupiers of the building and occupiers of nearby properties, in order to reduce noise and general disturbance, in accordance with policy DM1 of Manchester's Core Strategy, and policies DC26 and DC10 of the saved Unitary Development Plan for the City of Manchester."

"a) Any plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved, the scheme shall be submitted to

and approved in writing by the City Council as the Local Planning Authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences.

b) Prior to the operation of the scheme, a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard residential amenity by minimising the impact of the development and to prevent a general increase in pre-existing background noise levels around the site, pursuant to policies SP1 and DM1 of the Core Strategy for the City of Manchester and Unitary Development Plan saved policy DC26."

3.7 British Standard 6472-1: 2008

"Guide to evaluation of human exposure to vibration in buildings" (BS 6472) provides a code of practice for rating and assessing human response to vibration in buildings in the frequency range 0.5Hz – 80Hz. Impact is quantified in vibration dose value (VDV) from frequency weighted vibration measurements. The adverse effect is considered for different building uses (residential, office, workshop) and time periods (day/night).

3.8 ProPG: Gym Acoustics Guidance (GAG) 2023

The ProPG: GAG provides practitioners and Local Authorities with guidance on the approach for assessing Gymnasium, fitness and exercise space acoustics, including both noise and vibration impact. It identifies three main impact groups associated with gym activity:

- high impact response e.g. dropping weights
- synchronised repetitive excitation e.g. treadmill use
- airborne noise e.g. music.

Relevant standards and guidelines for assessment are suggested, including BS 8233, BS 4142, BS 6472 and WHO Guidance.

3.9 Sport England Framework Document Appendix 5: Acoustics 2023

This document sets out the governance framework within which Sport England and DCMS operate. In Appendix 5: Acoustics it states, "Acoustics design should allow easy verbal communication with low ambient noise levels for the benefit of all users." As such, the design criteria recommend a mid-frequency average reverberation time of 1.5 – 2.0 seconds.

3.10 Recommended Noise Assessment & Design Criteria

Based on the guidance above it is recommended that the following criteria would be reasonable with the aim of minimising the impact of noise on the surrounding environment.

- Noise levels originating from the proposed premises shall not exceed the background sound level – 5dB at the nearest residential receptors believed to be located at 3 & 4 Dale Street, Chatsworth House Apartments (23 & 8 Lever Street), as per MCC guidance and noise Planning Conditions.
- Noise levels originating from the proposed premises shall not exceed the external commercial noise limits at the nearest commercial receptors believed to be located at Sevendale House (lower ground and ground floors) and 22-24 Lever Street, as derived from BS 8233 internal ambient noise levels. These limits include:
  - 58dB for an open plan office (22 Lever Street various businesses)
  - 53dB for a public house (The Salmon of Knowledge, Dusk Til Pawn, Noho)
  - 63dB for a department store (Fred Aldous, Real Camera) & cafeteria (Foundation Coffee House, Nomad Coffee)

  as shown in Table 4.
- The proposed premises separating walls and floors are to achieve a minimum weighted standardized level difference of 45dB DnTw (~53dB Rw) in line with commercial internal noise levels as per BS 8233.
- A mid-frequency average reverberation time of 1.5 – 2.0 seconds should be achived throughout the sports / gym accomoodation for the development as per Sport England Appendix 5.

4.0 External Noise Assessment

4.1 SoundPLAN Model

Azymuth has undertaken acoustic modelling with the SoundPLAN 9.1 noise modelling software to predict and visualise the impact of noise from the site on the surrounding environment.

It is expected the peak operating hours of the premises shall be from 06:00hrs – 08:00hrs and 17:00hrs – 19:00hrs.

The main noise sources associated with the development are expected to originate from the use of gym equipment and sound system (music) noise breaking out of the 6no. external windows overlooking Lever Street. The following sound power spectra for gym window break-out noise has been derived from C of spin class noise, shown in Table 2. Azymuth have assumed all windows are 4mm glass single glazed units as a worst-case estimation, though the actual thickness may be higher than this.

Unit	Centre Frequency Octave Band Sound Power Level (dB)								Total L_{WA}/m^2 (dB)
	63	125	250	500	1k	2k	4k	8k	
Each external window	55.4	52.1	45.5	34.9	26.8	23.3	24.5	18.6	40.9

Table 5 – Octave band sound power spectra for gym windows overlooking Lever Street

In reality the overall sound level of the gym would be expected to be lower as the sound system is not likely to operate at spin class capacity throughout the full open hours of the gym. Nonetheless Azymuth have modelled a worst-case scenario with full capacity operation during all opening hours, including sensitive hours (e.g. 06:00hrs – 07:00hrs).

NB the spin class measurements included sound system music as the main noise source as well as general noise from users on the treadmill, row machine and weights area. As such this model is inclusive of synchronised repetitive excitation (e.g. treadmill use) and airborne noise (e.g. music), two of three gym activity acoustic risk groups identified in ProPG: GAG. The remaining group, high impact response (e.g. dropping weights), has been accounted for in the assessment via an impulsivity penalty.

External plant is expected but location and unit(s) have not been confirmed, though it is expected to be similar to the existing ventilation strategy with external units located on the roof/at the rear of Sevendale House. As such, external plant has not been modelled at this stage and Azymuth have provided noise limits in Section 4.4.

4.1.1 Grid Noise Map (GNM)

Azymuth have produced the following GNM to visualise the effect of noise emitting from the premises on the surrounding environment.



Figure 3 – GNM, modelled 06:00hrs – 07:00hrs at 1.5m

4.2 BS 4142 / MCC Assessment

4.2.1 Residential receptors

A BS 4142 assessment has been undertaken against the MCC noise limit and noise Planning Condition.

The following table identifies the nearest residential noise sensitive receptors, the predicted sound level as a result of the proposed premises at these receptors and how this noise level relates to the background sound level – 5dB. The lowest measured background sound level has been used in the assessment which is from the early morning measurement period.

Distances have been measured from the closest gym window to receptor.

A penalty of +4dB has been applied to account for the possible impulsive and intermittent nature of gym noise.

Receiver	Distance from Source to Receiver (~m)	Noise Level at Receptor (dBA)	Background Sound Level at Receptor, L_{90} – 5dB (dBA)	Penality for Tonality, Impulsivity and/or Intermittency (dBA)	Noise Rating Level (dBA)	Rating Level re. Background Sound Level
Nearest Residential Receptors for BS 4142						
23 Lever Street, 3rd floor	30	13.2	46.6	4.0	17.2	**-29.4**
3 Dale Street, 4th floor	44	5.3	46.6	4.0	9.3	**-37.3**
4 Dale Street, 3rd floor	47	9.9	46.6	4.0	13.9	**-32.7**

Table 6 – BS 4142 / MCC assessment of noise originating from proposed gym

As shown in the table above noise from the proposed premises shall be at least 29dB below the background sound level – 5dB at the nearest residential receptors, indicating no noise impact as per MCC guidance.

4.3 BS 8233 Assessment

4.3.1 Commercial receptors

A BS 8233 assessment has been undertaken against the external noise limits contained in Table 4.

The following table identifies the nearest commercial noise sensitive receptors, the predicted sound level as a result of the proposed premises at these receptors and how this noise level relates to the external noise limit.

Distances have been measured from the closest gym window to receptor.

A penalty of +4dB has been applied to account for the possible impulsive and intermittent nature of gym noise.

Receiver	Distance from Source to Receiver (~m)	Noise Level at Receptor (dBA)	External Noise Limit at Receptor (dBA)	Penality for Tonality, Impulsivity and/or Intermittency (dBA)	Noise Rating Level (dBA)	Rating Level re. Background Sound Level
Nearest Commercial Receptors for BS 8233						
Fred Aldous Ltd	2	28.7	63	4.0	32.7	**-30.3**
Foundation Coffee House	1	33.0	63	4.0	37.0	**-26.0**
Real Camera	1	32.3	63	4.0	36.3	**-26.7**
The Salmon of Knowledge	16	22.4	53	4.0	26.4	**-26.6**
Nomad Coffee	15	24.5	53	4.0	28.5	**-24.5**
22 Lever Street (various businesses)	15	25.0	58	4.0	29.0	**-29.0**

Table 7 – BS 8233 assessment of noise originating from proposed gym

As shown in the table above noise from the proposed premises shall be at least 25dB below the external nose limits at the nearest commercial receptors, indicating no noise impact as per BS 8233.

4.4 External Plant Noise Limits

External plant is expected but location and unit(s) have not been confirmed, though it is expected to be similar to the existing ventilation strategy with external units located on the roof or at the rear of Sevendale House. As such, Azymuth would recommend the following noise limit for any fixed external plant:

- 60dBA SPL at 1m from each item of fixed plant on building facades (external walls/atmosphere connections)
- 65dBA SPL at 1m from each item of fixed plant on building roof.

5.0 Internal Noise Assessment

The following table details the Sevendale House units adjacent to the proposed gym alongside the internal design range $L_{Aeq,T}$ as per BS 8233. NB there are no residential units located in the building.

Floor Level	Unit	Design Range $L_{Aeq,T}$ dB
Basement	Fred Aldous	50 – 55
Basement	Sevendale House storage	50 – 55
Ground Floor	Foundation Coffee	50 – 55
Ground Floor	Real Camera	50 – 55
Ground Floor	Sevendale House reception	45 – 50

Table 8 – Adjacent Sevendae House units alongside BS 8233 internal design range

Azymuth have calculated a minimum weighted standardized level difference of 45dB D_{nTw} (~53dB R_w) to be achieved by all proposed gym separating walls and floors. This has been derived from the worst-case internal noise level (near-field measurements of the existing One XPS Fitness gym spin class noise) and in line with the commercial internal noise levels as per BS 8233, shown in Table 8.

This would imply an absolute maximum permissible internal noise level of 85dBA for music and amplified voice within the gym, which is unlikely to be exceeded.

NB Sevendale House adjacent units are not residential thus the MCC noise limit and noise Planning Condition "*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 (Leq,5min), respectively"* is not applicable.

5.1 Separating Walls

Azymuth understand the existing walls will remain, which vary in thickness:

- 140-160mm WCs / Shower Area party walls
- 240-280mm main weight training room, Consultation room, Office party walls
- 500-1500mm track room party wall.

Wall construction details have not been provided. As such, Azymuth have estimated the following wall constructions and their respective weighted sound redcution index R_w values:

- Single leaf masonry walls (140-160mm) ~43dB R_w
- Double leaf masonry walls (240-280mm) ~55dB R_w
- Double leaf load bearing wall (500-1500mm) ~55dB R_w

assuming all walls are plastered but without plasterboard as a worst-case scenario.

The WCs / Shower Area party walls fall short of the 45dB D_{nTw} (~53dB R_w) target, however this area is separated from the main weight training room by internal partitions which will provide additional sound insulation from gym noise break-out.

There is a small section of ~140mm party wall bordering the main weight training room as shown in Figure 4. This is an acoustically weak point and possible source of significant gym noise break-out. As such, Azymuth would recommend an additional 2no. plasterboard layers

to be installed at this corner as well as ensuring any junctions in the highlighted area are acoustically sealed e.g. between different wall types, between wall and floor.

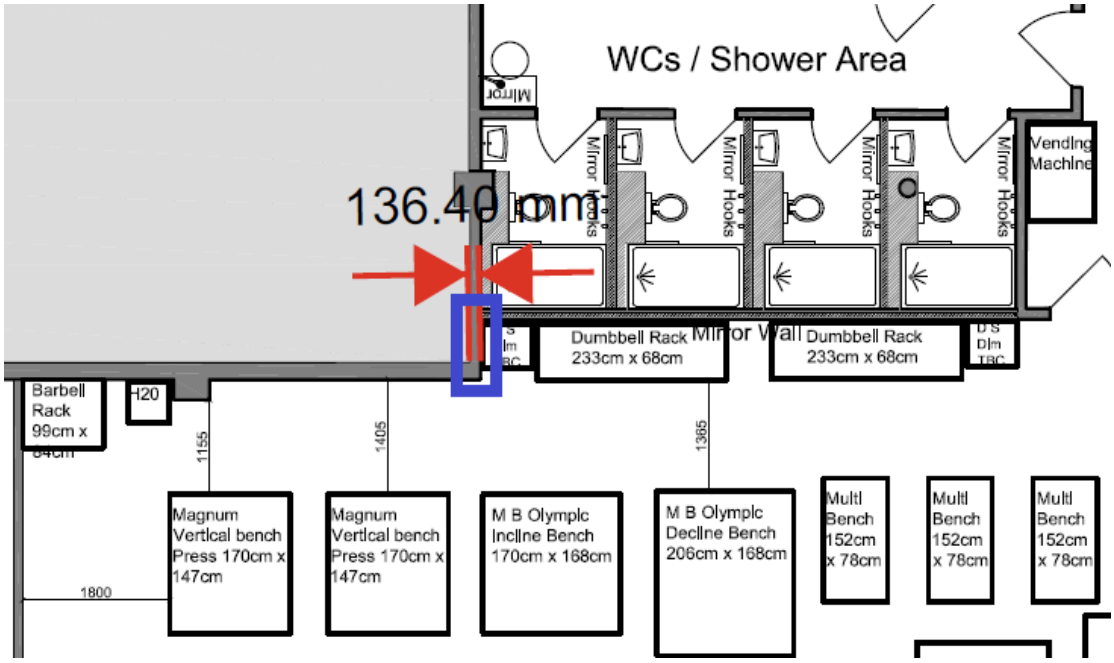


Figure 4 – Acoustically weak point highlighted in blue, section of ~140mm party wall bordering the main weight training room (ref. 25034_10_LG_ General Arrangment Plan_REV B)

5.2 Separating Floors

Azymuth understand the existing ceiling comprises ~160mm solid reinforced concrete, which has been calculated to achieve ~50dB R_w. This falls short of the 45dB D_{nTw} (~53dB R_w) target.

As such, Azymuth would recommend an additional 2no. plasterboard layers to be installed to the ceiling throughout the main weight training room, consultation room, office, entrance lobby, track room and circulation corridor as highlighted in Figure 5.

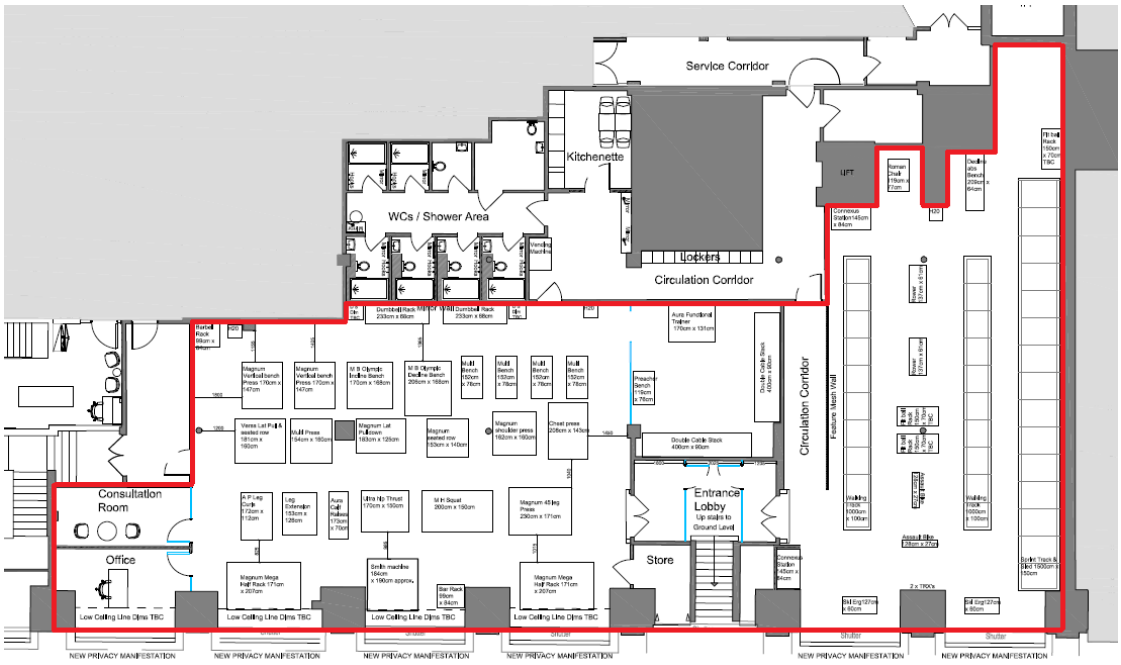


Figure 5 – Acoustically weak ceiling area highlighted in red (ref. 25034_10_LG_ General Arrangment Plan_REV B)

5.3 Internal Walls

Azymuth have identified a possible acoustically weak point within the proposed layout: the internal wall between the track room and lift shaft highlighted in Figure 6 below. As shown, the internal walls in this area vary in thickness from 90-120mm, indicating either single leaf masonry or stud partition i.e. ~43dB R_w or less. Assuming the lift shaft partition is of a similar construction, this does not provide enough sound insulation to prevent gym noise break-out propagating through the shaft.

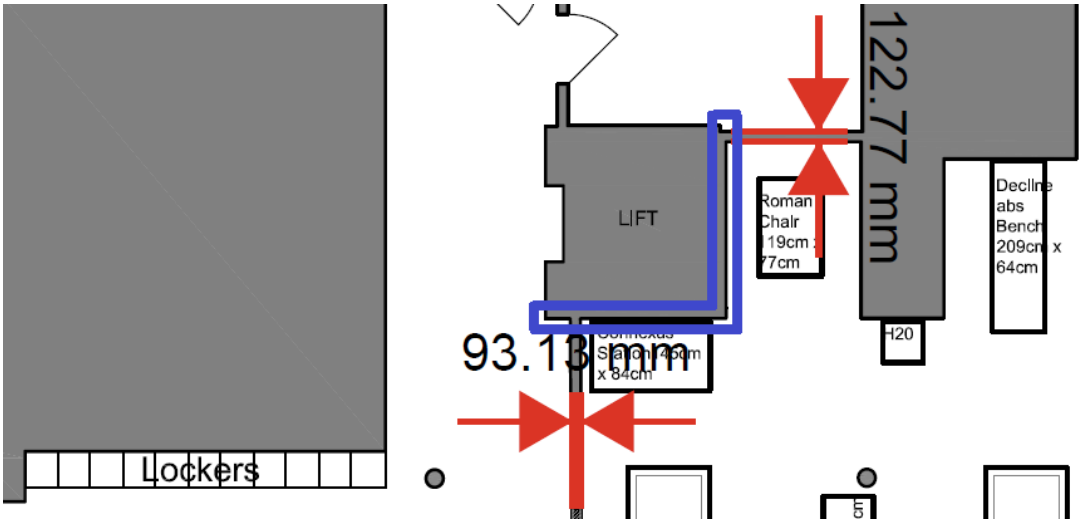


Figure 6 – Acoustically weak internal wall area highlighted in blue, section of ~100mm internal wall between the track room and lift shaft (ref. 25034_10_LG_ General Arrangment Plan_REV B)

As such, Azymuth would recommend an additional 2no. plasterboard layers to be installed at this partition as well as ensuring any junctions in the highlighted area are acoustically sealed e.g. between different wall types, between wall and floor.

5.4 Internal Gym Noise Break-Through

5.4.2 Units Separated by Walls

The calculated internal noise levels in adjacent spaces due to gym noise break-through have been calculated as ~20dBA in both Fred Aldous and Sevendale House basement storage, as such gym noise in these units shall be compliant with the design criteria set out in BS 8233.

5.4.3 Units Separated by Floors

The calculated internal noise levels in adjacent spaces due to gym noise break-through have been calculated as ~28dBA in Foundation Coffee Real Camera and Sevendale House reception, as such gym noise in these units shall be compliant with the design criteria set out in BS 8233.

6.0 Reverberation Control

The reverberation time (RT) throughout the development should be controlled to ensure clear communication of speech between staff and clients, and clear sound system operation.

Azymuth would recommend a mid-frequency average RT of 1.5 – 2.0 seconds throughout the premises, as per Sport England Appendix 5. This value is the arithmetic average of the RTs in the 500Hz, 1kHz and 2kHz octave bands or the arithmetic average of the RTs in the one-third octave bands ranging from 400Hz to 2.5kHz. Note RT values are for rooms that are finished and furnished however unoccupied.

As room finishes have not been finalised at this stage, estimated RT values cannot be calculated. Azymuth would suggest adequate absorption is included in the room finish schedule to ensure the target of 1.5 – 2.0 seconds is achieved e.g. absorptive ceiling tile.

7.0 Vibration Impact

The vibration impact on nearby receptors (mainly from high impact response) is expected to be negligible. Given the proposed gym is located on a basement floor, this would provide more absorption of structure borne vibration via the surrounding ground / heavy foundation structure than is typical of above ground floor spaces. Moreover, neighbouring basement units are occupied by commercial premises (Fred Aldous, Sevendale House) understood to be storage facilities. BS 6472 stipulates vibration impact criteria for residential buildings, offices and workshops only.

Nonetheless Azymuth understand a specialist absorptive rubber flooring is to be installed throughout the activity spaces which may help control vibration impact. ProPG: GAG provides the following performance estimates for various isolation systems:

Isolation type	Typical system thickness (mm)	Typical capped-maximum[1] reduction in impact noise/vibration per octave/third-octave band (dB)[2]
Pad/Matting (multiple layers)	100 – 150	10 – 20
Pad/Matting with solid elements	150 – 190	30 – 35

Table 9 – ProPG: GAG typical performance estimates for various isolation systems
(Notes: [1]Values correspond to thickness ranges. [2]Values assume a concrete structural floor. Very thin or lightweight structures would be expected to have lower values than presumed.)

Near-field maximum noise levels measured in the existing gym ranged from 71-84dB L_{Amax}. Assuming high impact response activity would produce similar levels to this, pad/matting with a high thickness or solid elements should be sufficient in reducing the impact.

Azymuth understand the 20mm SBR rubber tile (www.gymflooring.co.uk/flooring/free-weight-areas/gf-15mm-63mm-rubber-tile-black) is to be installed throughout the development.

8.0 Summary

Azymuth Acoustics UK has been contracted by One XPS Fitness Limited to perform a Noise Impact Assessment (NIA) in relation to a conversion of 2no. basement offices to 1no. multi gym at Sevendale House, Manchester. The main noise sources associated with the development are expected to originate from the use of gym equipment and sound system (music) noise breaking out of the 6no. external windows overlooking Lever Street. External plant is expected but location and unit(s) have not been confirmed.

A noise survey was undertaken in the vicinity of the site. Daytime background noise levels were measured to be 59-60dB $L_{A90,16hr}$ outside on Lever Street and ~45dB $L_{A90,16hr}$ inside Sevendale House atrium. Late evening background noise levels were measured to be ~56dB $L_{A90,16hr}$ and early morning background noise levels were measured to be ~52dB $L_{A90,8hr}$. The premises will not be open during the night hours 23:00hrs – 06:00hrs.

Azymuth have produced a noise model in SoundPLAN 9.1 to better predict and visualise the effect of noise from the proposed events venue on the surrounding environment.

An assessment of noise associated with the premises has been undertaken in line with BS 4142 procedure against MCC noise limits. It has been found noise from the proposed premises shall be at least 29dB below the background sound level – 5dB at the nearest residential receptors, indicating no noise impact as per MCC guidance.

An assessment of noise associated with the premises has been undertaken in line with BS 8233 against the derived external noise limits. It has been found noise from the proposed premises shall be at least 25dB below the external nose limits at the nearest commercial receptors, indicating no noise impact as per BS 8233.

Azymuth would recommend the following noise limit for any fixed external plant:

- 60dBA SPL at 1m from each item of fixed plant on building facades (external walls)
- 65dBA SPL at 1m from each item of fixed plant on building roof

Azymuth have calculated a minimum weighted standardized level difference of 45dB D_{nTw} (~53dB R_w) to be achieved by all proposed gym separating walls and floors. Three acoustically weak points have been identified in the proposed layout: the section of ~140mm party wall bordering the main weight training room (Figure 4), the existing ceiling (Figure 5), and the internal wall between the track room and lift shaft (Figure 6). In each case Azymuth have specified an additional 2no. plasterboard layers, as well as ensuring acoustically sealed junctions.

The vibration impact on nearby receptors is expected to be negligible, given the proposed gym is located on a basement floor and neighbours are commercial storage facilities. Nonetheless Azymuth understand an absorptive rubber flooring material is to be installed throughout the activity spaces which may help control vibration impact. Pad/matting with a high thickness or solid elements should be sufficient in reducing the impact, as per ProPG: GAG performance estimates.

Appendix A – Glossary of Acoustic Terms

Decibel (dB)
This is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal).

dB (A)
This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level
The human ear is sensitive to sound over a range of frequencies between approximately 20Hz to 20kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

L_{Aeq}
This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

Reverberation Time (RT or sometimes T_{30} or T_{60})
This is the time taken for the reverberant sound energy in an enclosure to decay one millionth of its equilibrium value, i.e. by 60dB, after the source has been switched off. The reverberation time is frequency dependent and it is customary to measure its value in octave or one-third octave bands. Reverberation occurs when sound waves are repeatedly reflected from each surface of the room.

Sound Reduction Index (SRI)
Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

SRI = L1 - L2 + 10 log (S/A), where:
L1 = Noise level in the source room
L2 = Noise levels in the receiving room
S = Surface area of test specimen
A = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index (R_w)
This is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the R_w is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves.

Appendix B – Noise Survey Data

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Wednesday 2nd July 2025							
14:32:00	1	00:05:00	68.9	52.7	54.5	48.6	45.8
14:37:00	1	00:05:00	74.2	52.2	52.8	47.4	44.8
14:42:00	1	00:05:00	72.8	52.2	53.6	47.7	45.7
14:47:00	1	00:05:00	71	52.5	54.7	48.4	45.5
14:52:00	1	00:05:00	69.4	52.6	55.9	47.7	45
14:57:00	1	00:05:00	70.1	53.8	57.4	48.3	45
15:07:00	2	00:05:00	78.6	65.1	67.4	64	60.3
15:12:00	2	00:05:00	82	67.9	69.8	67.2	62
15:17:00	2	00:05:00	79.7	65.6	68.9	62.8	57.8
15:22:00	2	00:05:00	76.8	63.4	66.2	61.6	58.1
15:27:00	2	00:05:00	82.5	65.6	67.4	62	59.7
15:32:00	2	00:05:00	85.5	67.9	70.8	62.5	59.9
15:38:00	3	00:05:00	83.7	66.8	69.1	64.4	61.9
15:43:00	3	00:05:00	83.9	66.9	70.2	63.1	58.3
15:48:00	3	00:05:00	81.9	65.9	69.3	62.7	58
15:53:00	3	00:05:00	80.1	64.6	67.5	61.4	56.1
15:58:00	3	00:05:00	82.6	66.9	70.7	62.5	58.4
16:03:00	3	00:05:00	82.3	69	71.4	64.9	58.9
21:26:00	2	00:05:00	81.5	65.9	68.4	60.6	56.9
21:31:00	2	00:05:00	77.6	64.5	67.8	60.4	57.1
21:36:00	2	00:05:00	82.5	65.1	68	59.3	55.7
21:41:00	2	00:05:00	74.3	61.9	64.9	59.2	56.4
21:46:00	2	00:05:00	70.2	61.2	65	58.5	56
21:51:00	2	00:05:00	81.4	63.4	66.1	59.7	55.9
Tuesday 8th July 2025							
06:17:00	2	00:05:00	73.3	69.3	71.1	69.1	66.8
06:22:00	2	00:05:00	74.6	62	66.8	50.3	47.6
06:27:00	2	00:05:00	82.4	62.9	66.2	51.6	48.3
06:32:00	2	00:05:00	80.9	64.2	69.2	55.4	49.3
06:37:00	2	00:05:00	76.1	59.9	63.9	53	49.3
06:42:00	2	00:05:00	69.6	55.4	59.8	50.9	48.1

Table B1 – Fully tabulated day, evening and early morning environmental noise measurement results

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Wednesday 2nd July 2025							
17:06:33	Spin class	00:01:00	79.4	71.9	75.1	70.3	65.8
17:07:33	Spin class	00:01:00	75.6	71.2	73.5	70.8	67.3
17:08:33	Spin class	00:01:00	76.1	71	73.8	70.2	66.3
17:09:33	Spin class	00:01:00	76.4	71.5	73.9	71.1	67.3
17:11:25	Row/Tread	00:01:00	71.7	66	68.3	65.2	62.2
17:12:25	Row/Tread	00:01:00	75.1	65.1	66.9	64	61
17:13:25	Row/Tread	00:01:00	79.9	63.8	64.5	60.3	56.6
17:14:45	Weights/Bike	00:01:00	71	67.6	69.1	67.9	62.3
17:15:45	Weights/Bike	00:01:00	81.2	64.7	67.3	62.6	58.4
17:16:45	Weights/Bike	00:01:00	72.3	60.9	62.8	59.9	57.1
17:17:45	Weights/Bike	00:01:00	78	62.7	63.6	60.2	57.2
17:18:45	Weights/Bike	00:01:00	84.2	68.6	69	61.6	57.8

Table B2 – Fully tabulated near-field gym noise measurement results