PLP CONSTRUCTION LTD

BARCLAY HOUSE, MANCHESTER

CLIMBING WALL AREA - INTERNAL NOISE TRANSFER - ACOUSTIC REVIEW

R2463-REP03-SJW

21 July 2026

RED ACOUSTICS LIMITED
Business First, Millennium Road, Preston PR2 5BL **T** 01772 722 182 **F** 01772 722 451
info@redacoustics.co.uk www.redacoustics.co.uk
Registered Company Number 6460126

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REPORT DETAILS

Project	Barclay House, Whitworth Street West, Manchester M1 5NG
Client	PLP Construction Ltd 30 Rochdale Lane Heywood, OL10 1PF ℅ Howard & Seddon [redacted]
Document Reference	R2463-REP03-SJW
Date Issued	21 July 2026
Revision	Initial Version
Issued By	Simon Webster BEng (Hons) MIOA Red Acoustics Limited Business First Millennium Road Preston PR2 5BL [redacted]
Signed	[redacted]
Checked by	Johnathan Whittle AMIOA MCIEH
Signed	[redacted]

1.0 INTRODUCTION

Red Acoustics has been commissioned by PLP Construction Ltd to provide an assessment of noise impact relating to the proposed Climbing Wallnasium (Climbing Wall) area, located at basement level of an existing building at Barclay House, Manchester.

Red Acoustics has been commissioned to conduct the following assessments:

- Measure the airborne sound insulation between the proposed Climbing Wall space and the adjacent spaces and compare internal noise transfer with the project specific criteria.
- Measure the Climbing Wall area impact sound insulation between the proposed Climbing Wall spaces and the adjacent spaces and provide guidance on internal noise transfer for compliance with project specific criteria.

This report presents the results of the initial round of sound insulation transfer testing and Climbing Wall & weight impact transfer testing.

Owing to the current site conditions, the findings are limited to the identification of preliminary mitigation measures addressing internal noise transfer from the proposed Climbing Wall unit into the adjacent residential spaces along the front elevation of Barclay House.

2.0 DESCRIPTION OF THE SITE, CLIMBING WALL UNIT & RESIDENTIAL UNITS LOCATION

As shown below, the proposal relates to a Climbing Wall unit located at basement level, with residential units directly above at ground floor level along the front elevation of Barclay House. To the rear, the proposal includes the formation of three additional ground floor residential units within the existing undercroft area, situated directly above the proposed basement Climbing Wall changing areas.

At the time of the on-site assessment, this rear area had not yet been formed and remained subject to ongoing construction activity. Consequently, it was not possible to undertake an acoustic assessment in this location due to the prevailing site conditions.

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PROPOSED CLIMBING WALL AREA LAYOUT - LOWER GROUND FLOOR



FSB

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KEY | NOTES

LGF

899 SQ M
9,677 SQ FT

0 1 2 3 M

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7A Southwood Hall
Muswell Hill Road
Highgate
London N6 5UF
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Rev	Date	Notes

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Project:
Barclay House-Whitworth St

Drawing Title:
Proposed GA-LGF SVP

Scale@A3 1:150 | First Issue: 14/07/2026

Job No: | Dwg No: ANT-540 - FSB-016 | Rev: *

PROPOSED RESIDENTIAL LAYOUT - GROUND FLOOR



REV	AMENDMENTS	BY	DATE
P12	G11 W/M AND KITCHEN REVD	SM	11.06.26
P11	RECEPTION ACCESS REVISED	SM	20.05.26
P10	CYCLE STORE SIZE REDUCED	SM	08.05.26
P9	STMC UPDATE	SM	16.04.26
P8	DRAWING UPDATED FIRE	SM	03.02.26
P7	DRAWING UPDATED	SM	22.01.26
P6	FOB / CCTV ADDED	SM	03.12.25
P5	DOOR REF ADDED	SM	14.11.25
P4	KITCHENS UPDATED	SM	02.10.25
P3	KITCHENS UPDATED	SM	22.09.25
P2	G11-G13 HOB REVD	SM	18.08.25
P1	FIRST ISSUE	SM	01.08.25

ISSUED FOR CONSTRUCTION
TO BE READ IN CONJUNCTION WITH STRUCTURAL DRAWINGS & CONSTRUCTION NOTES

PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT, BARCLAY HOUSE, WHITWORTH STREET WEST, MANCHESTER

CLIENT: PLP CONSTRUCTION LTD

DRAWING TITLE: PROPOSED GROUND FLOOR PLAN

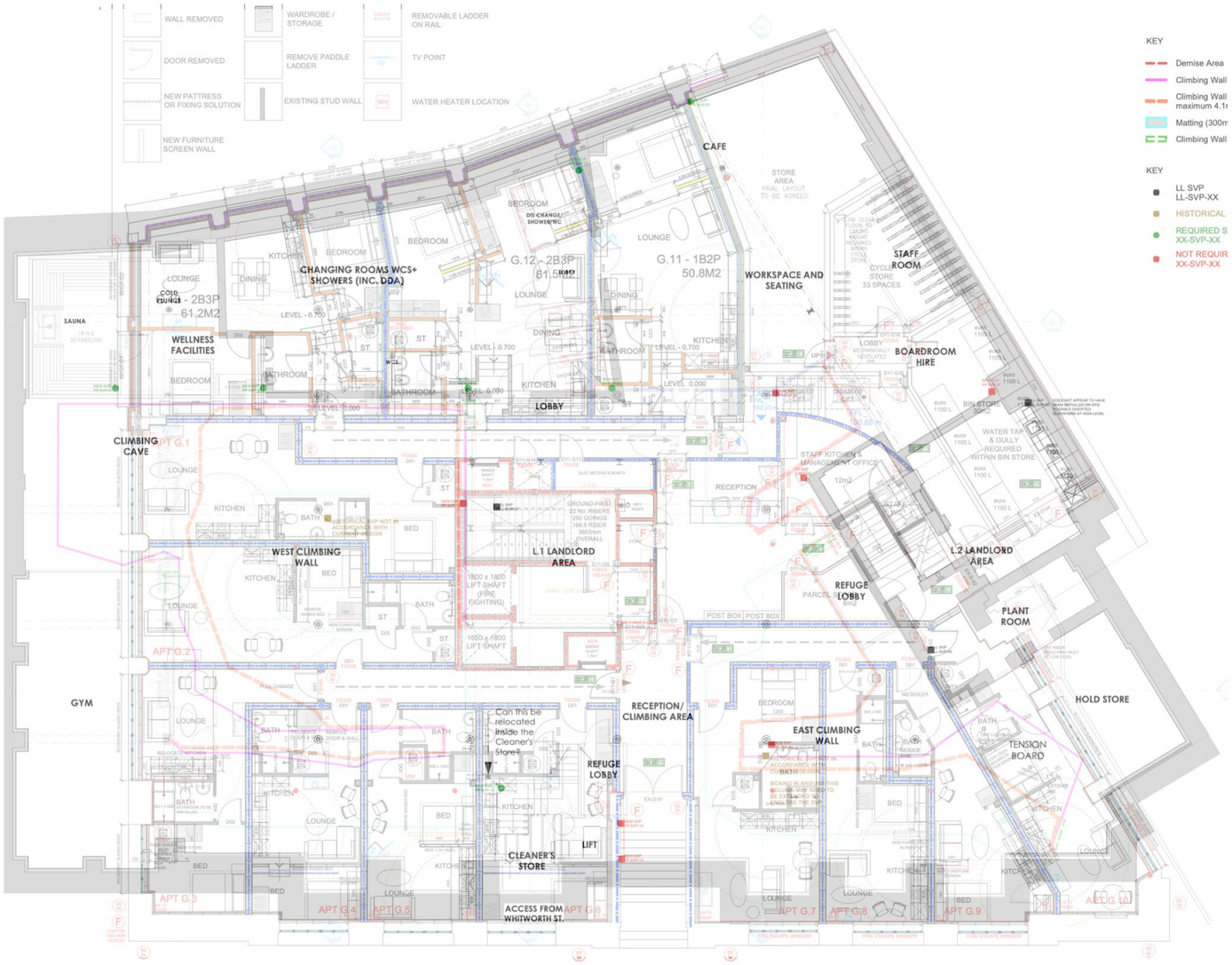
DRAWN: S MCKIERNAN | DATE: 01.08.25
CHECKED | SCALE: 1:50 (A0)
APPROVED

HOWARD & SEDDON A.R.I.B.A. CHARTERED ARCHITECTS
TEL: 0161 [illegible]
E-MAIL: [illegible]

JOB No: 12982 | DRG No: 2011 | REVISION: P12

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CLIMBING WALL UNIT OVERLAY ON GROUND FLOOR PLAN



3.0 TARGET ACOUSTIC CRITERIA

PropPG Acoustic Guidance

The recommended noise transfer targets set out in the ProPG GAG Document are summarised below for adjacent residential premises. These provide appropriate criteria for assessing potential impacts from the proposed Climbing Wall unit.

Music Noise Transfer Criterion:

The target noise transfer criterion for residual music noise in residential spaces in accordance with the PropPG Gym Acoustic Guidance Document is for the residual music noise to fall within the range of G Curve 15 to 25 for daytime use and G Curve 10 to 20 for nighttime use, when measured as a spectral time averaged L_{eq} noise level.

Table 2: Guidance Internal Sound Target Criteria for Gym Activity – Residential & Other Areas

Receptor type	**Guide Criteria** (for third octave band values plots against the stated G curve - see Figure 2)	
	Airborne Sound (e.g., music) $L_{eq,T}$ (31.5Hz to 8kHz)	Heavy Impact Sound $L_{max,F}$ (31.5Hz to 8kHz)
Commercial Offices	G25-G35	G35-G45
Retail Areas	G30-G45	G35-G50
Residential Areas	G15-G25 (day) G10-G20 (night)	G20-G25 (day) G15-G20 (night)

Table 2 Notes:

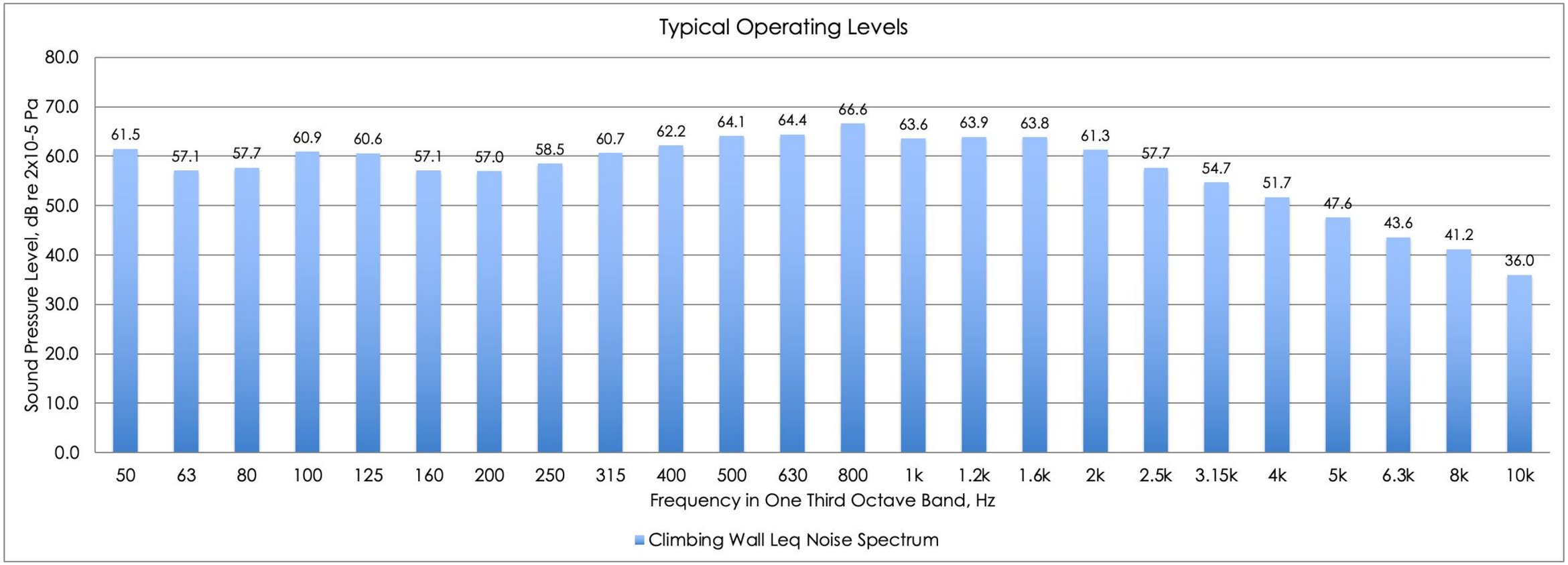
1. *The Working Group generally found in their experience that levels below the upper values tended to avoid significantly adverse impacts (SOAEL) occurring and higher levels than these should generally be avoided, but this is highly dependent on context. The background and ambient noise levels at any given site can fluctuate (e.g., a building in an urban setting adjacent to busy infrastructure versus a building shielded from external adverse noise intrusions and/or quieter location). This variation will also cause a subjective variance in relation to the perceived noise impact, both during the design phase and the completed development and the SQA should be cognisant of which target criteria would be most appropriate to their Gym scheme.*
2. *In rooms with low background noise levels (below ~20 dB $L_{A90,5minutes}$), the criteria should be carefully considered and fully justified. It has been noted that the subjective impression of low frequency noise could still cause issues of disturbance, despite meeting the above target ranges. Therefore, it is recommended that resulting heavy impact noise levels at frequencies 80Hz and below, do not exceed a level of 20dB above the existing background noise dB $L_{A90,5minutes}$ within commercial and retail adjacencies (without source/Gym related activities). Where good sound insulation and closed windows results in very low background sound levels this can result in the loss of masking sound making intruding low frequency sound from Gyms more prominent and so potentially more likely to cause disturbance*
3. *For heavy impact noise at least 1/3 octave bands analysis is desirable over the audible range from 31.5Hz, although measuring down to 20Hz is desirable to cover the audible range and may assist in identifying outlying peaks of energy.*
4. *For music noise, particular care should be given to controlling noise in the low frequency region, in the range 31.5Hz to 200Hz and $L_{max,F}$, L_1, L_{10} may also be used as parameters as a substitution for $L_{eq,T}$.*

Impact Noise Transfer Criterion:

The target noise transfer criterion for residual music noise in residential spaces in accordance with the PropPG Gym Acoustic Guidance Document is for the residual music noise to fall within the range of G Curve 20 to 25 for daytime use and G Curve 15 to 20 for nighttime use, when measured as a spectral L_{fMax} noise level.

In order to establish typical operating music / activity noise levels within the proposed Climbing Wall space, reference is made to representative Climbing Wall activity spectral noise data as measured by Red Acoustics at Stronghold Climbing, Unit 30, Canal Place, Andrews Rd, London E8 4FX on 29 June 2026. Details of typical music & activity noise levels measured are presented in Figure 3.1 below.

Figure 3.1: Typical Climbing Wall Leq Music / Activity Noise Spectra



4.0 INTERNAL NOISE TRANSFER TEST PROCEDURE & SUMMARY ASSEMENT

Test Procedure

Appendix A provides details of the test procedures undertaken on site.

Test Summary

Table 4.1 below summarises the initial tests undertaken on site to assess the transmission of music and activity noise as well as free and fitness weight transfer from the Climbing Wall unit to the adjacent noise sensitive spaces.

Table 4.1: Noise Transfer Measurements

AIRBORNE NOISE TRANSFER TESTS				
Test No.	**Source Area**	**Receiving Area**	**Source Type**	**Comments**
1	Proposed Basement Level Climbing Wall Unit: Front Area	Ground Floor Apt G.8 Living Area	Pink Noise Transfer	As shown in the graph below, sound insulation performance was poor, primarily due to the presence of open voids and unsealed penetrations within the building structure.
IMPACT NOISE TRANSFER TESTS				
2	Proposed Basement Level Climbing Wall Unit: Front Area	Ground Floor Apt G.8 Living Area	Fitness Weight Drops	As shown in the graph below, airborne noise generated by the weight drop was also audible, primarily due to the presence of open voids and unsealed penetrations within the building structure.
3	Proposed Basement Level Climbing Wall Unit: Front Area	Ground Floor Apt G.8 Bathroom Area	Free Weight Drops	As shown in the graph below, the airborne impact noise was also just audible. These tests were undertaken within the small bathroom area to enable a frequency based comparison with the tests completed in the living areas.

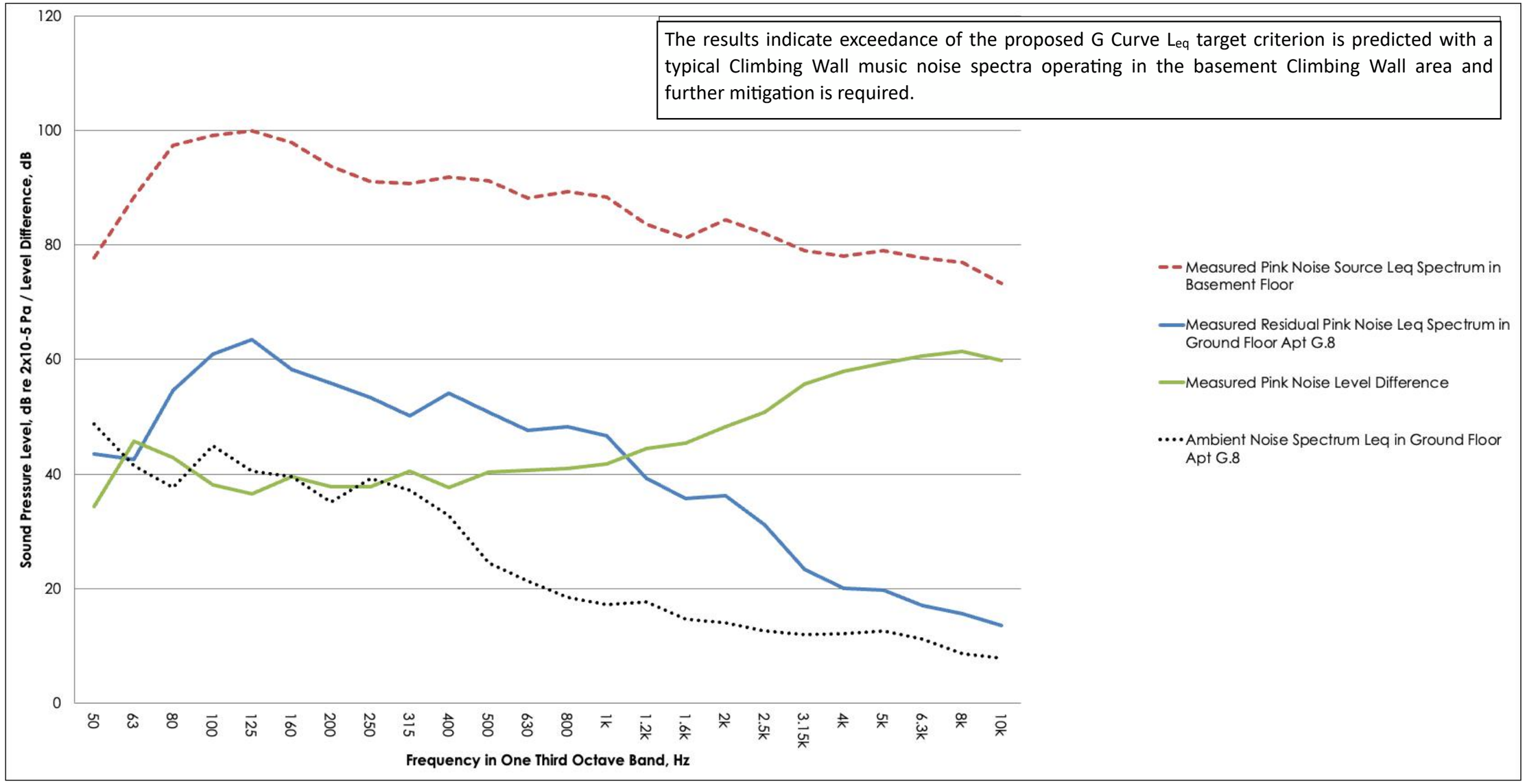
To assess impact from normal operation of the Climbing Wall unit, a noise transfer assessment has been undertaken by Red Acoustics based on the following information:

- Noise transfer measurements taken on site between the shell unit and adjacent noise sensitive spaces
- Knowledge of existing separating and flanking structures
- Database of typical source noise levels within the Climbing Wall spaces

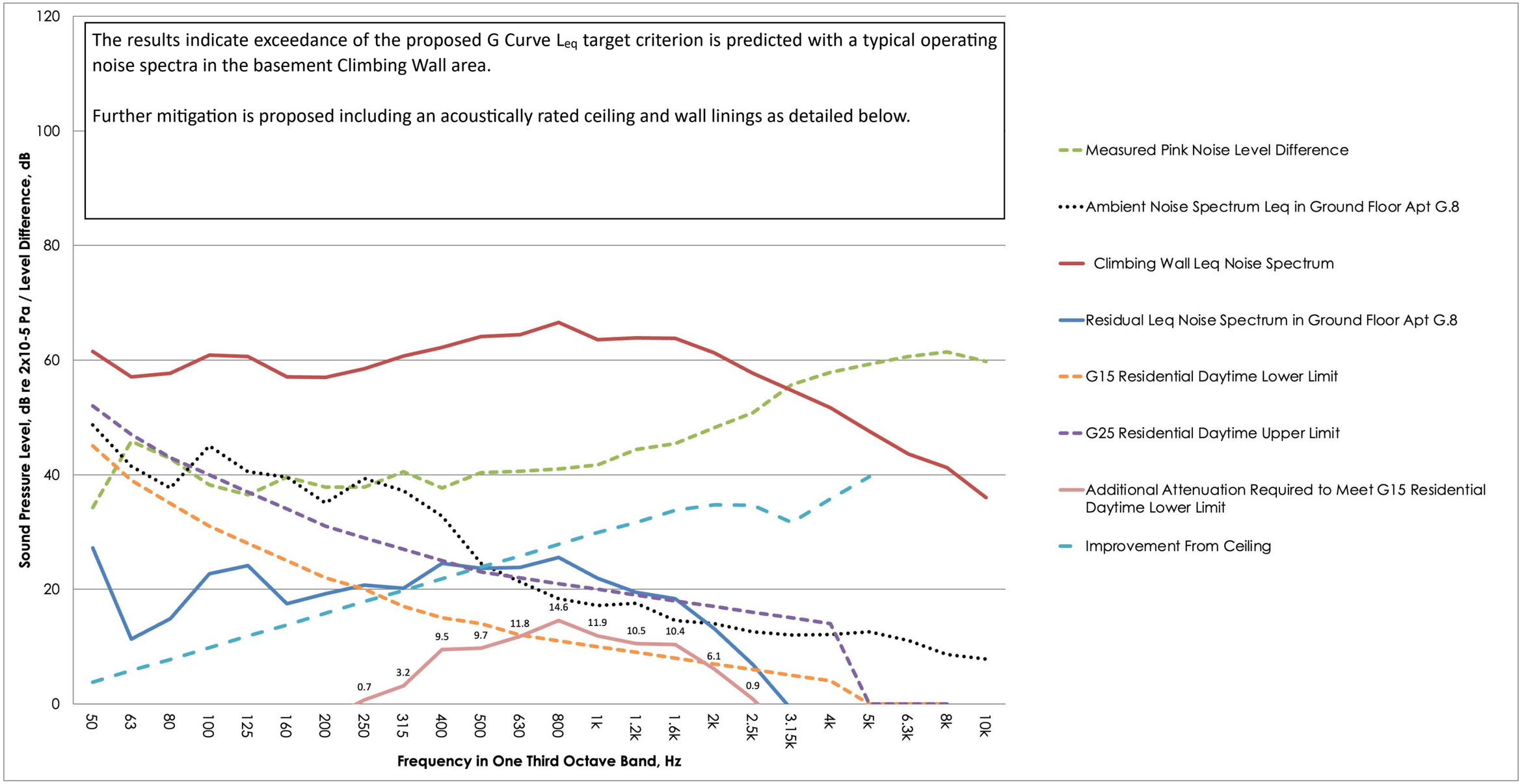
The graphs below present the results of the music noise transfer assessment based on the existing unit constructions.

Test 1 - Proposed Basement Level Climbing Wall Unit: Front Area to Ground Floor Apt G.8 Living Area: Pink Noise Transfer & Measured Level Difference

The results indicate exceedance of the proposed G Curve L_{eq} target criterion is predicted with a typical Climbing Wall music noise spectra operating in the basement Climbing Wall area and further mitigation is required.

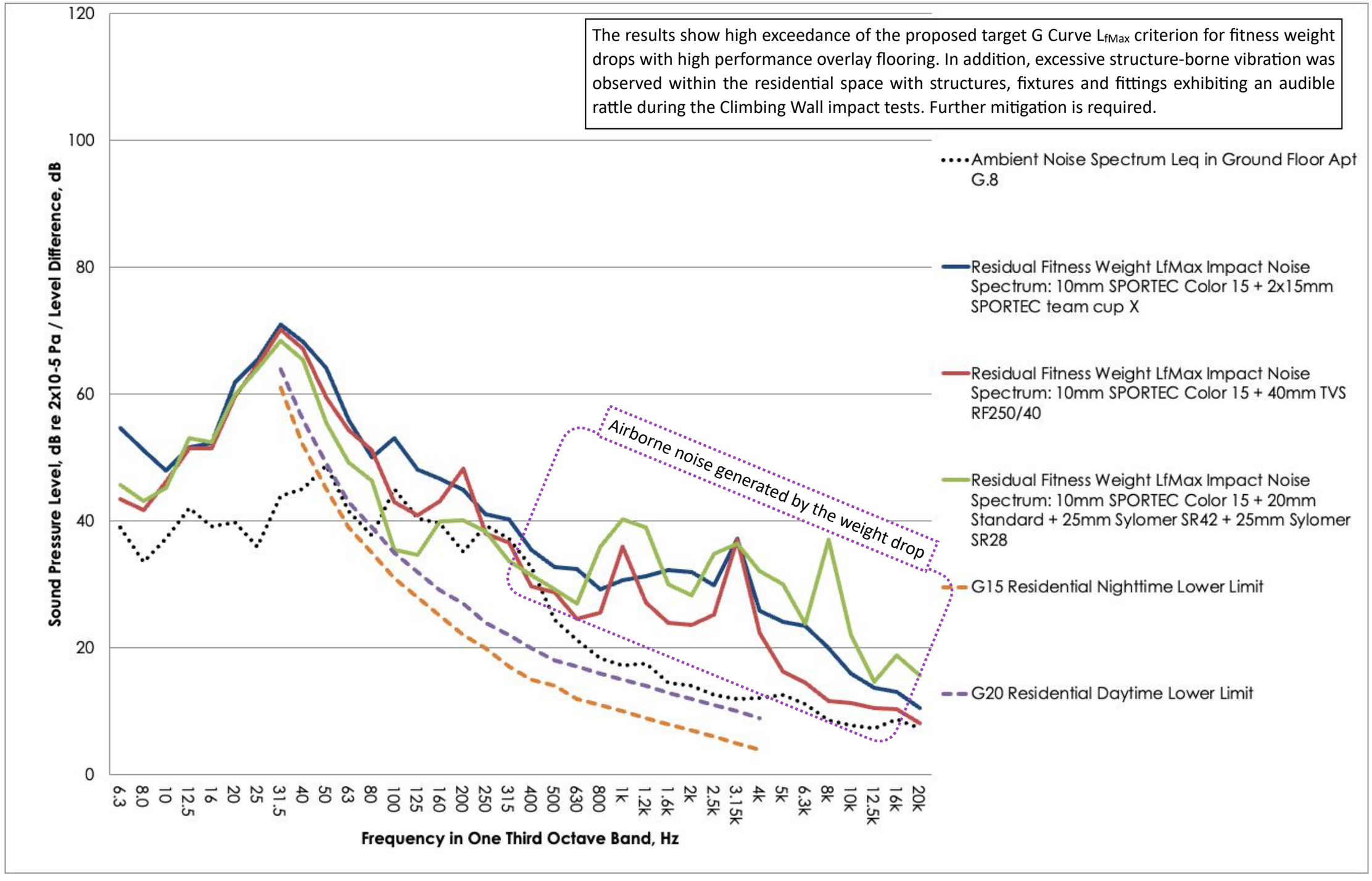


Assessment 1 - Proposed Basement Level Climbing Wall Unit: Front Area to Ground Floor Apt G.8 Living Area: Predicted Climbing Wall L_{Aeq} Music & Activity Noise Transfer



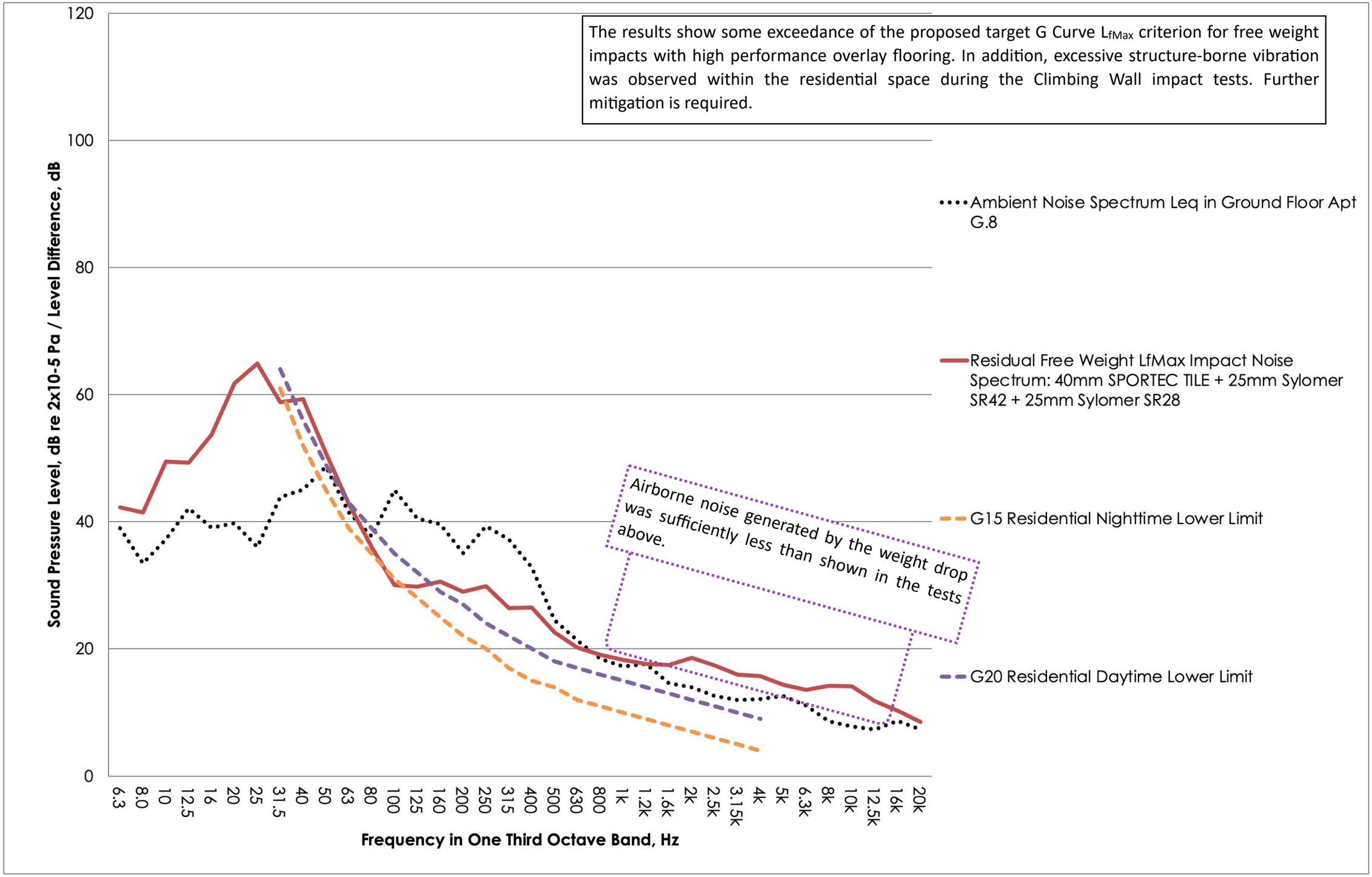
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Test 2 - Proposed Basement Level Climbing Wall Unit: Front Area to Ground Floor Apt G.8 Living Area: Fitness Weight Impact L_{fMax} Noise Transfer



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Test 3 - Proposed Basement Level Climbing Wall Unit: Front Area to Ground Floor Apt G.8 Bathroom: Free Weight Impact L_{fMax} Noise Transfer



5.0 PROPOSED MITIGATION SUMMARY

The recommendations detailed below are informed by the measured sound insulation performance between the basement and the ground floor above, which was found to be limited by the presence of open voids and unsealed service penetrations within the existing building structure.

The proposed climbing wall activities have been assessed separately and, based on the use of the proposed high-performance impact-absorbing flooring together with the ceiling and wall treatments described below, are not expected to give rise to unacceptable levels of airborne noise or structure-borne vibration within the residential accommodation above.

The proposed layout also incorporates a small gym area; however, the final equipment layout has not yet been confirmed. Consequently, it has not been possible to define a single floor construction suitable for all potential uses. The recommendations presented below therefore provide a range of outline mitigation measures for different categories of gym equipment, including general strength and functional training equipment together with free weight areas. The final floor construction should be selected and verified once the equipment layout has been finalised.

Free Weight Use - Suggested Mitigation Subject to Kit Layout

- 40mm TVS SPORTEC TILE
- 25mm TVS SYLOMER SR42
- 25mm TVS SYLOMER SR28
- Over option 1, 2 or 3:

Strength & Functional Use - Suggested Mitigation Subject to Kit Layout

- 10mm TVS Sportec Color 15
- 20mm TVS Standard
- 25mm TVS SYLOMER SR42
- 25mm TVS SYLOMER SR28
- Over option 1, 2 or 3:

OPTION 1 - LFSA STEEL FLOOR SYSTEM

- TVS LFSA Floor System; Incorporating Low Frequency Shock Absorbers
- Shock absorbers located at 1.0 m × 1.0 m centres, incorporating 200 mm × 200 mm × 10 mm steel base plates.
- Base plates can have rubber noise stop pads bonded to underside.
- Subfloor to be level and smooth.

Weight is approximately 100kg/m^2

OPTION 2 - JACK UP CONCRETE SLAB

- 120mm Concrete Slab with Rebar on DPM on
- TVS ASFF Adjustable Spring Floor Mounts Typically 600mm Ctrs subject to loadings
- Mount Natural Frequency <5Hz
- Floor Slab Jacked Up By a Minimum 50mm Cavity

Weight is approximately 288kg/m^2

OPTION 3 ENHANCED TVS DRY RESI (AS APPROVED BY TVS FOR FREE WEIGHT USE)

- 2x18mm OSB Plywood over
- 3x18mm Cementitious Boards over
- 22mm T&G Subdeck over
- 50mm Timber Battens (design & Ctrs TBC by TVS) over
- 2mm Metal Channels Fitted with 50mm High TVS Isolation Cubes over
- 50mm Insulation in the cavity
- Subfloor to be level and smooth.

Climbing Wall Area - Flooring

- Climbing wall flooring / mats as required for use

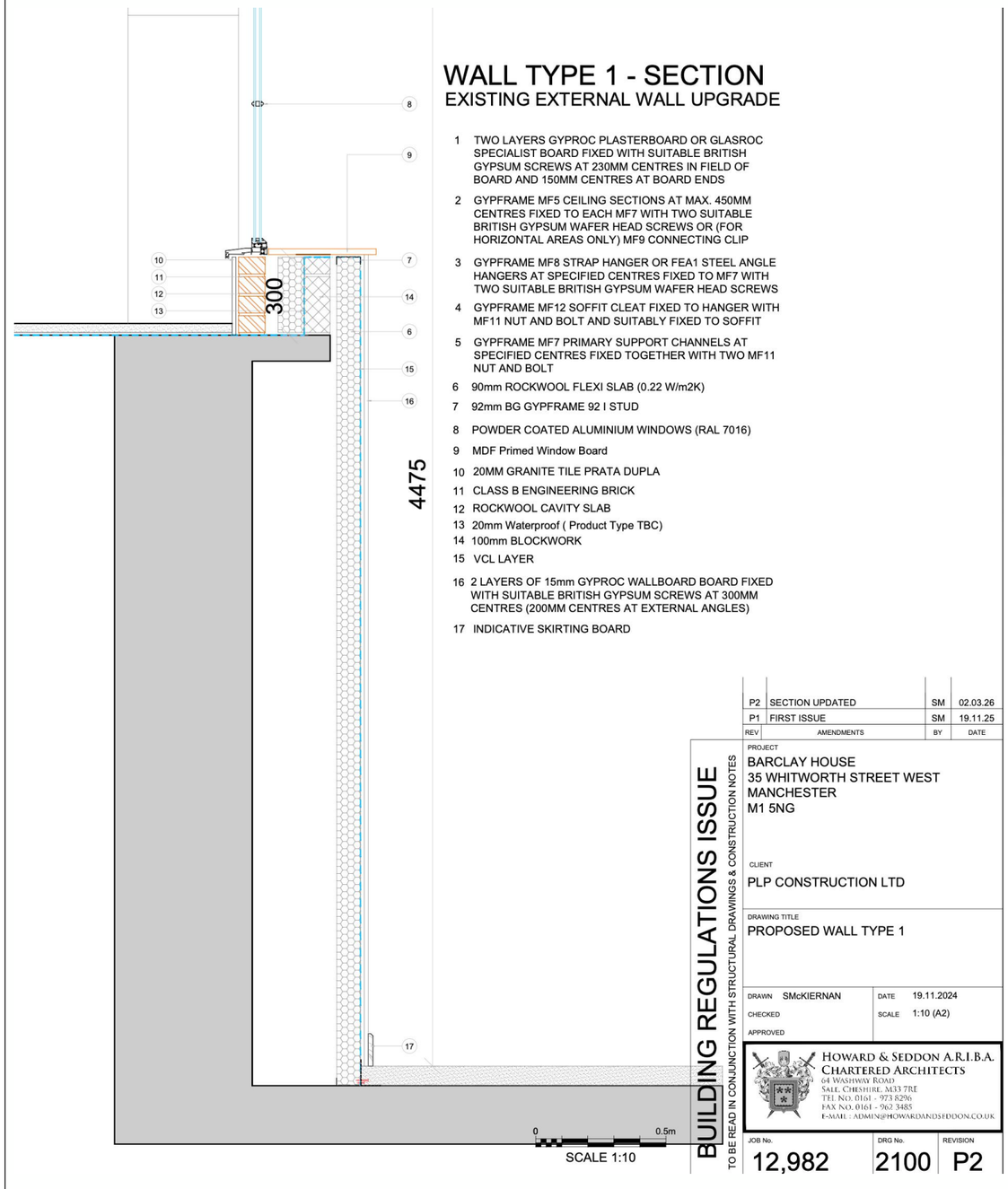
Acoustic Ceiling Throughout

- Make good any existing gaps in the existing basement ceiling
- 2x15mm SoundBloc or (2 x 15mm Fireline) Plasterboard fixed on
- Acoustically rated spring hangers and no penetrations through the ceiling with all services located below the ceiling. ***Ceiling must be imperforate and located above any services***
- Minimum cavity 100mm with 100mm Insulation in the ceiling cavity (density 10kg/m^3)

GypLyner Linings to Common Residential Flanking Walls

- 2x15mm SoundBloc or (2 x 15mm Fireline) Plasterboards fixed on
- Gyplyner Wall Lining System.
- Minimum cavity 26mm with 25mm Insulation in cavity (density 10kg/m^3)

Linings to Existing External Wall



WALL TYPE 1 - SECTION
EXISTING EXTERNAL WALL UPGRADE

1 TWO LAYERS GYPROC PLASTERBOARD OR GLASROC SPECIALIST BOARD FIXED WITH SUITABLE BRITISH GYPSUM SCREWS AT 230MM CENTRES IN FIELD OF BOARD AND 150MM CENTRES AT BOARD ENDS
2 GYPFRAME MF5 CEILING SECTIONS AT MAX. 450MM CENTRES FIXED TO EACH MF7 WITH TWO SUITABLE BRITISH GYPSUM WAFER HEAD SCREWS OR (FOR HORIZONTAL AREAS ONLY) MF9 CONNECTING CLIP
3 GYPFRAME MF8 STRAP HANGER OR FEA1 STEEL ANGLE HANGERS AT SPECIFIED CENTRES FIXED TO MF7 WITH TWO SUITABLE BRITISH GYPSUM WAFER HEAD SCREWS
4 GYPFRAME MF12 SOFFIT CLEAT FIXED TO HANGER WITH MF11 NUT AND BOLT AND SUITABLY FIXED TO SOFFIT
5 GYPFRAME MF7 PRIMARY SUPPORT CHANNELS AT SPECIFIED CENTRES FIXED TOGETHER WITH TWO MF11 NUT AND BOLT
6 90mm ROCKWOOL FLEXI SLAB (0.22 W/m2K)
7 92mm BG GYPFRAME 92 I STUD
8 POWDER COATED ALUMINIUM WINDOWS (RAL 7016)
9 MDF Primed Window Board
10 20MM GRANITE TILE PRATA DUPLA
11 CLASS B ENGINEERING BRICK
12 ROCKWOOL CAVITY SLAB
13 20mm Waterproof (Product Type TBC)
14 100mm BLOCKWORK
15 VCL LAYER
16 2 LAYERS OF 15mm GYPROC WALLBOARD BOARD FIXED WITH SUITABLE BRITISH GYPSUM SCREWS AT 300MM CENTRES (200MM CENTRES AT EXTERNAL ANGLES)
17 INDICATIVE SKIRTING BOARD

REV	AMENDMENTS	BY	DATE
P2	SECTION UPDATED	SM	02.03.26
P1	FIRST ISSUE	SM	19.11.25

BUILDING REGULATIONS ISSUE
TO BE READ IN CONJUNCTION WITH STRUCTURAL DRAWINGS & CONSTRUCTION NOTES

PROJECT
BARCLAY HOUSE
35 WHITWORTH STREET WEST
MANCHESTER
M1 5NG

CLIENT
PLP CONSTRUCTION LTD

DRAWING TITLE
PROPOSED WALL TYPE 1

DRAWN SMcKIERNAN | DATE 19.11.2024
CHECKED | SCALE 1:10 (A2)
APPROVED

HOWARD & SEDDON A.R.I.B.A.
CHARTERED ARCHITECTS
64 WASHWAY ROAD
SALE, CHESHIRE, M33 7RE
TEL NO. 0161 - 973 8296
FAX NO. 0161 - 962 3485
E-MAIL : ADMIN@HOWARDANDSEDDON.CO.UK

JOB No.	DRG No.	REVISION
12,982	2100	P2

APPENDIX A: SOUND INSULATION TEST PROCEDURE

Airborne - Pink Noise Sound Insulation Transfer Test

Where practical, airborne sound insulation testing was carried out in accordance with the requirements of the BS EN ISO 140-4:1998: “Field Measurements of Airborne Sound Insulation between Rooms” in order to determine the level difference, D, between the proposed Climbing Wall unit and the existing residential spaces. Where

$$D = L_1 - L_2$$

and

L_1 is the average sound pressure level in the source room

L_2 is the average sound pressure level in the receiving room

To conduct airborne sound insulation tests, a noise source is placed in the “source room” and the resultant noise level (L_{eq}) in this room is measured at fixed positions. The room on the other side of the party construction is the “receiver room” and the noise transmitted to this room is measured at fixed positions.

The background / ambient (L_{eq}) noise levels were recorded in the receiver room with the sound source turned off and during lulls in external traffic activity or other environmental sources.

All of the above measurements were made over the one-third octave bands from 50 Hz to an extended frequency of 10,000 Hz inclusive.

The differences between source and receiver third octave band noise levels were then calculated in accordance with BS EN ISO 140-4: “Field Measurements of airborne sound insulation between rooms” and corrected for background noise.

Assessments using a music noise source were also undertaken to subjectively assess potential impact from music noise transfer.

Where applicable, reverberation time measurements were also undertaken to enable the RT60 corrections to be applied in accordance with the target acoustic specification.

Shock Vibration Transfer

To assess the transfer of free weight shock vibration from the Climbing Wall unit to the adjacent noise sensitive spaces, residual impact noise levels were measured within noise sensitive spaces during controlled free weight drops in the Climbing Wall unit using a 35kg dumbbell onto different resilient floor types to determine the most cost effective solution. The 35kg Dumbbell was dropped from a height of 0.5m for each measurement. This provided a representative assessment for free weight shock loads on the building structure and is representative of normal Climbing Wall use.

To assess the transfer of fitness weight shock vibration from the Climbing Wall area to the adjacent noise sensitive spaces, residual impact noise levels were measured within noise sensitive spaces during controlled fitness weight drops in the studio unit using a 20kg kettle bell onto different resilient floor types to determine the most cost effective solution. The 20kg Kettle bell was dropped from a height of 0.1m for each measurement. This provided a representative assessment for fitness weight shock loads on the building structure and is representative of normal studio use.

Airborne Sound Insulation

Airborne sound insulation testing was carried out in accordance with the requirements of the BS EN ISO 140-4:1998: “Field Measurements of Airborne Sound Insulation between Rooms”.

If the rooms are of different volumes, the larger one should be chosen as the source room when the standardised level difference is to be evaluated and no contradictory procedure is agreed upon.

To conduct airborne sound insulation tests, a pink noise source is placed in the “source room” and the resultant noise level ($L_{eq,30secs}$) in this room is measured using a moving microphone with a sweep radius of at least 0.7 m. The plane of the traverse is inclined in order to cover a large proportion of the space permitted for measurement. The plane of traverse shall not lie within 10° of any plane of the room (wall, floor, ceiling). The duration of the traverse period is minimum of 30 seconds. The room on the other side of the party construction is the “receiver room” and the noise transmitted to this room is measured using a moving microphone as described above.

The numbers of microphone and loudspeaker positions is determined from the floor area of the source and receiving rooms in accordance with the requirements of the BS EN ISO 140-4:1998: “Field Measurements of Airborne Sound Insulation between Rooms” and BS EN ISO 140-14:2004: “Measurement of Sound Insulation in Buildings and of Building Elements”. Two sets of source and receiving room measurements were required, with the loudspeaker moved between sets of measurements. This gives at least two level differences, which are then averaged arithmetically.

The background ($L_{eq,30secs}$) noise level in the receiver room with the noise source turned off is measured in accordance with BS EN ISO 140-4:1998: “Field Measurements of Airborne Sound Insulation between Rooms” and BS EN ISO 140-14:2004: “Measurement of Sound Insulation in Buildings and of Building Elements” where the resultant background noise level ($L_{eq,30secs}$) in this room is measured using a moving microphone with a sweep radius of at least 0.7 m. The plane of the traverse is inclined in order to cover a large proportion of the space permitted for measurement. The plane of traverse shall not lie within 10° of any plane of the room (wall, floor, ceiling). The duration of the traverse period is minimum of 30 seconds.

All of the above measurements were made over the one-third octave bands from 50 Hz to 5000 Hz inclusive.

APPENDIX B: TEST DETAILS & CALIBRATION CERTIFICATES

Location

Barclay House, Manchester.

Date of Tests

16 February 2026 - Internal Noise Transfer Tests

Tests Conducted By

Simon Webster BEng(Hons) MIOA

Paul Clark Pg. Dip. IOA MIOA

Red Acoustics Limited, Unit 8 Cable Court, Pittman Way, Preston, PR2 9YW

Associate Members of the Association of Noise Consultants

Accredited Test Organisation Number 180

Instrumentation

Table B1: List of Instrumentation Used

Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
Sound Level Meter	XL3	Nti Audio	A3A-00480-D1	21/03/2025	UK-25-033
Preamplifier	MA220	Nti Audio	11390	21/03/2025	UK-25-033
Microphone Capsule	MC230A	Nti Audio	A24694	21/03/2025	UK-25-033
Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	31040	31/10/2025	52541

Methodology

Before and after the measurements the sound level meter was check calibrated to an accuracy of ±0.3dB using the Type 1 Calibrator. The calibrator produces a sound pressure level of 114 dB re 2x10-5 Pa @ 1kHz.