

**PROPOSED LATE NIGHT BAR/NIGHT-CLUB
GROUND FLOOR, WINDMILL GREEN, MOUNT STREET, MANCHESTER**

NOISE IMPACT ASSESSMENT

**On behalf of:
LHP Group Limited**

**PROPOSED LATE NIGHT BAR/NIGHT-CLUB
GROUND FLOOR, WINDMILL GREEN, MOUNT STREET, MANCHESTER**

NOISE IMPACT ASSESSMENT

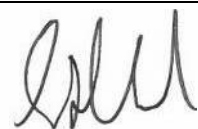
Report prepared by:
Hepworth Acoustics Ltd
21 Little Peter Street
Manchester
M15 4PS

On behalf of:
LHP Group Ltd

Report prepared by:
Donald Quinn BSc FIOA – Managing Director



Report checked by:
Graham Bowland BSc MIOA – Technical Director



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1.0 INTRODUCTION & SITE DESCRIPTION

- 1.1 Hepworth Acoustics Ltd was commissioned by the LHP Group Ltd to carry out a noise impact assessment in connection with the change of use of an existing ground floor unit at the Windmill Green commercial development at Mount Street in Manchester city centre to form a new late-night bar/night-club.
- 1.2 This is an updated version of our report following feedback from Manchester City Council Environmental Health department. We have added important clarification regarding trading noise levels as set out in paras 5.15 – 5.20.
- 1.3 Proposals are for the new late-night bar/night-club to be open to members and the general public between 23:00 – 04:00 on Friday, Saturday and Sunday nights. On this basis, the late-night bar/night-club will operate outside of hours of use of the majority of the surrounding (commercial/office) uses and we therefore understand from the client that noise impact on surrounding offices/commercial premises (including noise transmission to other demises within the building) is not of key concern.
- 1.4 There are however hotel guest rooms at the Midland Hotel opposite the site on Mount Street. There are also hotel guest rooms at the Edwardian Manchester hotel beyond the Theatre Royal building to the Museum Street elevation, as well as apartments on the upper floors of Great North Tower further to the west. The noise assessment has therefore focussed on the potential noise impact of trading noise break-out to these noise sensitive receptors. The assessment has included:
- An inspection of the ground floor unit, and surrounding area;
 - A baseline noise survey to establish the existing baseline noise climate of the area towards the end of the proposed trading (i.e. between 02:00 – 04:00);
 - Adopting appropriate source trading noise levels for the premises and calculation of potential noise break-out via the premises shopfronts;
 - Recommendation of appropriate sound insulation/noise mitigation measures and
 - Recommendation of appropriate noise limits for new fixed plant and equipment.
- 1.5 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are

imperceptible. Our recommendations are provided for acoustics purposes only and other matters (e.g. fire, structural etc.) should be checked by others.

2.0 SITE DESCRIPTION & PROPOSALS

Existing Site Description

- 2.1 The new late-night bar/night-club will be located in the currently vacant commercial unit occupies part of the ground floor of the Windmill Green development that is bounded by Mount Street, Windmill Street and Museum Street in Manchester city centre. The unit has existing planning consent for restaurant use. The unit has shopfronts to both Museum Street and Mount Street, although it is proposed that the member/customer entrance/exit will be via the Museum Street elevation only, with the Mount Street elevation used as an emergency fire escape only. The site location is shown in Figure 1. Opposite the Mount Street shopfront is the Midland Hotel, with hotel guest rooms on the upper floors. Opposite the Museum Street shopfront are vacant/disused buildings including the Theatre Royal building which was most recently occupied by a nightclub.
- 2.2 The nearest noise-sensitive receptors to the Museum Street shopfront are hotel guest rooms at the corner of Windmill Street and Southmill Street to the rear of the Edwardian Manchester hotel, with the apartments on the upper floor of the Great North tower further to the west on Watson Street beyond. There is however no line of sight of the Museum Street shopfront from these hotel guest rooms/dwellings, this being blocked by the Theatre Royal and adjoining building.
- 2.3 The existing ground floor existing unit has been fitted out generally to shell/core with the central area featuring what is assumed to be a raised access floor with metal floor tiles (assumed to be on pedestals). The soffit is the original cast in-situ concrete with coffered profiles. At the Museum Street and Mount Street elevations, there are steps down to a lower level at grade with the pavements outside. Both shopfronts are of modern curtain wall design with aluminium frames and large double-glazed units. It was not possible to see to what extent the existing soffit was connected to the external curtain wall.
- 2.4 The existing unit is shown in the photos set out below:

Photo 1: Inside unit, looking towards Mount Street shopfront

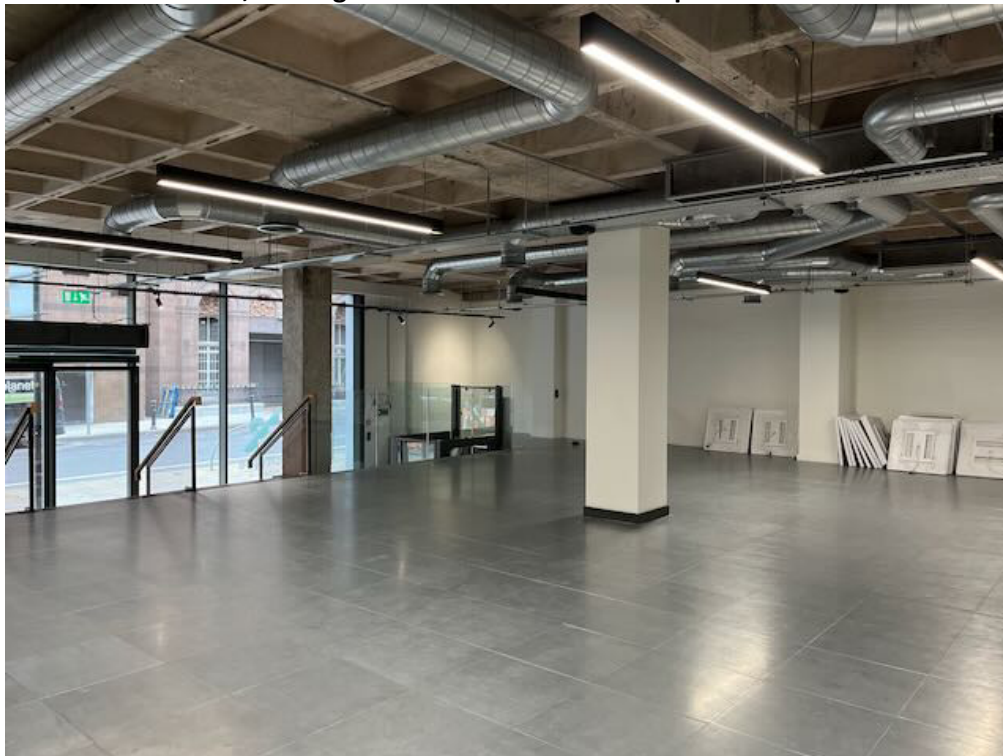


Photo 2: Inside unit, looking towards Museum Street shopfront

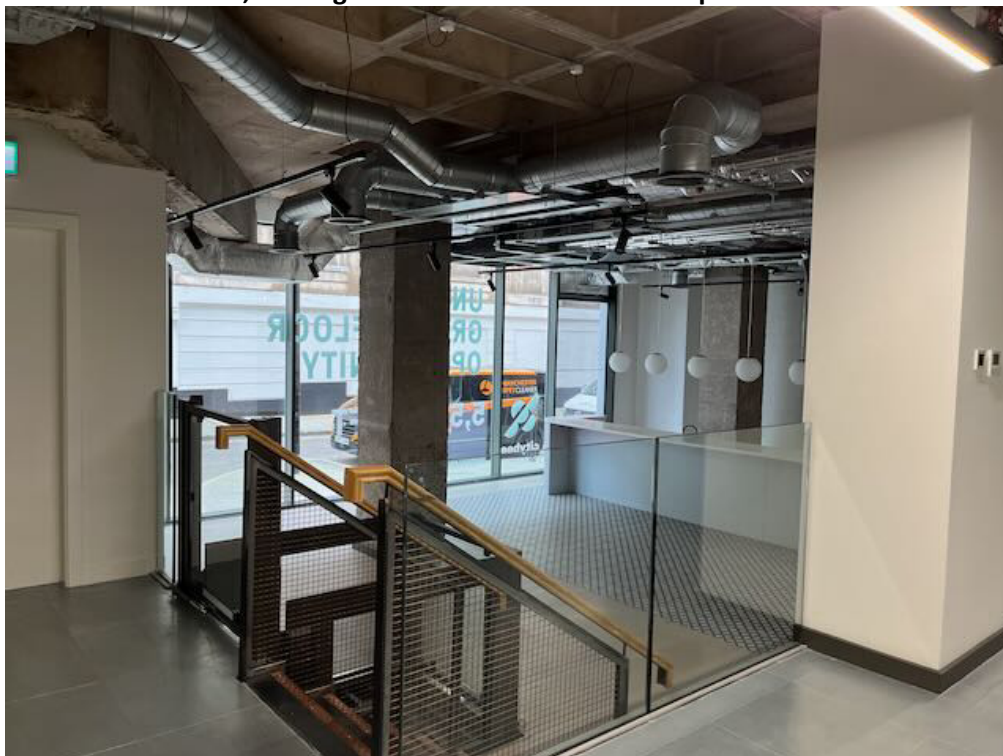


Photo 3: Mount Street shopfront viewed from outside Midland Hotel



Photo 4: Museum Street shopfront



Proposals

- 2.5 The proposed layout is shown in Figure 2. The member/customer entrance exit is to be from Museum Street. Immediately inside the entrance door is a small lobby from which there is access to a second separate lobby, leading to what will be the private members area adjoining the Museum Street shopfront.
- 2.6 The private members area will feature an internal plasterboard lining to the existing shopfront.
- 2.7 The main trading area will be accessed via further sets of doors such that there are three separate sets of doors between the entrance and the main trading area.
- 2.8 Towards the rear of the premises (i.e. towards the Mount Street elevation) there will be a bar area with a new wall constructed near to the edge of the raised floor area hence forming a lobby/buffer zone between the trading area and the Mount Street shopfront. There will be a fire escape to Mount Street via two separate sets of doors - one at the top of the steps from the raised area and the other in the Mount Street shopfront. These doors will remain closed at all times except in the case of emergencies.
- 2.9 We understand that the trading style of the bar/night-club will include R&B-type music at fairly high music noise levels in the main bar/night-club trading area, with the PA system designed such that there will be significantly lower levels of noise in the bar area and in the private members room. There will be no music played in the entrance lobbies and hence trading noise levels in these areas will be low.
- 2.10 Proposals are for the new late-night bar/night-club to be open to members and the general public between 23:00 – 04:00 on Friday, Saturday and Sunday nights. On this basis, the late-night bar/night-club will operate outside of hours of use of the surrounding commercial/office uses.

3.0 NOISE CRITERIA

3.1 Manchester City Council have well-established noise design criteria for developments such as bars/night-clubs:

3.2 Manchester City Council document *Planning & Noise Technical Guidance* dated October 2022 states:

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

3.3 It is also noted that where a new residential development is structurally connected (and structurally separate) from entertainment premises:

‘a criterion that would achieve a condition of ‘inaudible’ / ‘virtually inaudible’ which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:

‘Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{eq,5min}$), respectively’.

3.4 Taking the above into account, and on the basis that a typical façade with windows open for ventilation will provide at least 10 dB reduction of external noise (including in the 63 Hz and 125 Hz octave bands), we have therefore adopted the following criterion for assessment purposes:

‘Entertainment noise (in dB $L_{eq,5min}$) to be controlled to at least 5 dB below the typical background noise level (in dB $L_{90,5min}$) in each octave band at the nearest noise-sensitive location, subject to lower limits of 57 dB and 51 dB in the 63 Hz and 125 Hz octave bands respectively’.

3.5 In respect of plant/equipment noise, Manchester City Council guidance states that:

‘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 (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location’.

4.0 BASELINE NOISE SURVEY

- 4.1 Environmental noise measurements were carried out at the site to determine the prevailing baseline noise climate in the vicinity of the nearest noise sensitive receptors.
- 4.2 The site was found to be unsuitable for the installation of unattended automated noise monitoring equipment (i.e. there were no suitable secure locations available). As such the noise survey was carried out on an attended basis between 02:00 and 04:00 hours on Tuesday 25 June 2024 to be representative of the most sensitive (i.e. quietest) proposed trading period. Measurements were taken in sets of generally 4-5 minute periods at two locations in rotation. The measurements locations, which are shown in Figure 1 and described below, were chosen to be representative of the nearest noise sensitive receptors to each of the Mount Street and Museum Street shopfronts:
- A. Near to hotel guest rooms at the rear of the Edwardian Manchester hotel at the corner of Windmill Street and Southmill Street; and
 - B. Outside the Midland Hotel on Mount Street (the precise location here was chosen so as to be least affected by existing buildings services noise from the Midland Hotel itself).
- 4.3 The measurements were taken with a NTi Audio XL2 sound analyser (serial no. A2A-20361-E0) that was tripod mounted at a microphone height of approximately 1.4m above local ground level in free-field conditions. The measurements included octave band analysis and audio recording. The sound analyser was field calibrated before and after the measurements with no variance observed.
- 4.4 The weather conditions throughout the noise survey were warm/mild, dry, generally clear and calm. These were considered suitable conditions for the survey.
- 4.5 The full results of the noise survey are detailed in Appendix II. The noise levels are summarised in Table 1.

Table 1: Summary of measured noise levels (dB)

Location	Range of measured noise levels (dB)	
	$L_{Aeq,T}$	$L_{A90,T}$
A. Corner of Windmill Street & Southmill Street	46 – 56	42 – 45
B. Mount Street	50 – 55	46 – 51

- 4.6 The main identified noise sources included distant and local road traffic which generally reduced over the course of the survey, generally steady building services noise from other premises and occasional pedestrians.
- 4.1 From analysis of the measured octave band noise levels, the lowest typical octave band L₉₀ noise levels are as follows:

Table 2: Adopted lowest typical octave band L₉₀ noise levels (dB)

Location	Octave band centre frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
A. Corner of Windmill Street & Southmill Street	49	48	47	40	37	34	27	43
B. Mount Street	50	47	50	44	43	37	36	48

5.0 NOISE IMPACT ASSESSMENT & RECOMMENDATIONS

Internal Noise Break-out

- 5.1 Taking into account the adopted noise criteria and the results of the baseline noise survey, the adopted noise limits for control of internal noise break-out are as follows:

Table 3: Internal noise break-out limits (dB L_{eq})

Location	Octave band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
A. Manchester Edwardian Hotel/Great North Tower	57	51	47	40	37	34	27
B. Midland Hotel	57	51	50	44	43	37	36

- 5.2 We understand from the client that music will be played at high noise levels in the main trading/VIP area towards the centre of the premises, but noise levels will be significantly lower in the bar area and in the private members' area that adjoin the external shopfronts.
- 5.3 For the purposes of this assessment, we have adopted the following worst-case source trading noise levels for the main trading/VIP area, based upon the guidance set out in the Manchester City Council *Planning & Noise Technical Guidance* for night-clubs:

Table 4: Adopted main trading/VIP area music noise levels (dB)

Description	Octave band centre frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Main/VIP trading area noise in L_{eq}	115	110	105	102	99	96	93	105

- 5.4 In the bar area and private members' area, where we understand music noise levels will be significantly lower, we have adopted the following music noise levels which are equivalent to half the loudness of the values for the main/VIP trading area:

Table 5: Adopted main trading/VIP area music noise levels (dB)

Description	Octave band centre frequency (Hz)							A
	63	125	250	500	1k	2k	4k	
Main/VIP trading area noise in L_{eq}	105	100	95	92	89	86	83	95

- 5.5 It should be noted that the noise levels set out in Table 5 remain significant and are reflective of foreground music at elevated levels.

- 5.6 Using the adopted trading noise levels in Table 5 alongside details of the existing external building envelope, we have calculated the likely resulting trading noise break-out. As one would expect, the existing glazed curtain wall building envelope will not provide sufficient sound insulation. As such, it will be necessary for the proposed new internal wall linings to adequately enhance the sound insulation of the shopfront.

Recommendations

- 5.7 In order to adequately control the break-out of internal trading noise, we recommend the following internal wall lining:
- New wall linings on both the Mount Street and Museum Street elevations mounted via fully independent metal studs, with no connection to the existing external shopfront wall.
 - The internal lining is to be formed of three layers of 15mm Gyproc SoundBloc plasterboard, or equivalent. One layer of plasterboard can be replaced with 15mm ply if this is required to allow fixtures/fittings. Plasterboard/ply joints are to be staggered and well-sealed with an appropriate acoustic mastic.
 - The cavity between the new internal wall lining and the inner face of the external glazing must be at least 500mm;
 - The cavity must be partially filled with at least 200mm dense (i.e. min. 33 kg/m³) Rockwool.
 - The new wall lining must be built to full height (i.e. from slab to soffit) and be well-sealed around the perimeter. It will be necessary to ensure that a good seal is achieved at the head of the wall where it meets the coffered soffit. If necessary, an appropriate flat soffit detail formed of multiple layers of dense plasterboard spanning between coffers with the coffers above fully filled with dense (i.e. min. 33 kg/m³) Rockwool can be used to ensure a good seal.
- 5.8 We would recommend that this wall lining construction is also used for the inner face of the walls to the adjoining lobby areas. The outer face of the lobby walls should be formed of two layers of 15mm Gyproc SoundBloc or equivalent on separate studs (i.e. forming a twin stud wall) with dense (i.e. min. 33 kg/m³) Rockwool in the cavity.

- 5.9 The new fire exit doors adjacent to the bar (as indicated in Figure 2) should be a proprietary acoustic doorset with a laboratory airborne sound insulation performance of at least 45 dB R_w . New internal doors between the lobbies and trading areas (also as indicated in Figure 2) should have a minimum laboratory airborne sound insulation performance of at least 30 dB R_w .
- 5.10 We would also recommend that where feasible the outer entrance lobby and the fire escape lobby (i.e. those immediately adjoining the shopfront) should feature an acoustically absorptive lay-in grid ceiling with tiles with Class A absorption (as defined in BS EN ISO 11654:1997). This will assist in optimising the acoustic performance of the lobbies.
- 5.11 There should be no ventilation openings in the Mount Street elevation (due to the proximity of Midland Hotel guest rooms). Any necessary ventilation openings in the Museum Street elevation must incorporate appropriate silencers.
- 5.12 The in-house PA system will need to be designed so as to minimise the music noise levels around the perimeter. Loudspeakers should be located away from perimeter walls, be mounted via proprietary anti-vibration brackets and orientated towards the centre of premises. There should be no bass bins in the bar area or in the vicinity of the fire escape doors. An appropriate electronic music noise limiter will be required in order to ensure that music noise levels do not exceed appropriate limits.
- 5.13 Entrance/exit doors (including those between the outer and inner lobbies, and between the inner lobby and main trading area) should be fitted with self-closing devices and should not be pinned open at any time during trading.
- 5.14 Taking into account the above, trading noise break-out is anticipated to be within the adopted noise limits outside the nearest sensitive receptors with some margin of safety (as noted in the calculations shown in Appendix III).

Further Commissioning/Verification Testing

- 5.15 However, please note that because it has not been possible to determine to what extent the existing soffit is connected to the external curtain wall, there remains the possibility of some flanking sound transmission of trading noise to the exterior via the soffit/facade. This may limit the achievable sound insulation enhancements to the shopfront.

- 5.16 As such, we recommend that commissioning/verification testing is carried out upon completion of the fit-out and PA system installation to determine appropriate music noise limits.
- 5.17 This would take the form of noise break-out testing following completion of the venue fit-out and installation of the PA system (including a suitable electronic music noise limiter).
- 5.18 The testing would be carried out to an agreed methodology involving:
- Generating high levels of music noise within the venue using the in-house PA system, probably during an out of hours period (and potentially even towards the end of proposed/approved trading times)
 - Noise measurements taken simultaneously in the main trading areas of the venue and outside the nearest receptors (i.e. hotel opposite). These could be witnessed by a representative from MCC Environmental Health if appropriate
 - The maximum permissible trading music noise levels (i.e. those that do not result in undue noise break-out) would then be determined and the electronic music noise limiter set such that the maximum permissible levels cannot be exceeded.
- 5.19 The need for this commissioning testing will likely be enshrined in any planning consent for the development as per Manchester City Council's usual requirements.
- 5.20 To be clear, we would not expect any residual flanking transmission of trading noise to the exterior via the soffit/façade to reduce the maximum permissible trading noise levels by any more than around 5 dB, which we understand LHP Group Ltd are satisfied will not have any detrimental effect on the proposed operation.

Noise limits for Fixed Plant & Equipment

- 5.21 At this stage, we have not been provided with details of any plant and equipment to be installed as part of the development. As such, we have recommended appropriate noise design limits which can be considered in the selection and installation of the equipment.
- 5.22 Table 1 shows that the lowest background noise level outside the nearest noise sensitive locations. On this basis, the corresponding Manchester City Council noise limits are as follows:

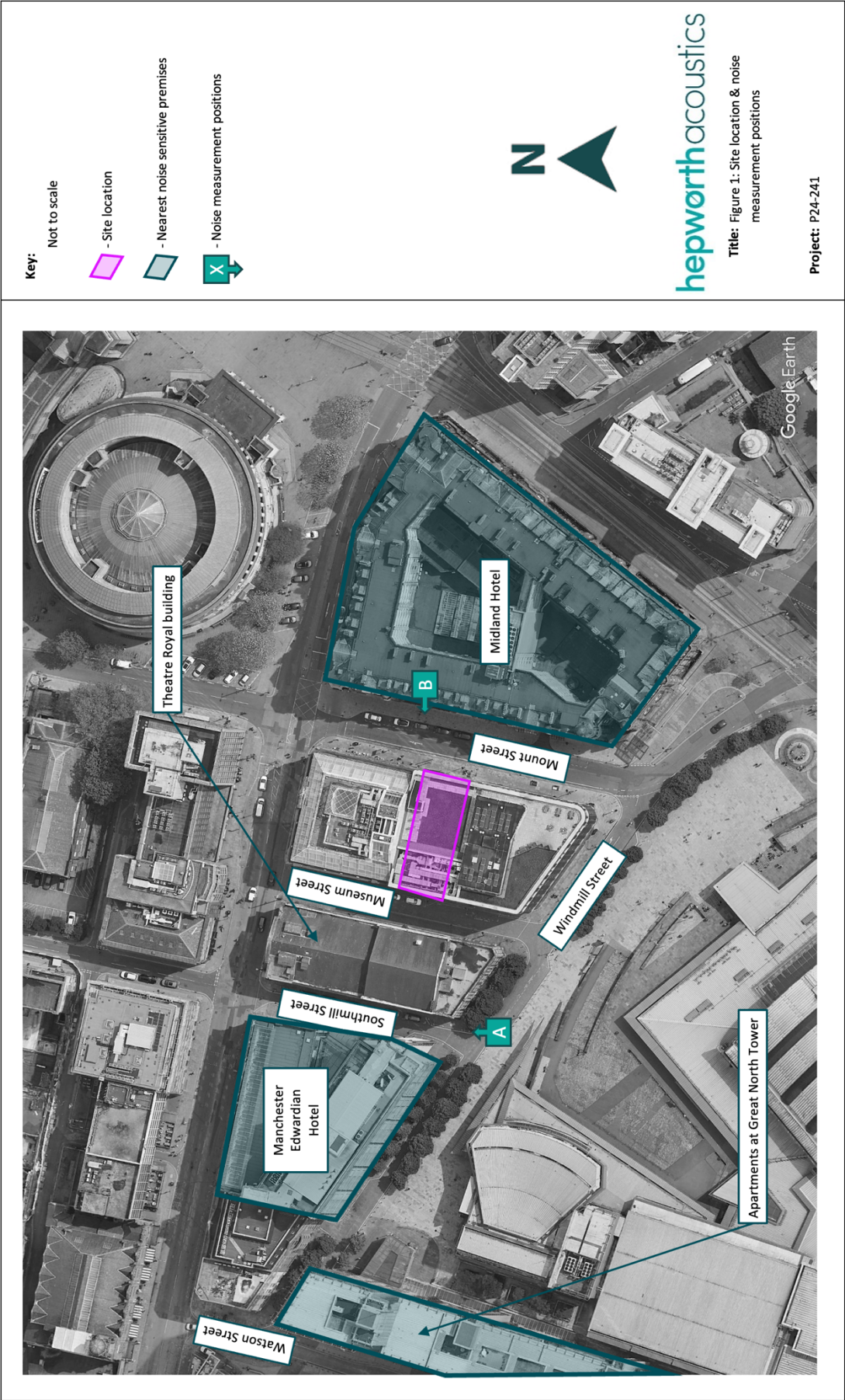
Table 6: New external fixed plant/equipment noise limits (dB)

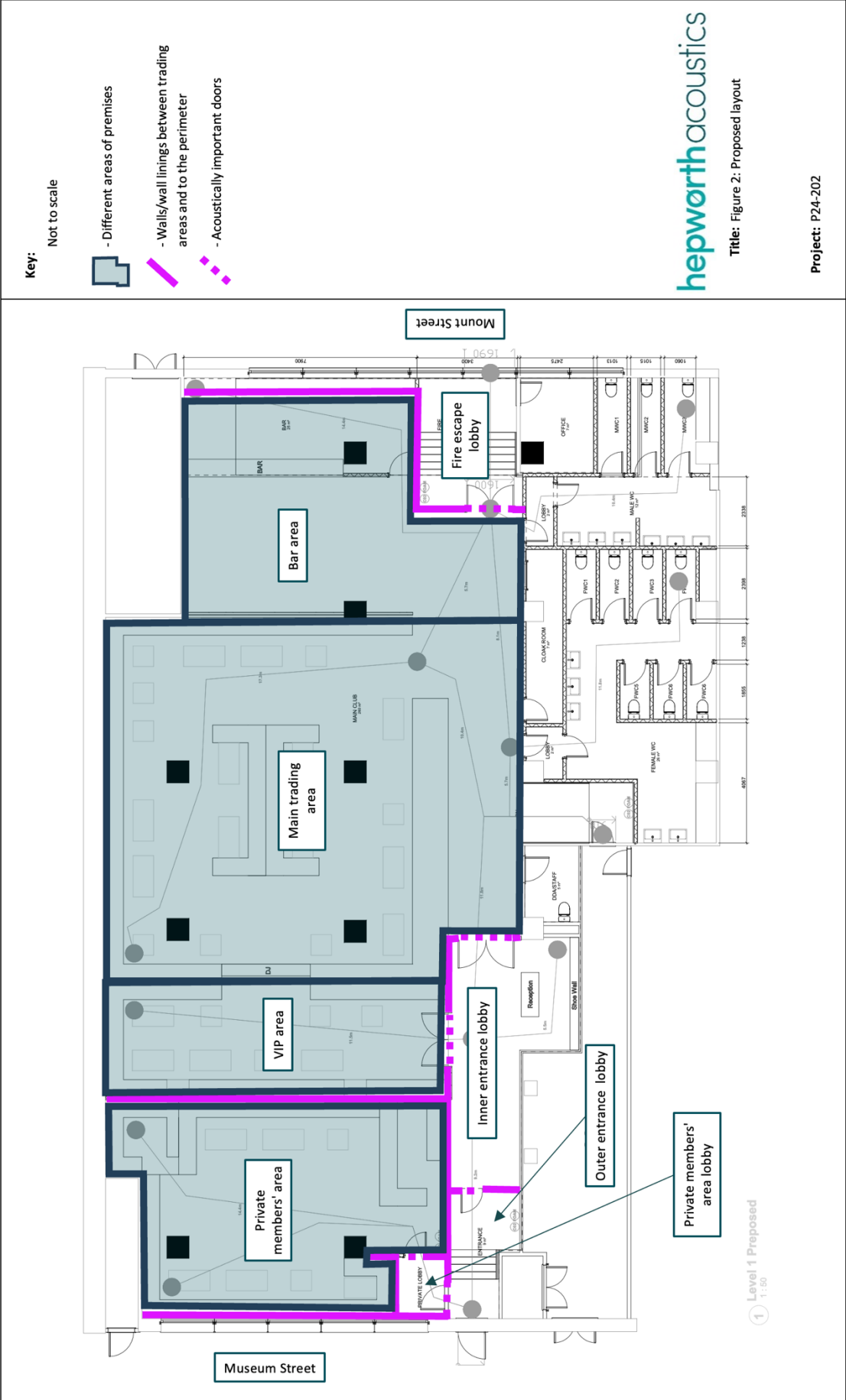
Location	Noise limit in dB $L_{A,r,Tr}$
A. Manchester Edwardian Hotel/Great North Tower	37
B. Midland Hotel	41

- 5.23 The need to adequately control plant and equipment noise to this level can be secured by an appropriately worded planning condition and this approach would be in line with Manchester City Council standard practice.
- 5.24 Since there will be no kitchen at the premises, plant/equipment is likely to be limited to general ventilation and comfort heating/cooling. Nevertheless, for any necessary outdoor equipment, the following measures may need to be incorporated to adequately control noise:
- Specifying low noise equipment;
 - Careful siting of equipment;
 - Installation of acoustic enclosures around the fixed plant and machinery where necessary;
 - Any equipment that has the potential to generate vibration should be isolated from the building with effective anti-vibration mounts; and
 - Carrying out regular maintenance of equipment to minimise noise emissions.

6.0 SUMMARY AND CONCLUSION

- 6.1 Hepworth Acoustics Ltd was commissioned by the LHP Group Ltd to carry out a noise impact assessment in connection with a proposed late night bar/night-club to be located in the ground floor unit at the Windmill Green development off Mount Street in Manchester city centre.
- 6.2 The premises, which will feature a customer entrance on Museum Street and fire escape only on Mount Street, is only proposed to operate between 23:00 – 04:00 on Friday, Saturday and Sunday nights and hence will only operate outside typical commercial office hours. For that reason, the noise assessment has focussed on potential impact on the nearby Midland and Manchester Edwardian hotels and the apartments at Great North Tower.
- 6.3 Appropriate noise criteria have been adopted based upon Manchester City Council guidance. A baseline noise survey has been carried out covering the last two hours of the proposed trading times.
- 6.4 Calculations have shown that the premises shopfronts to both Museum Street and Mount Street will require sound insulation enhancements to adequately control trading noise break-out.
- 6.5 We have also provided recommendations to optimise the control of trading noise break-out. Nevertheless, we recommend that commissioning testing is carried out upon completion of the fit-out of the unit to establish appropriate practical music noise limits for the venue.
- 6.6 Appropriate noise limits have been recommended for any proposed new external plant/equipment.





Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

L_{Aeq} This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{A90} This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Date:	Tuesday 25 June 2024
Equipment:	NTi Audio XL2 'Class 1' sound analyser (serial no. A2A-20361-E0) with tripod and associated calibrator
Weather:	Dry, ~16°C, clear skies and calm <2 m/s

All noise levels in dB

Location A: Corner of Windmill Street and Southmill Street

Start	Stop	L_{AFmax}	L_{Aeq}	L_{A90}	Notes
02:05	02:10	63.1	48.9	44.2	Distant road traffic, low-level building services noise, occasional local road traffic and pedestrians
02:10	02:15	73.3	56.1	45.2	
02:15	02:20	71.0	50.6	44.9	
02:41	02:45	61.4	47.7	43.3	
02:45	02:50	56.8	45.5	42.5	
02:50	02:55	56.0	45.8	42.3	
03:11	03:15	59.2	46.9	42.9	
03:15	03:20	65.0	47.3	43.4	
03:20	03:25	62.7	48.6	42.9	
03:41	03:45	59.0	46.4	43.1	
03:45	03:50	66.2	51.9	43.7	

Location B: Mount Street, outside Midland Hotel

Start	Stop	L_{AFmax}	L_{Aeq}	L_{A90}	Notes
02:21	02:25	65.8	54.3	49.2	Distant road traffic, building services noise (mainly from Midland Hotel), occasional local road traffic and pedestrians.
02:25	02:30	63.4	55.3	50.7	
02:30	02:35	63.5	54.6	50.2	
02:35	02:40	64.2	54.6	50.5	
02:56	03:00	63.7	53.2	49.0	
03:00	03:05	67.8	53.7	48.9	
03:05	03:10	63.9	52.9	48.6	
03:30	03:35	65.8	52.3	48.0	
03:35	03:40	60.8	50.7	47.7	
03:51	03:55	60.9	50.2	46.8	
03:55	04:00	67.7	52.4	46.5	

Appendix III: Trading Noise Break-out Calculations

Project Number	P24-241
Description	Proposed late night bar/night-club, Windmill Green - Mount Street elevation. Break-out to Midland Hotel guest rooms opposite

hepworthacoustics

Noise Break-out v6.0 February 2019

Source - Woods Practical Guide to Noise Control

	63	125	250	500	1k	2k	4k	A
SPL_{int}	105	100	95	92	89	86	83	95

Element 1 - solid wall element to Mount Street

SPL_{int}	105	100	95	92	89	86	83	95
Element SRI	37	52	66	75	75	75	75	→
Area (S) =	63.0	18	18	18	18	18	18	
Distance (r) =	17.0	-25	-25	-25	-25	-25	-25	
At receiver	47	27	8	-4	-7	-10	-13	22

2x15mm SoundBloc & 1x15mm ply - 500mm cavity with 200mm min 33 kg/m3 Rockwool - 10mm glass

→ = $SPL_{int} - SRI + 10 \log S - 20 \log(r) - 14$ **Element 7 - Door**

	Is door lobbied?	Yes						
SPL_{int}	105	100	95	92	89	86	83	95
Element SRI	35	47	51	61	72	75	82	→
Area (S) =	4.0	6	6	6	6	6	6	
Distance (r) =	17.0	-25	-25	-25	-25	-25	-25	
Lobby absorption (A) =	8	assumes ceiling of Class A tiles						
At receiver	-1	-30	-43	-66	-91	-100	-117	-27

Solid core inner door with drop seals and gaskets - 10mm glass outer door - combined SRI

→ = $SPL_{int} - [\text{Combined SRI of both doors}] + 10 \log S - 20 \log(r) - 14 - 10 \log(A)$ **Overall Results**

	63	125	250	500	1k	2k	4k	A
Resulting	47	27	8	-4	-7	-10	-13	22
Adopted limits	57	51	41	37	37	33	31	
Difference	-10	-24	-32	-41	-44	-42	-43	

Project Number	P24-241
Description	Proposed late night bar/night-club, Windmill Green - Mount Street elevation. Break-out to Manchester Edwardian hotel and Great North Tower

hepworthacoustics

Noise Break-out v6.0 February 2019

Source - Woods Practical Guide to Noise Control

	63	125	250	500	1k	2k	4k	A
SPL_{int}	105	100	95	92	89	86	83	95

Element 1 - solid wall element to Museum Street

SPL_{int}	105	100	95	92	89	86	83	95
Element SRI	37	52	66	75	75	75	75	→
Area (S) =	36.0	16	16	16	16	16	16	
Distance (r) =	45.0	-33	-33	-33	-33	-33	-33	
Screening	-10	-10	-10	-10	-10	-10	-10	
At receiver	26	6	-13	-25	-28	-31	-34	1

2x15mm SoundBloc & 1x15mm ply - 500mm cavity with 200mm min 33 kg/m3 Rockwool - 10mm glass

→ = $SPL_{int} - SRI + 10 \log S - 20 \log(r) + \text{Screening} - 14$ **Element 7 - Door**

	Is door lobbied?	Yes						
SPL_{int}	105	100	95	92	89	86	83	95
Element SRI	35	47	51	61	72	75	82	→
Area (S) =	4.0	6	6	6	6	6	6	
Distance (r) =	45.0	-33	-33	-33	-33	-33	-33	
Screening	-10	-10	-10	-10	-10	-10	-10	
Lobby absorption (A) =	6	assumes ceiling of Class A tiles						
At receiver	-18	-47	-60	-83	-108	-117	-134	-44

Solid core inner door with drop seals and gaskets - 10mm glass outer door - combined SRI

→ = $SPL_{int} - [\text{Combined SRI of both doors}] + 10 \log S - 20 \log(r) + \text{Screening} - 14 - 10 \log(A)$ **Overall Results**

	63	125	250	500	1k	2k	4k	A
Resulting	26	6	-12	-24	-27	-30	-33	1
Adopted limits	57	51	50	44	43	37	36	
Difference	-31	-45	-62	-68	-70	-67	-69	