



Project: J 05704
Noise Impact Assessment v1.2:
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Client: Elysium Lounge

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Signed:

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1. **BACKGROUND**

1.1. The application concerns the change of use of an existing commercial/retail premises as a bar.

1.2. Sound Planning understands that the following sources will contribute to the noise emissions from the proposed use:

- Noise from customers in the rear courtyard of the site, 10 person capacity
- Noise break-out from customers and background music to the front of the site, 40 person capacity
- No live music or performance proposed at the site and only background music will be played

1.3. Sound Planning has been retained to evaluate potential noise impact on the nearest noise sensitive receivers using appropriate methodologies and assessment criteria, and to design a suitable noise mitigation strategy if required.

1.4. Jake Willmott is a Member of the Institute of Acoustics (M.I.O.A) having attained appropriate qualifications in acoustics and has six years' experience undertaking acoustic assessments including significant experience of a wide variety of noise assessments in the context of planning applications.

Jake has attained the following qualifications within the field of acoustics:

- Institute of Acoustics (IOA) Diploma
- Masters Degree - Applied Acoustics (Solent University)

1.5. Site and Location

1.5.1. The site is in an area of predominantly commercial use in central Manchester. See APPENDIX 2 - Site Location/Plans.

1.5.2. The nearest noise sensitive receiver to the rear of the site (NSR1) is the office unit directly above the bar.

See APPENDIX 2 - Site Location/Plans.

1.5.3. The nearest noise sensitive receiver to the front of the site (NSR2) is the office directly above the bar.



1.6. Proposed Operation Times:

- Monday – Sunday: 07:00-23:00 hours

2. **ASSESSMENT CRITERIA**

2.1. There are no specific guidance or standards relating to noise from bars. However, Manchester City Council have requested that the noise impacts on nearby commercial receivers should be assessed.

2.2. As live music or other performance is not proposed at the site, it is not expected that low frequency noise will be emitted at any time.

2.3. National Planning Policy Framework

2.3.1. The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in December 2023.

2.3.2. Paragraph 174 of the NPPF states: ‘Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...’.

2.3.3. Paragraph 185 of the NPPF states that; ‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.’*



2.3.4. Paragraph 193 of the NPPF states that; *‘Planning policies and decisions should ensure that new development⁴ can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’*

2.3.5. Therefore, the NPPF requires that significant impacts are avoided, adverse impacts be mitigated and reduced to a minimum, and places an obligation on developers to not unduly constrain the operation of existing businesses and other noise sources in the area (the ‘agent of change’ principle).

2.4. Noise Policy Statement for England (NPSE)

2.4.1. The NPSE requires that developments:

- ‘Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible contribute to the improvement of health and quality of life’

2.5. Local Planning Policy (Manchester City Council Planning and Noise Technical Guidance):

2.5.1. Graeme Souter, Environmental Health Officer at Manchester City Council has given the following comment via email on suitable assessment criteria:

“We will need an assessment for entertainment noise breakout from the proposed use to demonstrate our criteria will not be exceeded which is 5dB below the LA90 at the nearest noise sensitive receptors which will be the offices above and any neighbouring commercial receptors. Assessment should factor in doors open as a worst case scenario to account for access and egress. The maximum internal noise level will need to be identified in order to comply with the criteria and details recommending with regard to how the level will be set and controlled. I note your comment that there is no live music being proposed so I assume background music is likely to be suitable?”



Assessment of noise transfer from the ground floor to the upper floor offices will also be required and details of any necessary acoustic upgrades recommending, along with identification of any sound transmission paths such as structurally adjoining columns and recommendations for insulation of these areas if required.”

“With regard to plant, if nothing new is to be installed associated with the bar such as chiller units etc then some sort of comment in the report once confirmed by the applicant will be sufficient to address the plant condition.

I am happy for the entertainment noise to be based on background music internally and for the noise breakout from patrons to be addressed under condition during the planning process. But it may be that acoustic insulation measures are required between the bar and any adjoining offices which will need to be picked up and recommendations providing in the subsequent assessment where require.

The offices may have the potential to operate at weekend or later in the evening so we will need the assessment to be based on the hours the bar intends to operate to cover off worse case scenario.”

2.6. Noise Measurement Protocol - British Standard 7445-1: 2003¹

- 2.6.1. The methods and procedures described in BS 7445 are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.
- 2.6.2. The aim of the BS 7445 series is to provide authorities with material for the description of noise in community environments. Based on the principles described in this standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.
- 2.6.3. BS 7445 does not specify limits for environmental noise.

¹ Description and measurement of environmental noise. Part 1 – Guide to quantities and procedures.



3. NOISE SURVEY METHODOLOGY

3.1. A noise measurement survey has been undertaken at the site between Friday 28th February and Monday 3rd March 2025

3.2. Noise Measurements

3.2.1. Unattended sound monitoring equipment was installed in the rear courtyard of the site, at 1.5m above ground level. (MP1)

See APPENDIX 2 – Site Location & APPENDIX 3 – Site Photographs.

3.2.2. The environmental noise measurements were carried out over a four-day period.

3.2.3. The measurement location was chosen because the noise environment was subjectively similar to the nearest sensitive receiver which is above the bar.

3.2.4. The sound level meter was Class 1 – details provided in 3.3. The microphone was positioned 1.5m above ground level but was within 3.5m of reflective surfaces. However, due to the presence of similar reflective surfaces directly adjacent to the NSR1 window (which is in a semi-enclosed location), no façade correction has been applied.

3.2.5. A short term attended noise survey was undertaken at the front of the site due to the lack of a secure location to position a sound monitor over an extended period. Sound measurements were undertaken in accordance with the CRTN shortened measurement procedure as the dominant noise source at the front of the site is road traffic noise (MP2).

3.3. Sound Level Measurement Equipment

Equipment	Make	Model	Class	Serial Number	Calibration Date
Sound Level Meter (MP1)	Casella	C633C	1	1716934	21/09/2023
Calibrator (MP1)	Casella	CEL 120/1	1	1530668	29/01/2024
Sound Level Meter (MP2)	Cirrus	CR:171C	1	G300656	31/10/2024



Calibrator	Cirrus	CR:515	1	87921	01/11/2024
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- 3.4. The Sound Level Meter (SLM) was field calibrated before and after the on-site noise measurements. No deviation was detected (1kHz). UKAS accredited calibration certificates are available on request.
- 3.5. Full noise measurements are provided in APPENDIX 4 – Noise Measurement Data.
- 3.6. Noise at MP1 (rear of the site) was controlled by plant noise from the rear of adjacent commercial and licensed premises. At peak times (Sunday afternoon and Friday/Saturday evenings) elevated noise levels associated with the use of adjacent licensed premises were recorded. Road traffic noise and noise from trams was also audible at the measurement position during but was not the dominant noise source.
- 3.7. Noise at MP2 (front of the site) was controlled by road traffic noise with a secondary contribution from trams.

4. NOISE LEVEL CALCULATION METHODOLOGY

- 4.1. Noise levels will be calculated using the formulae:

$$SPL_2 = SPL_1 - 20 \log (r_2/r_1)$$

Where 'r' = radius; SPL = Sound Pressure Level

And

$$SPL = SWL - 20 \log (r) - 8$$

Where 'SWL' is sound power level

- 4.3. The sound power level for 'normal' vocal effort from ANSI 3.5 (1997), 68.4 dB L_{wA} has been taken as representative of the level of sound generated from a person in the bar or rear courtyard representing general conversation.
- 4.4. It has been assumed that 50% of the people present will be talking at any given moment as a worst cast representation of normal conversation with one person talking and one person listening.
- 4.5. The level of one person talking has been scaled to represent multiple people talking using the formula:



$$L_2 = L_1 + 10 * \log_{10} (n)$$

Where ' L_1 ' is the level of 1 person talking, and ' n ' is the number of people talking

- 4.6. Noise break-out calculations are undertaken using the following formulae:

$$T = 1/10^{SRI/10}$$

$$T_{avg} = (T_1 * A_1) + (T_2 * A_2) / (A_1 + A_2) \dots etc$$

Where ' T ' is the transmission coefficient and ' A ' is the Area of each structural element, and SRI is the Sound Reduction Index in dB R_w

And

Composite Sound Reduction Index:

$$SRI = -10 * (\log * T_{avg})$$

External Noise Level:

$$L_{external} = L_{internal} - R_w + 10 * \log(S) - 20 * \log(r) - 14$$

Where ' S ' is the surface area of the partition and ' r ' is the distance to the receiver

- 4.7. As part of the noise break-out calculation, a diffuse field level for the internal noise source has been calculated and added to the source level to calculate the combined direct and reverberant sound level within the bar using:

$$L_{p,rev} = L_w - 10 \log(V) + 10 \log(T) + 14$$

Where ' V ' is the room volume, and ' T ' is the reverberation time

- 4.8. Reverberation time is calculated using the Sabine Formula and a reasonable estimation of the sound absorption properties of the likely internal fit-out of the bar:

$$T = 0.161 * V/A$$

Where ' T ' is reverberation time, ' V ' is the room volume and ' A ' is the total amount of acoustic absorption



- 4.7 Calculations have been based on the bar having open doors to account for entrance/exit of the site by customers as a worst case.

5. NOISE MEASUREMENT RESULTS

- 5.1. Measured Noise Levels – see APPENDIX 2

Location	Lowest Background Noise Level (dB L _{A90,1hr})
MP1 (rear)	46
MP2 ² (front)	61

6. NOISE LEVEL CALCULATION RESULTS

- 6.1. Noise levels for ‘entertainment noise’ (understood to be background music only) have been calculated according to the formulae in Section 4.
- 6.2. Noise from customers will be managed by staff according to a noise management plan put in place for the site. Discussion with the local authority has determined that this approach is likely to be acceptable with submission of the noise management plan secured by planning condition, and outline advice on the content of the noise management plan will be provided in this report.
- 6.3. For the purposes of assessment, it has been assumed that zoned control of background noise levels will be available to the site operator (which is common for bars). Zoned level controls for background music systems are common in licensed premises and allow the level of loudspeakers in different areas to be controlled separately to control noise and influence customer behaviour. The permissible zoned music noise levels are provided below:

² Noise levels derived from 3-hour noise survey during daytime hours.



6.4. Zoned Music Levels:

Location	Maximum Music Level dB L _{Aeq}
“Secret Garden” Seating area (internal, rear)	61
Main Bar area (front)	76

6.5. It will be important to ensure that loudspeakers installed at the site are not installed facing directly towards either the front or rear doors.

6.6. Calculated external noise levels at receivers.

Calculations based on Music noise levels in 6.4:

See APPENDIX 5 - Calculations

Location	Area	L _{Aeq}
NSR1	REAR 1 st floor office above bar, rear façade. Break-out via open rear door (door open)	41
NSR2	FRONT 1 st floor office above bar, front façade. Break-out via open front door (door open)	56

7. INTERNAL SOUND INSULATION

7.1. It is appropriate for the use proposed that a scheme of sound insulation should be specified to ensure that direct sound transmission between the bar and the offices above does not impinge on use of the offices.



- 7.2. The bar is likely to be a noise source of ‘*High*’ activity noise levels according to BS8233: 2014, and the office use above is likely to be of ‘*Medium*’ sensitivity to noise with no privacy requirement. Therefore, an appropriate target performance for sound insulation between the two uses, with reference to Section 7.5 of BS8233: 2014 is 42 dB D_{nTw} .
- 7.3. The existing structure of the floor/ceiling partition is timber joist based, and a new ceiling is to be hung as part of the fit-out of the bar.
- 7.4. The ceiling is therefore the main means by which sound insulation may be enhanced.
- 7.5. The ceiling should be constructed as follows to achieve the sound insulation criteria:

Partition	Location	Description (<i>additions in italics</i>)	Sound Reduction Index, dB R_w
Floor/Ceiling	Separating floor between bar and offices above	1 st floor office subfloor (assumed 18mm particleboard with floor covering over, existing), 300mm timber joist with insulation (existing), plasterboard ceiling (existing), 2x12.5mm <i>Soundbloc plasterboard ceiling with 200mm insulated cavity hung on Gyproc acoustic hanger</i>	60

- 7.6. Based on an estimation of the likely reverberation time in the offices above, assumed to be 0.5 seconds which is representative of typical office fit-outs with acoustic ceiling tiles, the floor/ceiling construction recommended will achieve approximately 50 dB D_{nTw} , providing flanking noise transmission is adequately controlled. This exceeds the level recommended in BS8233 for the proposed use (ref 7.2).
- 7.7. Flanking noise should be controlled through the following means:
- 7.7.1. Structural beams or steelwork which penetrate the floor slab should be boxed in with 2x12.5mm Soundbloc on timber battens with any gaps behind the plasterboard filled with mineral wool.
- 7.7.2. A good seal around the perimeter of the ceiling should be ensured through the use of flexible setting acoustic sealant at the perimeter of the ceiling.



7.7.3. Light fittings and similar fixings through the plasterboard ceiling should be fitted with back boxes to reduce noise transmission as far as possible.

7.8. The noise level predicted from operation of the bar at full capacity within the offices above is shown below.

See APPENDIX 5 – Calculations

Location	L _{Aeq}
Office Units Above Bar, assuming bar operating at full capacity	35

7.9. The noise level for transmitted noise through the floor/ceiling is generally low and would be suitable for domestic living rooms under normal circumstances. It is therefore suitable for the proposed use and will provide adequate protection for the office use above.

8. EXTERNAL NOISE IMPACT ASSESSMENT

8.1. Comparison of ‘entertainment noise’ levels and background noise levels at receivers:

Location	Existing background noise level, dB L _{A90}	Music Noise Break-out (background music), dB L _{Aeq}	Difference
NSR1 - rear	46	41	-5 dB
NSR2 - front	61	56	-5 dB

8.2. This assessment assumes that doors will be open for the full daytime period which is a worst-case assumption.

8.3. In addition to controlling music noise to the levels outlined in Paragraph 6.6 and 7.1, it will be important to manage customer noise through appropriate noise management procedures.



- 8.4. We recommend that a noise management plan for the site should be put in place for the site to demonstrate how best-practise measures are implemented while the site is in operation.
- 8.5. The local authority has indicated support for this approach (ref: paragraph 2.5.1) and it is common for submission of such a plan to be secured by planning condition. It is common for licensing authorities to also request such a plan be put in place as part of the premises license for the site, and one noise management plan may satisfy both sets of criteria if appropriately designed.
- 8.6. As a minimum, the following measures should be included in the noise management plan document:
 - 8.6.1. Locations and details of signage at entrance and exits to the site encouraging customers to enter and leave in an orderly fashion and respect neighbours.
 - 8.6.2. Code of conduct for customers discouraging rowdy or disorderly behaviour.
 - 8.6.3. Capacity limits for the site and means by which they are enforced.
 - 8.6.4. Details of training given to staff about noise management and the noise management plan, including training logs and a copy of training materials used.
 - 8.6.5. Details of zoned music level settings to achieve the music levels set out in this report.
 - 8.6.6. Log sheets for regular checks to be undertaken by site management to subjectively gauge noise impacts from the site.
 - 8.6.7. Details for a single point of contact provided to neighbours to deal with any instances of disturbance.
 - 8.6.8. Log sheets for any complaints or other noise related enquiries received.
 - 8.6.9. All log sheets and relevant information should be made available to the Local Authority on request.

9. CONCLUSIONS

- 9.1. Sound Planning has carried out a noise impact assessment for the proposed conversion of an office unit to a bar in accordance with the requirements outlined by Manchester City Council.



- 9.2. Live music or performance of any kind is not proposed at the site therefore low frequency noise emissions are not expected from the proposed use. Music noise levels for background music have been determined which will allow the site to meet the criteria of '5 dB below existing background noise levels' outside the nearest sensitive receiver to both the front and rear facades, which is the 1st floor office unit directly above the bar.
- 9.3. Noise from customers at the site will be managed through the use of a noise management plan, which may be secured by condition by the local authority. Outline advice on the contents of the noise management plan has been provided in this report.
- 9.4. Internal sound insulation measures required to ensure that noise transmission from the bar to the offices above within the building have been specified which will ensure that the sound insulation within the building meets performance of 49 dB D_{ntW} and exceeds the performance requirement of BS 8233: 2014.
- 9.5. The predicted noise level from use of the site is therefore not likely to cause significant impacts at the nearest noise sensitive receiver, and adverse impacts are not likely. This meets the requirements of national planning policy that significant impacts are avoided and adverse impacts are reduced as far as possible.
- 9.6. The proposal should therefore be considered to satisfy the requirements of local and national planning policy with regards to noise.
- 9.7. An electronic noise limiter will be installed with loudspeaker systems present at the site and calibrated to the levels in this report to ensure that music noise is kept to an acceptable level.



APPENDIX 1

Glossary of Acoustic Terms

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

Noise Rating

The Noise Rating (NR) system is a set of octave band sound pressure level curves used for specifying limiting values for building services noise. The Noise Criteria (NC) and Preferred Noise Criteria (PNC) systems are similar.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).



Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

- $L_{Aeq, T}$ *The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq, T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.*
- L_{AE} *Where the overall noise level over a given period is made up of individual noise events, the $L_{Aeq, T}$ can be predicted by measuring the noise of the individual noise events using the sound exposure level, L_{AE} (or SEL or L_{AX}). It is defined as the level that, if maintained constant for a period of one second, would deliver the same A-weighted sound energy as the actual noise event.*
- L_{A1} *The level exceeded for 1% of the time is sometimes used to represent typical noise maxima.*
- L_{A10} *The level exceeded for 10% of the time is often used to describe road traffic noise.*
- L_{A90} *The level exceeded for 90% of the time is normally used to describe background noise.*

Sound Transmission Descriptors

- D_{nT} Standardised level difference
- $D_{nT, w}$ Weighted standardised level difference
- L_1 The average sound pressure level in the source room
- L_2 The average sound pressure level in the receiving room
- T Reverberation time (receiving room)
- T_0 Reference reverberation time = 0.5s
- C_{tr} Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).
- C Adaptation spectrum which takes account of domestic activities including speech, music, radio and television.



Frequency Analysis

Octave Band *A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000 Hz...*

One Third Octave *The logarithmic frequency interval between a lower frequency f_2 , when f_2/f_1 equals $2^{1/3}$ apart. Frequencies include: 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000Hz.*

Sound Transmission in the Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law.

In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB. Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

Factors Affecting Sound Transmission in the Open Air

Reflection

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

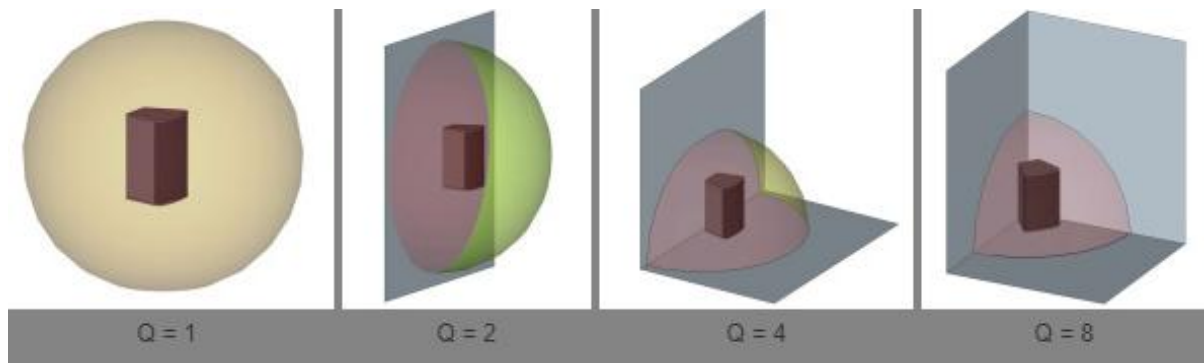
Screening and Diffraction

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

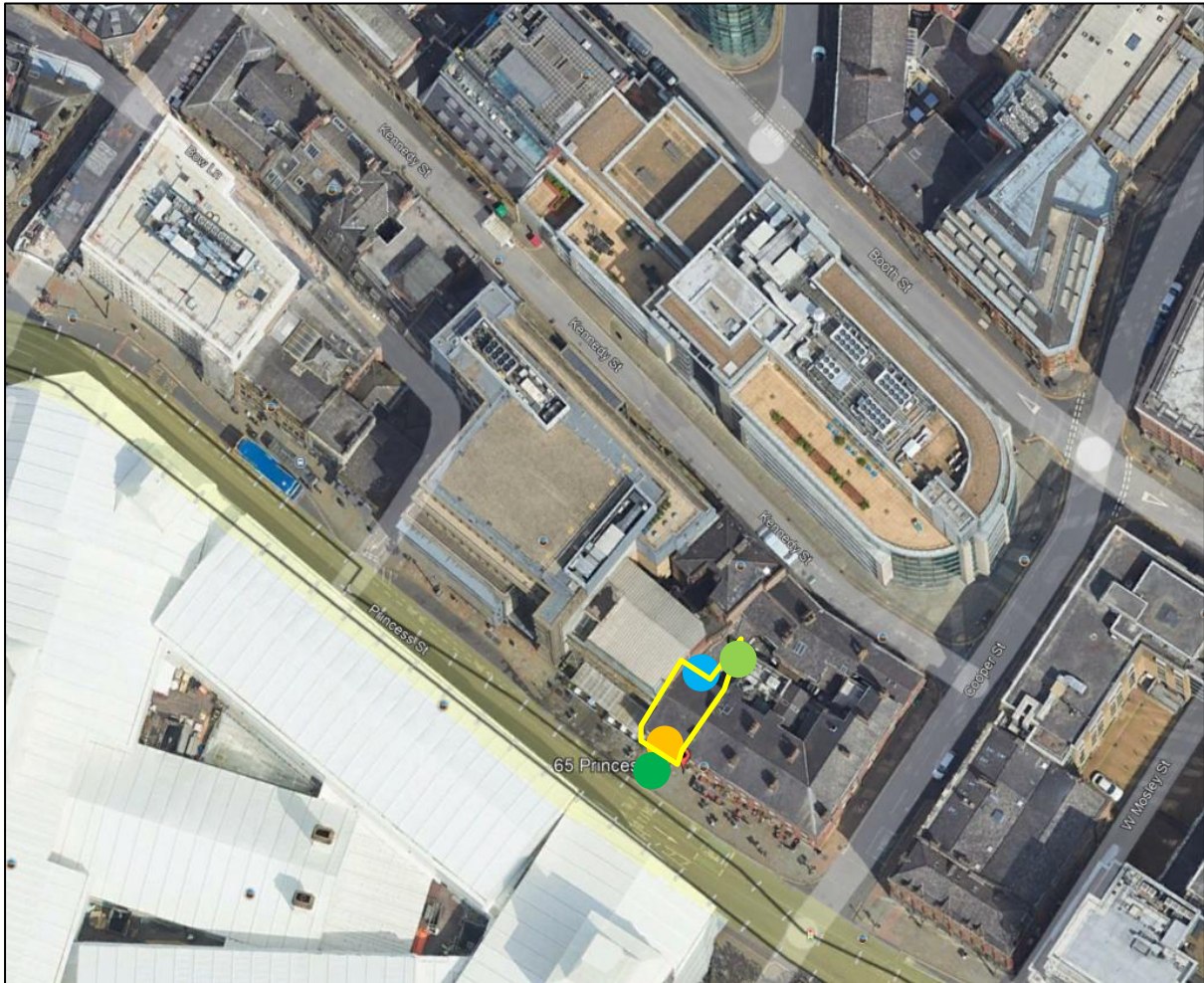
Meteorological Effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradient are variable and difficult to predict.

Directivity Index



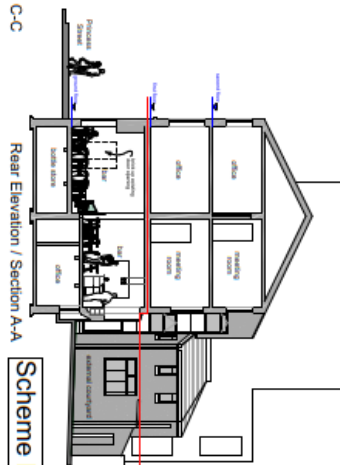
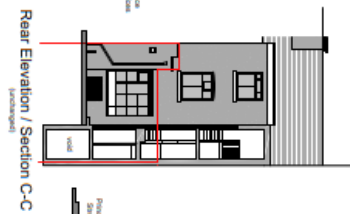
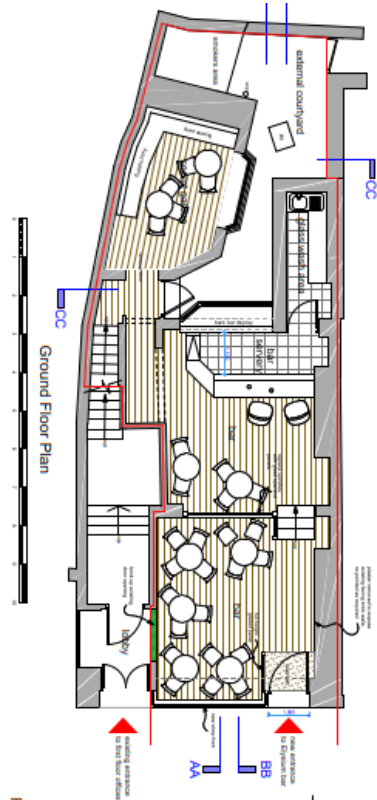
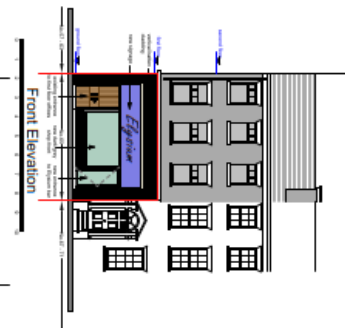
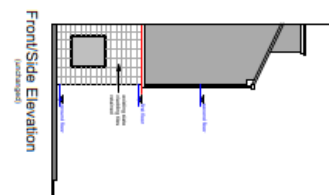
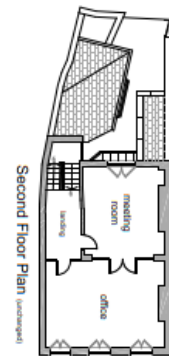
APPENDIX 2
Site Location/Plans
Google Earth



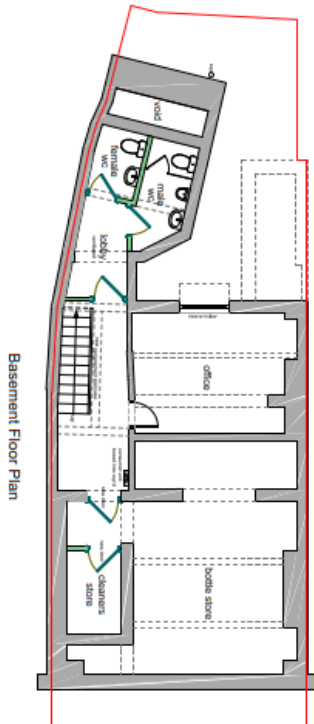
Key:

-  NSR 1 – 1st floor office
-  NSR 2 – 1st floor office
-  Site Boundary
-  Noise Monitoring Position (MP1)
-  Noise Monitoring Position (MP2)

Site Layouts



Scheme Proposals



APPENDIX 3

Site Photographs



Noise Measurement Position 1



Noise Measurement Position 2



APPENDIX 4

Noise Measurement Data

MP1

Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
(d/m/y)	(hrs:mins)	(dB)	(dB)	(dB)	(dB)
28/02/2025	11:00	56.2	85.5	55	53.6
28/02/2025	12:00	54.5	67.0	55	53.4
28/02/2025	13:00	54.7	70.4	55	53.3
28/02/2025	14:00	52.9	64.8	53.5	51.5
28/02/2025	15:00	59.5	72.2	55.5	54.3
28/02/2025	16:00	56.5	72.7	55	51.9
28/02/2025	17:00	57.4	75.3	53.5	53.6
28/02/2025	18:00	52.3	71.0	53.5	50.4
28/02/2025	19:00	52.2	69.3	53	50.1
28/02/2025	20:00	55.8	73.4	52.5	51.4
28/02/2025	21:00	57.3	74.8	58	52.1
28/02/2025	22:00	54.1	72.8	52	50.4
28/02/2025	23:00	50.9	69.4	51.5	49.0
01/03/2025	00:00	49.9	61.7	51	47.8
01/03/2025	01:00	49.3	70.0	50	47.3
01/03/2025	02:00	49.1	62.4	50	47.3
01/03/2025	03:00	49.4	61.3	51.5	47.1
01/03/2025	04:00	48.9	63.7	51	46.3
01/03/2025	05:00	50.5	66.3	51	47.8
01/03/2025	06:00	51.3	67.0	52	49.1
01/03/2025	07:00	50.4	62.4	51.5	48.6



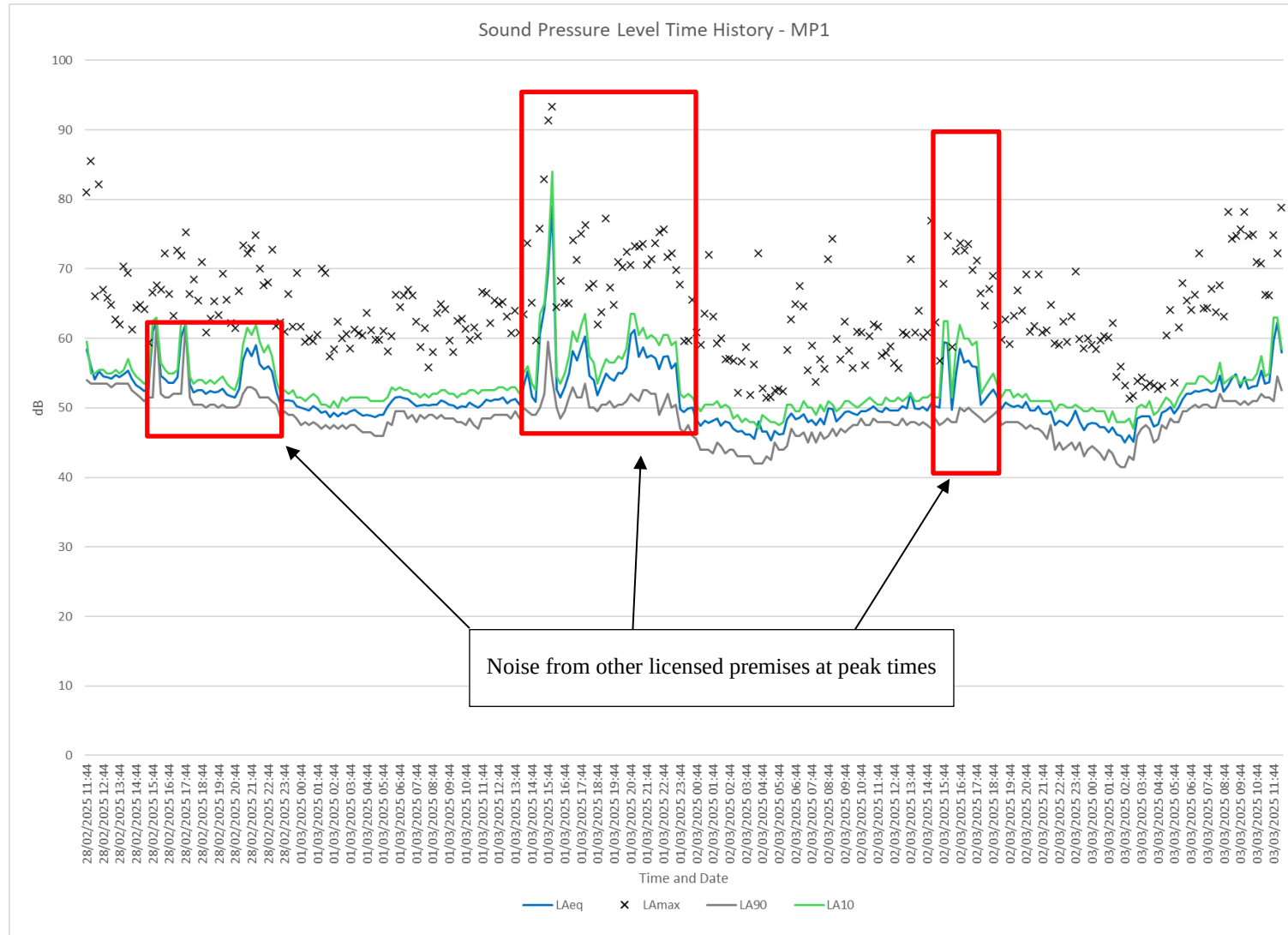
Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
01/03/2025	08:00	50.8	64.9	52	48.8
01/03/2025	09:00	50.3	62.8	51.5	48.3
01/03/2025	10:00	50.3	61.6	52	47.6
01/03/2025	11:00	51.0	66.7	52.5	48.6
01/03/2025	12:00	51.1	65.2	52.5	48.9
01/03/2025	13:00	52.9	73.7	52	49.4
01/03/2025	14:00	60.1	82.9	52.5	50.0
01/03/2025	15:00	73.5	93.3	53.5	53.0
01/03/2025	16:00	56.1	74.1	55	51.4
01/03/2025	17:00	57.7	76.3	56.5	51.3
01/03/2025	18:00	53.8	77.3	53.5	50.4
01/03/2025	19:00	55.0	72.4	56.5	50.5
01/03/2025	20:00	59.7	73.6	60.5	51.8
01/03/2025	21:00	56.9	75.3	59	51.4
01/03/2025	22:00	56.8	75.7	59	50.8
01/03/2025	23:00	49.8	67.7	51.5	46.8
02/03/2025	00:00	48.0	72.0	49.5	44.4
02/03/2025	01:00	48.1	63.2	50	44.1
02/03/2025	02:00	47.1	57.1	48	43.5
02/03/2025	03:00	46.6	72.2	47	42.5
02/03/2025	04:00	46.3	52.8	48	43.1
02/03/2025	05:00	47.7	62.7	47.5	44.9
02/03/2025	06:00	48.5	67.5	49.5	45.9
02/03/2025	07:00	48.0	59.0	49	45.9
02/03/2025	08:00	49.2	74.3	49.5	46.5



Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
02/03/2025	09:00	49.3	62.4	50	47.1
02/03/2025	10:00	49.8	62.0	50.5	48.0
02/03/2025	11:00	49.7	61.7	50.5	48.0
02/03/2025	12:00	49.8	60.9	51	47.8
02/03/2025	13:00	50.6	71.4	51	47.9
02/03/2025	14:00	50.2	76.9	51.5	47.6
02/03/2025	15:00	57.3	74.7	51.5	48.1
02/03/2025	16:00	57.1	73.7	59	49.8
02/03/2025	17:00	52.9	71.2	52	48.5
02/03/2025	18:00	51.3	69.0	51.5	48.5
02/03/2025	19:00	50.2	66.9	51.5	47.9
02/03/2025	20:00	50.1	69.2	51	47.1
02/03/2025	21:00	48.9	64.8	49.5	45.9
02/03/2025	22:00	48.0	63.1	50	44.6
02/03/2025	23:00	48.1	69.6	49.5	44.0
03/03/2025	00:00	47.5	60.3	49.5	43.6
03/03/2025	01:00	46.5	62.2	48	42.8
03/03/2025	02:00	46.4	53.9	47	43.3
03/03/2025	03:00	48.5	54.4	49	46.6
03/03/2025	04:00	49.2	64.1	49.5	47.1
03/03/2025	05:00	50.8	68.0	50	48.8
03/03/2025	06:00	52.3	72.2	53.5	50.3
03/03/2025	07:00	53.1	67.6	53.5	50.6
03/03/2025	08:00	53.8	78.2	53.5	51.0
03/03/2025	09:00	53.4	78.2	53.5	50.8



Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
03/03/2025	10:00	54.0	71.0	54.5	51.5



APPENDIX 5

Calculations

Noise Break-Out Calculation (Rear, NSR 1)

Façade Noise Break-Out Calculation						
Rear Seating Area						
Partition	SRI	T	Area (sq metres)			
Wall	28	0.001585	A1	5		
Open Door	0	1.000000	A2	2		
Vent	0	1.000000	A3	0		
					Distance to Receiver (m):	3
Transmission Coefficient = $1/10^{SRI/10}$						
T Average = $(T_{Wall} * A1) + (T_{Window} * A2) + (T_{Vent} * A3) / A1 + A2 + A3$						0.28684635
Overall RW = $-10 * (\log * T_{Average})$						5.4
External Noise = Internal noise level - Rw + $10 * \log(S)$ - $20 * \log(r)$ - 14						
					Internal Noise Level (dB)	61.0
					Overall Rw	-5.4
					Surface Area Correction	8.5
					Distance Correction	-9.5
					-14	-14.0
					External Noise Level (dB)	40.5



Calculations

Noise Break-Out Calculation (Front, NSR 2)

Façade Noise Break-Out Calculation						
Partition	SRI	T	Area (sq metres)			
Wall	28	0.001585	A1	14		
Open Door	0	1.000000	A2	2		
Vent	0	1.000000	A3	0		
					Distance to Receiver (m):	3
Transmission Coefficient = $1/10^{SRI/10}$						
T Average = $(T_{Wall} * A1) + (T_{Window} * A2) + (T_{Vent} * A3) / A1 + A2 + A3$						0.12638678
Overall RW = $-10 * (\log * T_{Average})$						9.0
External Noise = Internal noise level - Rw + $10 * \log(S)$ - $20 * \log(r)$ - 14						
					Internal Noise Level (dB)	76
					Overall Rw	-9.0
					Surface Area Correction	12.0
					Distance Correction	-9.5
					-14	-14.0
					External Noise Level (dB)	55.5

Calculations

Noise Transfer through Floor/Ceiling

GF Bar to 1F Office								
Timber Floor Construction								
	Frequency (Hz)							Total 'A' Weighted
	63	125	250	500	1k	2k	4k	
Activity Noise (dB)	70	70	70	70	70	70	70	76
V (m3)	50	50	50	50	50	50	50	
A (m2)	16.1	16.1	16.1	16.1	16.1	16.1	16.1	
T (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
SRI (dB)	20	40	49	57	64	66	80	
First Floor Noise Level (dB)	60	40	31	23	16	14	0	35
A-Weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	

Calculations

Recommended Ceiling Construction

1st floor office subfloor (assumed 18mm particleboard with floor covering over, existing),
300mm timber joist with insulation (existing), 2x155mm *Soundbloc* plasterboard ceiling
mounted on resilient bars

