



Ref: P5521/R01/LTH

15 April 2025

To:	Laura Hallam	of:	Broadgrove
Cc:	As per email distribution list	of:	

40 Peter Street, Manchester M2 5GP

Noise Impact Assessment for Planning Purposes

1.0 INTRODUCTION

- 1.1 Acoustic and Engineering Consultants Limited (AEC) has been instructed by Broadgrove to assess the proposed creation of a “*roof terrace, including extension of plant room, glass protective balustrade and other associated works to facilitate the use*”, at 40 Peter Street, Manchester.
- 1.2 To comply with the requirements of Manchester City Council, the report presents an assessment of the proposals and considers the following elements:
 - Noise levels in the new office space and paved terrace area
 - Noise break-out from the office space and paved terrace area
 - Noise emitted from the building services plant
- 1.3 AEC understands that there will be no new plant installed on the roof, however, existing plant will be relocated.
- 1.4 The Client has confirmed that there will be no amplified music played in the new office or on the paved terraced area.
- 1.5 Acoustic terminology is used throughout this report and is discussed in brief in Appendix A at the back of this report.

2.0 SITE DESCRIPTION & DEVELOPMENT LAYOUT

Site Description

- 2.1 As stated above, the scheme includes the development of a new office and terraced area. The existing plant will be relocated and screened from the terrace area by a timber fence.
- 2.2 The site is located on the corner of Peter Street, Watson Street and Windmill Street within Manchester city centre, as shown on Figure 2.1. On the opposing side of Windmill Street is a block of apartments, which are the nearest residential receptors. There are numerous pubs and restaurants in the local area, and many of these venues include the playing of amplified music, with some having outdoor seating areas.

Peter Street

Watson Street

Windmill Street

Site

Residential

2.3 It is understood that the office and terrace will be used during typical office hours, 0800 to 1800h Monday to Friday. It is understood that the plant items could run on a 24/7 basis.

2.4 As part of the scheme, the existing plant items will be relocated and reconfigured to a single enclosed location as shown on Figure 2.2 below.

Architectural site plan of a building extension project. The plan shows an existing building with a new 3.3m extension and a new paved roof terrace (c. 70 sq m). Key areas include an existing lift motor room, an office, a new unit, and a paved area for seating. The plan also shows a new flank wall, a new window, and a new plank wall. A gravel margin is shown around the building. The plan includes various annotations such as 'ZONE OF NEW RENDER TO MATCH NEW EXTENSION', 'MAINTENANCE ZONE', 'DOOR WIDENED & CRISP EXTENDED', 'EXISTING STAIRCASE TO BE RETAINED', 'ADJACENT BUILDING', 'EXISTING AC UNITS RECONSTRUCTED & DOUBLE STACKED', '1.8M HIGH FINED LOUIRE TREES SCREEN WITH GATE', 'GRAVEL MARGIN', 'ADJACENT BUILDING', and 'Extent of adjacent building at lower level'. The plan also shows a 'NEW 1.8M HIGH FRAMELESS GLASS PROTECTIVE BARRIER WITH ALUMINIUM CHANNELS TO PROVIDE 1.1M EDGE BARRIER ABOVE FINISHED DECKING LEVEL' and a 'NEW 1.8M HIGH FRAMELESS GLASS PROTECTIVE BARRIER WITH ALUMINIUM CHANNELS TO PROVIDE 1.1M EDGE BARRIER ABOVE FINISHED DECKING LEVEL'.

3.0 BASIS OF ASSESSMENT

- 3.1 Noise emitted from entertainment venues is partially covered by Manchester City Council's document '*Planning & Noise – Technical Guidance*' (PNTG) issued in October 2022.
- 3.2 PNTG does not give any noise level limits for noise breaking into an office space or into a non-residential external amenity space. PNTG, however, does provide a noise level limit for terraces in a residential development. The limit, as presented in Section 3.7.1.1, of 55dBL_{Aeq,T} in the daytime is based on British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' (BS8233).
- 3.3 Therefore, due its intended use, it is proposed that a limit of 55dBL_{Aeq,T} would be a suitable design target.
- 3.4 BS8233 also provides internal noise level limits for offices. With doors closed, the external envelope of the office should be design to achieve an internal noise level limit of 40dBL_{Aeq,T}. This would be suitable for the space to be used as a meeting room or break out space.
- 3.5 In order to reduce the potential for an adverse impact from noise breaking out of the terrace area, it is proposed that ambient noise levels (dBL_{Aeq,T}) from people talking should be controlled to not exceed the background noise levels at the nearest noise sensitive receptors.
- 3.6 In relation to noise from any external building services plant. PNTG states that noise from this source should be controlled to no greater than 5dB (L_{Aeq}) below the typical background (L_{A90}) level external to the nearest noise sensitive receptors.

4.0 NOISE CLIMATE

- 4.1 A baseline noise survey was undertaken at a single location representative of the existing noise climate on the external roof area of 40 Peter Street, Manchester between 1500h on Thursday 10 April 2025 and 0600h Sunday 13 April 2025.
- 4.2 Noise measurements were undertaken in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. All measurements undertaken were free field.
- 4.3 The measured existing noise levels during the office operating hours and night-time hours are presented in Table 3.1 below. Full details of the noise survey are presented in Table B.1 of Appendix B. A graph of the measured ambient, maximum and background noise levels are presented in Graph B.1

Table 3.1 – Free-field Noise Levels

Period	Time, h	Noise Levels, dB		
		L _{Aeq}	L _{A90}	L _{Amax,F}
Thursday 10.04.25	1500 – 1800	54	52	76
Thursday 10.04.25 – Friday 11.04.25	2300 – 0700	54	51	78
Friday 11.04.25	0700 – 1800	56	52	85
Friday 11.04.25 – Saturday 12.04.25	2300 – 0700	54	47	81
Saturday 12.04.25 – Sunday 13.04.25	2300 – 0611	56	48	88

- 4.4 The daytime noise climate in the area was dominated by road and pedestrian traffic on the surrounding streets, with contribution from the existing low level plant noise, and ongoing building works to the north. The night-time noise climate was also dominated by pedestrian traffic, with contribution from the nearby outdoor seating areas of bars and music noise from the nearby venues.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

Noise from use of Terrace area

- 5.1 Noise levels in the external seating areas have been determined using the calculation method presented in the J.H. Rindel, C.I Christensen, A.C. Grade research paper: '*Dynamic sound source for simulating the Lombard effect in room acoustic modelling software*' (Proceedings of Inter-Noise 2012, New York, USA, (2012)).
- 5.2 It is deemed appropriate to use a noise level representative of '*normal*' speech conversation levels as expected for the terrace use. The sound power level of a person speaking in a normal voice is equal to roughly 68dB_{LWA} (ref. ANSI 3.5).
- 5.3 The calculation methodology is based on a figure of 50 persons in the outdoor terrace area. In order to do this, the first step is to calculate the number of speaking persons (NS) at any one time, where N is the total number of persons (50) and G is the assumed group size (4).

$$\text{Number of speaking persons (NS)} = N/G$$

- 5.4 In this scenario, this equates to roughly 12-13 people speaking at once (50/4). Considering the number of people speaking and the sound power level of conversation (68dB_{LWA}) the resultant sound power level would be around 81dB_{LWA}.
- 5.5 The equation shown below is then used to convert the sound power to a sound pressure level, where r is the distance to the nearest residential noise sensitive receiver.

$$\begin{aligned}\text{Sound pressure level, } L_p &= L_{WA} - 20\log(r) - 8 \\ L_{WA} &= 81\text{dB} \\ r &= 15\text{m}\end{aligned}$$

- 5.6 Using this methodology, the calculated external ambient noise level with the terrace area full is expected to be around to 49dB_{LAeq,T} outside the nearest noise sensitive receptor.
- 5.7 This is 5dB below the existing ambient noise climate during office working hours, and therefore deemed within the requirements of the PNTG.
- 5.8 The figure provided of up to 50 persons in the terrace area is presented here for demonstration purposes only. This is considered a worst case scenario, and that the typical number of patrons using the terrace is expected to be considerably lower.

Noise Level in Office and on Terrace Area

- 5.9 Based on the noise levels presented in Table 3.1, the noise level on the terrace area, when corrected for the reduction in noise from the plant which is being relocated, would typically be no greater than 55dB_{LAeq,T} when the office was in use. Therefore, this would meet AEC's suggested criteria.

- 5.10 In relation to noise breaking into the office, based on the external noise level on the terrace, suitable internal noise levels would be achieved with standard double glazing $29\text{dBR}_w / 25\text{dBR}_w + C_{tr}$. An example glazing construction to achieve this is 4mm Glass, 6-16mm thermal cavity, and 4mm Glass.
- 5.11 To maintain the sound insulation performance of the external envelope the remainder of the façade construction should have a sound insulation performance of at least 10dB higher than the glazing. Therefore, the external walls and roof would need to achieve a sound insulation performance of at least around $39\text{dBR}'_w$. This would be readily achievable with standard construction methods.

Noise From External Plant

- 5.12 It is understood that the existing external plant units on the roof area are to be condensed into a single partially enclosed area, as illustrated in Figure 2.2.
- 5.13 The plant items consist of two Daikin Sky Air Advance RZASG140M7Y1B units, and nine Mitsubishi SRC50ZSX-S units. Product data sheets provided by the manufacturers suggests that each Mitsubishi unit has a sound pressure level output of 50dB(A) at 1m distance, and the Daikin units have maximum sound pressure level output of 57dB(A) at 1m.
- 5.14 The resultant noise level external to the nearest noise sensitive receptor, which is 15m away, is presented in Table 5.1, below.

Table 5.1 – Resultant Noise Level External to Nearest Noise Sensitive Receptor

Unit	SPL @1m	No. of Units		Distance		Resultant, $\text{dBL}_{Aeq,T}$
		Units	dB	m	dB	
Daikin	50	2	+3	15	-24	36
Mitsubishi	57	9	+9	15	-24	35
Total						39

- 5.15 The resultant figure is 12dB(A) below the existing daytime background noise levels and 8dB(A) below the existing night-time background noise levels. The plant items are comfortably within the requirements set out in PNTG.

APPENDIX A – Acoustic Terminology in Brief

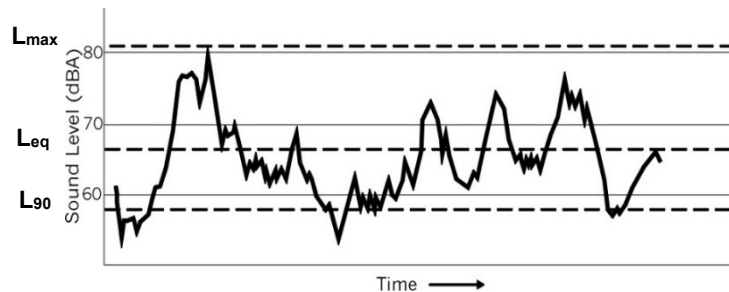
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The *dBA* weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



Commonly Used Descriptors for Sound / Noise

$L_{Amax,F/S}$	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. It can be considered as the "ambient" noise level.
$L_{A90,T}$	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe the "background" noise.
$L_{A10,T}$	The (A-weighted) sound level exceeded for 10% of a measurement period. It is the value often used to describe traffic noise.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	This refers to the sound level measured outside, at 1m from a hard reflecting surface, typically 3dB greater than the free-field level.

APPENDIX B – Noise Survey Details

Table B.1 – Environmental Noise Measurement Procedure

Date & Time of Survey:	1500 on Thursday 10 April 2025, to 0611 on Sunday 13 April 2025.					
Personnel:	Liam Harrison (AEC).					
Equipment Used:	NTI XL2-TA Sound Level Meter (AEC Kit 6).					
Calibration:	The sound level analyser, which conforms to BS EN 61672-1: 2013 ' <i>Electroacoustics – Sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	10.04.25	Daytime	Dry	17°C	Negligible	0%
	10.04.25 to 11.04.25	Night	Dry	2°C	Negligible	0%
	11.04.25	Daytime	Dry	20°C	Negligible	0%
	11.04.25 to 12.04.25	Night	Dry	6°C	Negligible	0%
	12.04.25	Daytime	Dry	19°C	Negligible	0%
	12.04.25 to 13.04.25	Night	Dry	9°C	Negligible	0%
Measurement Locations:	Measurements were undertaken at a single location in the centre of the external roof area of the development site.					
Measurement Details:	Measurements were undertaken in terms of L_{eq} , L_{90} , and L_{max} .					
Façade / Free-Field:	All measurements were undertaken in free field conditions.					
Measured Data:	Full 1/3 rd octave band centre frequency data was obtained for all measurements and are available on request.					

Graph B.1 – L_{Aeq} , L_{Amax} and L_{A90} for full measurement period - Thursday 10 April 2025 to Sunday 13 April 2025

