

Unit 1A, 1 Piccadilly Gardens Manchester



Noise Impact Assessment Report Report 26828.NIA.01

K Food London Limited
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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by K Food London Limited, 3 Lanark Place, London W9 1BT to assess the suitability of an outdoor restaurant seating area at Unit 1A, 1 Piccadilly Gardens, Manchester M1 1RG.

This report presents the results of the environmental survey undertaken in order to measure prevailing background noise levels and outlines any necessary mitigation measures to ensure the amenity of the nearby residential receivers is protected.

2.0 SITE SURVEYS

2.1 Site Description

The site is bounded by Piccadilly Gardens to the north, a mixed-use residential and commercial block (One Piccadilly Gardens) to the southeast, and the Piccadilly Gardens tram stop to the southwest. At the time of the survey, the background noise climate was comprised of road traffic noise from Parker Street, intermittent tram noise from the tram stop, and the noise of human speech from the gardens and the outdoor seating area at Pizza Express.

2.2 Environmental Noise Survey Procedure

A noise survey was undertaken on the proposed site as shown in Figure 2.1. The location was chosen in order to determine the average ambient noise level and the representative background noise level at the windows of the nearby residential receivers.

Continuous automated monitoring was undertaken for the duration of the survey between 13:42 on 21/06/2023 and 12:42 on 22/06/2023.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.3 Measurement Position, Proposed Outdoor Seating Area and Nearest Identified Receivers

The noise measurement position, proposed outdoor seating area and nearest identified residential receivers are as described within Table 2.1 and shown within Figures 2.1 and 2.2.

Icon	Descriptor	Location Description
	Noise Measurement Position	The microphone was installed on a tripod on the roof of Unit 1A at the location shown in Figure 2.1. The microphone was positioned within free-field conditions at approximately 1.5 metres from the nearest surface.
	Proposed Outdoor Seating Area	The proposed seating area is located at the northeast boundary of the restaurant unit, as shown in Figure 2.1 and 2.2.
	Nearest Identified Residential Receivers	5 th floor windows of One Piccadilly Gardens.

Table 2.1 Measurement position and description

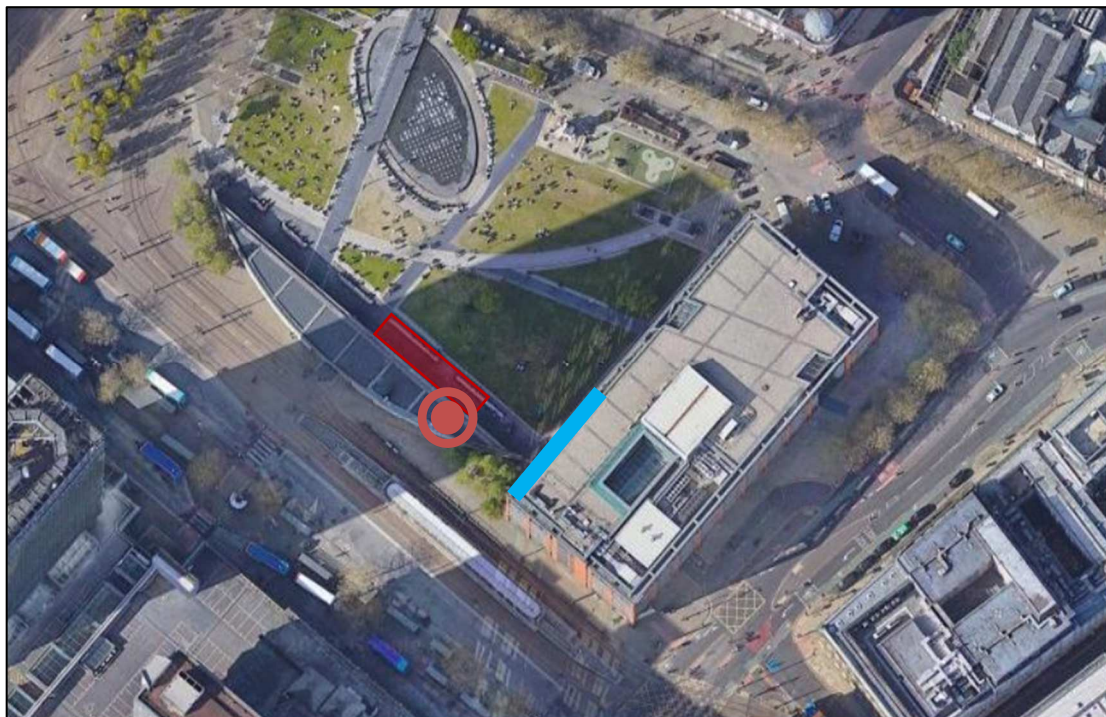


Figure 2.1 Site measurement position, proposed outdoor seating area and nearest identified receivers
(Image Source: Google Maps)



The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

Table 2.2 Measurement instrumentation

The $L_{Aeq: 5min}$, $L_{Amax: 5min}$, $L_{A10: 5min}$ and $L_{A90: 5min}$ acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figure 26828.TH1. Measured noise levels are representative of ambient noise levels at the windows of the nearby residential receivers, and are shown in Table 3.1.

Time Period	Average Ambient Noise Level $L_{Aeq,T}$
Daytime $L_{Aeq,16hour}$	64
Night-time $L_{Aeq,8hour}$	63

Table 3.1 Site average noise levels for daytime and night time

The lowest measured $L_{Aeq,1hour}$ during daytime hours occurred between 07:02 and 08:02 on 22/06/2023. The spectral octave band sound data for this measurement is shown in Table 3.2 below.

Description	$L_{Aeq,T}$ Noise level (dB) at octave band centre frequency (Hz)								dBA
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Daytime $L_{Aeq,1hour}$ 07:02-08:02 on 26/06/2023	67	61	59	54	53	51	45	37	58

Table 3.2 Lowest measured $L_{Aeq,1hour}$ during daytime hours

4.0 NOISE ASSESSMENT GUIDANCE

4.1 IEMA Guidelines for Environmental Noise Impact Assessment (2014)

IEMA provides guidance on assessing the noise impact of an activity on an identified receiver based on the change of the ambient noise level ($L_{Aeq,T}$) and the significance/importance of the effect, as shown in Table 4.1.

Importance/Sensitivity of receptor	Magnitude /Scale of change
Very substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

Table 4.1 Effects descriptors as recommended by IEMA Guidelines for Environmental Noise Impact Assessment (2014)

5.0 NOISE IMPACT PREDICTIONS

5.1 Noise Impact of Proposed Outdoor Seating Area on Nearest Identified Receivers

It is understood that the proposed outdoor seating area will only be operational during daytime hours (07:00 to 23:00), and that no amplified sound or any music will be played within the outdoor seating area.

To assess the noise impact of the outdoor seating area on the nearest receivers, the source noise levels for a quiet restaurant (as per The Little Red Book of Acoustics by R. Watson and O. Downey, 3rd Ed. 2013) have been used to model the worst-case noise emissions from the outdoor seating area, as shown in Table 5.1 below.

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Overall (dBA)
60	60	60	65	65	55	50	50	67

Table 5.1 Source noise levels for a quiet restaurant as per The Little Red Book of Acoustics

An assessment period of one hour has been chosen to account for natural fluctuations in the ambient noise level throughout the operational period.

Table 5.2 shows the predicted sound pressure level at the window of the nearest receiver (minimum 30 metres distance) due to the outdoor seating area operation. Full calculations are shown in Appendix B.

Case	Result	Notes
Before	58 dB(A) $L_{eq,1hour}$	Lowest measured $L_{Aeq,1hour}$ during daytime hours, as shown in Table 3.2.
After	59 dB(A) $L_{eq,1hour}$	Predicted noise level at receiver window due to worst-case noise emissions from outdoor seating area is 53dB, as shown in Appendix B. This level has been logarithmically added to the lowest measured $L_{Aeq,1hour}$ during daytime hours to determine the 'After' Result, as shown in Appendix B.
Noise level change	$59 - 58 = 1 \text{ dB(A)}$	An increase of 1dB indicates no significant impact on the nearest noise sensitive receivers

Table 5.2 Assessment of the scale of change and potential noise impact at the sensitive receivers using worst-case activity over a 1-hour period

As shown in Table 5.1, transmission of noise to the nearest sensitive receiver due to the worst-case noise emissions at the proposed outdoor seating area is expected to cause a change of no greater than 1dB to the average ambient background noise level at the nearest noise sensitive receiver. This correlates to no significant impact on the nearest residential receivers, as per the IEMA Guidelines presented within Table 4.1.

6.0 CONCLUSION

An environmental noise survey has been undertaken at Unit 1A, 1 Piccadilly Gardens, Manchester M1 1RG allowing the assessment of background noise levels representative of the nearest identified receivers.

An assessment of the worst-case noise emissions from the proposed outdoor seating area on the nearest identified receivers has been undertaken. Our calculations indicate that the worst-case noise emissions from the proposed outdoor seating area would have no significant impact on the nearest identified receivers. No further mitigations are required to protect the amenity of the nearby residential receivers.

Unit 1A, 1 Piccadilly Gardens, Manchester - Position 1
Environmental Time History
21/06/2023 to 22/06/2023

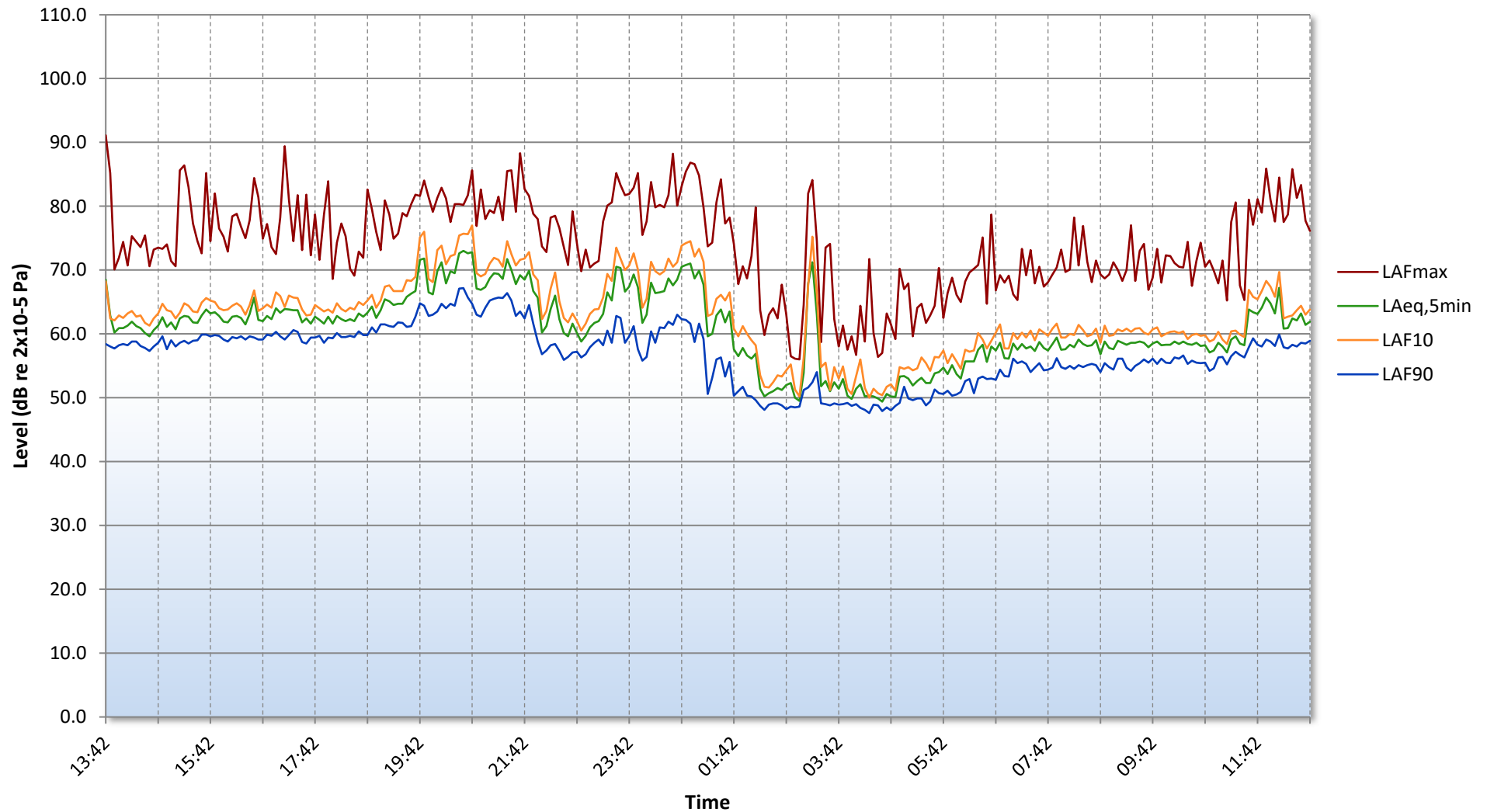


Figure 26828.TH1

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

APPENDIX B

Unit 1A, 1 Piccadilly Gardens, Manchester

ACOUSTIC CALCULATIONS

Source: Outdoor Seating Area	Frequency, Hz								dB(A)
Receiver: 5th Floor Windows of One Piccadilly Gardens	63	125	250	500	1k	2k	4k	8k	
Worst-case noise levels produced by outdoor seating area*, dB	60	60	60	65	65	55	50	50	67
Minimum attenuation due to distance (min. 30m), dB	-14	-14	-14	-14	-14	-14	-14	-14	
Conformal area losses, based on size of outdoor seating area									
Sound pressure level at receiver due to outdoor seating area, dB	46	46	46	51	51	41	36	36	53
Lowest measured $L_{Aeq,1hour}$ during daytime hours, dB	67	61	59	54	53	51	45	37	58
Total sound pressure level at nearest receiver, dB	67	61	59	56	55	51	46	39	59

*Source noise levels for a quiet restaurant as per *The Little Red Book of Acoustics – A Practical Guide (Second Edition)* by R. Watson and O. Downey