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UNIT 1, 70 SPRING GARDENS, MANCHESTER

NOISE IMPACT ASSESSMENT

Report **16935-NIA-01_RevA**

Prepared on 24 September 2021

Issued For:

Origin Manchester GP on behalf of Origin Manchester LP



Executive Summary

This noise impact assessment has been undertaken in order to assess proposed cafe bar use at Unit 1, 70 Spring Gardens, Manchester.

Proposals will include customer seating areas, where it is anticipated background levels of music will be played during the majority of the time. It is understood there will be no live music, and amplified music is not anticipated to be played at an 'entertainment' level.

There are currently no plans for external fixed plant attached to the café bar. If these plans change, full noise impact calculations will be undertaken in order to predict the level of noise expected at the closest residential window.

A background noise survey has been undertaken as detailed in the report, in order to determine an appropriate noise emission criterion, in accordance with the requirements of Manchester City Council.

Calculations were undertaken for the nearest residential receiver, identified as The Gotham Hotel. Additional calculations were undertaken for office premises above the site. It should be noted that if there are closer receivers that Clement Acoustics is not aware of, a reassessment will be necessary, and this should therefore be confirmed by the Client.

It has been demonstrated that compliance with the established criterion is feasible, dependant on the noise management plan set out in this report.

If there is any deviation from the above, Clement Acoustics must be informed, in order to establish whether a reassessment is necessary.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment.

This report is designed to be suitable to discharge typical plant noise planning conditions, as per our original scope of work.

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16935-SP1	Indicative Site Plan
16935-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	Acoustic Calculations

Document Revision	Date of Revision	Reasons for Revision	Revision By
0	21/09/2021	First Issue	Jamie Newton AMIOA
A	24/09/2021	Addressing client comments	Jamie Newton AMIOA

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Sixteen Real Estate to measure existing background noise levels at Unit 1, 70 Spring Gardens, Manchester. Measured noise levels have been used to determine noise emissions criteria for a proposed cafe bar in agreement with the planning requirements of the Manchester City Council.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures. An acoustic terminology glossary is provided in Appendix A.

2.0 SITE DESCRIPTION

Proposals are to redevelop a ground floor unit within 70 Spring Gardens for use as a cafe bar, a venue for drinks with minimal food offering. Proposals will include customer seating areas, where it is anticipated background levels of music will be played for the majority of the time. It is understood there are no proposals for live music, and amplified music is not anticipated to be played at an 'entertainment' level.

The proposed opening hours of the Cafe bar are as follows:

- Wednesday to Sunday: 12:00 - 01:00.

Residential and commercial receivers have been identified in the locations shown in the attached site plan. The area is predominantly commercial, with uses such as retail units and restaurants with office accommodation above.

Residential receivers were identified through a combination of an onsite inspection of the area, and council tax checks on available online databases. The closest residential receiver was identified as Hotel Gotham, located approximately 90 m to the west on Spring Gardens. If there are any receivers closer to that identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receiver should be confirmed by the client before any works are undertaken.

The noise profile of the area is dominated by surrounding commercial uses, as well as road traffic noise from surrounding roads.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 16935-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest affected receiver.

The surroundings and position used for the monitoring location are described in Table 3.1.

Position No.	Description
1	The microphone was mounted on a 1 st storey window on the side façade of the building overlooking West Mosley Street. The microphone was positioned 1 m in front of the window. ^[1]

Table 3.1: Description of unattended monitoring locations

The position was not considered to be free-field according to guidance found in BS 4142: 2014, and a correction for reflections has therefore been applied. Based on the presence of the reflective surface and the nature of surrounding noise sources, a correction for reflections of 3 dB has been applied, in line with the recommendations of the standard.

Continuous automated monitoring was undertaken for the duration of the survey between 16:00 on 17 September 2021 and 09:00 on 20 September 2021

The measurement procedure generally complied with BS 7445: 1991: '*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*'.

3.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment and during the attended measurements, the weather conditions were dry with light winds. It is understood that the weather conditions during the unattended survey remained generally dry with wind speeds below 5 m/s, and light showers on the morning of 19th September.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

3.3 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

4.0 RESULTS

4.1 Unattended Noise Survey Results

The $L_{Aeq}: 5min$, $L_{Amax}: 5min$, $L_{A10}: 5min$ and $L_{A90}: 5min$ acoustic parameters were measured at the location shown in site drawing 16935-SP1.

Measured noise levels are shown as a time history in Figure 16935-TH1, with average ambient and minimum background noise levels summarised in Table 4.1.

Time Period	Average ambient noise level	Minimum background noise level
	$L_{eq}: T$	$L_{90}: 5min$
Daytime (07:00 - 23:00)	63 dB(A)	52 dB(A)
Night-time (23:00 - 07:00)	61 dB(A)	51 dB(A)
Proposed Operating Hours (12:00 – 01:00)	64 dB(A)	52 dB(A)

Table 4.1: Average ambient and minimum background noise levels

5.0 NOISE CRITERIA

5.1 Local Authority Criteria

The noise emissions criteria, typically set by the local authority are as follows:

“The noise level from any plant or activities shall be 10dB or more below the lowest measured external background noise LA90_T at the closest residential window. The equipment shall be installed and constructed in accordance with any approved scheme and be permanently maintained thereafter.”

It is understood there is also a requirement for spectral noise levels to be 10 dB below the corresponding background noise levels.

Based on the results of the environmental noise survey and requirements of Manchester City Council, Table 5.1 presents the proposed plant noise emission criteria to be achieved at 1 m from the nearest noise sensitive receiver:

Period	Plant Noise Emission Limit $L_{eq,T}$
Daytime (07:00 - 23:00)	42 dB(A)
Night-time (23:00 - 07:00)	41 dB(A)
Proposed Operating Hours	42 dB(A)

Table 5.1: Plant noise emission limits

5.2 Commercial Receivers

The closest receivers to the proposed cafe bar facility are existing commercial offices on the first floor of 70 Spring Gardens, directly above the proposed cafe bar.

In order to assess whether noise emissions will be controlled to an acceptable level, guidance has been sought in British Standard 8233: 2014 ‘Guidance on sound insulation and noise reduction for buildings’

In Table 6, guidance is given on typical noise levels for non-domestic buildings where concentration may be required. The relevant guidance given in this table is summarised in Table 5.2.

Objective	Location	Design range $L_{Aeq,T}$ dB
Study and work requiring concentration	Staff/meeting room	35-45 dB(A)
	Executive office	35-40 dB(A)

Table 5.2: BS8233 recommended internal background noise levels

Based on the use of the adjacent space, we would recommend noise emissions should not exceed the design ranges shown in Table 5.2.

6.0 NOISE IMPACT ASSESSMENT - INTERNAL ACTIVITIES

6.1 Proposed Activities

As the building is not currently in use as a cafe bar, manual measurements were taken of similar sized venue, with patrons present and music played back at a level considered to be an entertainment level. In this way, an assessment will be provided for the worst-case scenario of loudest noise levels.

The measured noise levels that will be used in calculations are as shown in Table 6.1.

Source	Sound Pressure Level (dB) in each Frequency Band, at source								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Busy Café Bar with Background Music	93	93	90	91	87	81	71	66	92

Table 6.1: Measured Music Noise Levels

These levels will be used to calculate the current noise breakout to nearby noise sensitive receivers.

For all calculated levels shown below, full formulae used and spectral calculations are shown in Appendix B.

6.2 Noise Breakout Assessment – Residential Receiver

Windows to rooms used for residential purposes have been identified at the location shown in attached site plan 16935-SP1. The closest windows are located a minimum of 90 m from the façade of the proposed venue.

The facade to the venue is formed of existing masonry and glazing. In order to provide a robust assessment, nominal single glazing and masonry has been assumed for the façade construction. Laboratory data for glazing and masonry, and a calculated composite sound reduction index for the façade is shown in Table 6.2.

Construction	Stated Sound Reduction in Each Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
5mm Single Glazing	20	19	23	30	35	27	32	35
Nominal Masonry	39	41	43	48	50	55	55	55
Composite Facade	23	22	26	33	38	30	35	38

Table 6.2: Predicted sound reduction of café bar facade

The main entrance doors to the café bar are on the eastern corner of the building, facing away from the identified receiver. This will limit breakout of noise through these transmission paths, although certain steps are recommended in the noise management plan, shown in Section 7.0.

With music played back at the level shown in Table 6.1, predicted noise emissions levels at nearest residential windows would be as shown in Table 6.3.

Levels have been calculated using the measured background music levels, the calculated sound reduction of the venue facade and the formula shown in Appendix B1.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to amplified music)
Closest Residential Receiver	42 dB(A)	29 dB(A)

Table 6.3: Noise levels and criteria at Residential Receiver

As shown in Table 6.3 and Appendix B1, transmission of noise to the nearest sensitive windows due to the effects of the events and activities would meet the set criteria, based on current proposals. The criterion is met both spectrally and overall.

6.3 Noise Breakout Assessment – Commercial Receiver (Offices)

Offices are directly above the proposed café bar. The weakest path for noise transmission will be through the separating floor to the adjacent space.

In order to predict the transmission of noise to adjacent spaces, calculations have been undertaken using the following standard acoustic formula:

$$SPL_{receiver} = SPL_{source} - SRI_{separation} + 10\log_{10} S - 10\log_{10} A$$

Where:

- $SRI_{separation}$ is the sound reduction of the separating floor [see below],
- S is the area of the transmitting floor,
- and A is the absorption area of the receiving room.

The sound insulation of the separating floor between first floor and ground floor was measured through sound insulation testing on site.

High volume “white” noise was generated from two loudspeakers in the source room, positioned in order to obtain a diffuse sound field. A spatial average of the resulting one-third octave band noise levels between 50 Hz and 10 kHz was obtained by using a moving microphone technique over a minimum period of 15 seconds at each of two positions.

The same measurement procedure was followed in the receiver room.

The results of the tests were rated in accordance with BS EN ISO 717-1: 1997 “*Rating of sound insulation in buildings and of building elements. Part 1 - Airborne sound insulation*”.

The measured sound insulation performance of the floor between ground floor and first floor spaces is as shown in Table 6.4.

Construction	Stated Sound Reduction in Each Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Existing Separating Floor	26	34	38	46	50	51	50	50

Table 6.4: Predicted sound reduction of separating floor

With music played back at the levels shown in Table 6.1 noise emissions levels within the adjacent commercial premises due to internal music play back would be as shown in Table 6.5.

Levels have been calculated using the measured amplified music levels, the calculated sound reduction of the separating floor and the formula shown above. Detailed calculations are shown in Appendix B2.

Receiver	Design Range	Noise Level at Receiver (due to amplified music)
Adjacent Office	35-40 dB(A)	53 dB(A)

Table 6.5: Noise levels and criteria at Commercial Receiver

As shown in Table 6.5 and Appendix B2, transmission of noise to the proposed office space above the venue would exceed the relevant design range. The exceedance is at a level that indicates the level of noise could be disruptive in a typical office environment.

We would therefore recommend that by imposing a noise limit on amplified music during typical office working hours. This is reflected in the noise management plan shown in Section 7.0.

6.4 Internal Noise Transmission to Residential Spaces

No residential receivers have been identified in the same building as the proposed café bar, or in any connected buildings. We would therefore not anticipate any transmission of structure borne noise to residential receivers.

In order to suitably control the breakout of structure borne noise to commercial receivers in the same building, certain steps are recommended in the noise management plan, shown in Section 7.0.

7.0 PROPOSED NOISE MANAGEMENT PLAN

In order to ensure the calculated noise emission levels are not exceeded, we would recommend following certain steps when operating the café bar, as detailed below:

- We would recommend maximum noise levels as follows, to protect the amenity of offices on the first floor. These limits would apply during typical office hours of 09:00 to 19:00:

Source	Low Frequency Limits		Overall Limit
	63Hz	125Hz	
Amplified Music	81 dB	78 dB	81 dB(A)

Table 7.1: Proposed noise limits in café bar

- We would also recommend maximum noise levels as follows, to protect the amenity of the closest residential receiver at The Gotham Hotel. These limits would apply during after 19:00:

Source	Low Frequency Limits		Overall Limit
	63Hz	125Hz	
Amplified Music	108 dB	106 dB	108 dB(A)

Table 7.2: Proposed noise limits in café bar

- All loud speakers should be isolated from the building structure. For fixed speakers, this should be achieved using neoprene fixings for all speaker mountings. For free standing speakers, these should be sited on a suitable isolating material.
- External doors should be kept closed when not in use, particularly during evening hours (19:00 to 01:00).
- Patrons should also be reminded of the nature of surrounding premises and behaviour outside the premises should be monitored accordingly.

[1] The main driving factor in determining the proposed noise limits is transmission of noise through the existing separating floor. If in future there is a desire to increase allowable noise levels, this could be done through the specification of suitable improvements, e.g. a suspended acoustic ceiling.

A commissioning exercise should be undertaken in order to ensure the recommended design targets are not exceeded in offices. The final appropriate noise limit could be lower than that shown in Table 7.1.

8.0 CONCLUSION

An environmental noise survey has been undertaken at Unit 1, 70 Spring Gardens, Manchester. The results of the survey have enabled criteria to be set for noise emissions from the proposed use in accordance with the requirements of the Manchester City Council.

A noise impact assessment has then been undertaken using typical café bar noise levels to predict the noise levels, due to the proposed activities, at the nearby noise sensitive receivers.

There are currently no plans for external fixed plant attached to the café bar. If these plans change, full noise impact calculations will be undertaken in order to predict the level of noise expected at the closest residential window.

Calculations show that noise emissions from the proposed use should meet the requirements of the Manchester City Council with the adoption of a suitable noise management plan as stated herein.

Further restrictions, recommended to protect the amenity of offices above the proposed café bar will result in further reduced noise levels at the identified residential receptor.

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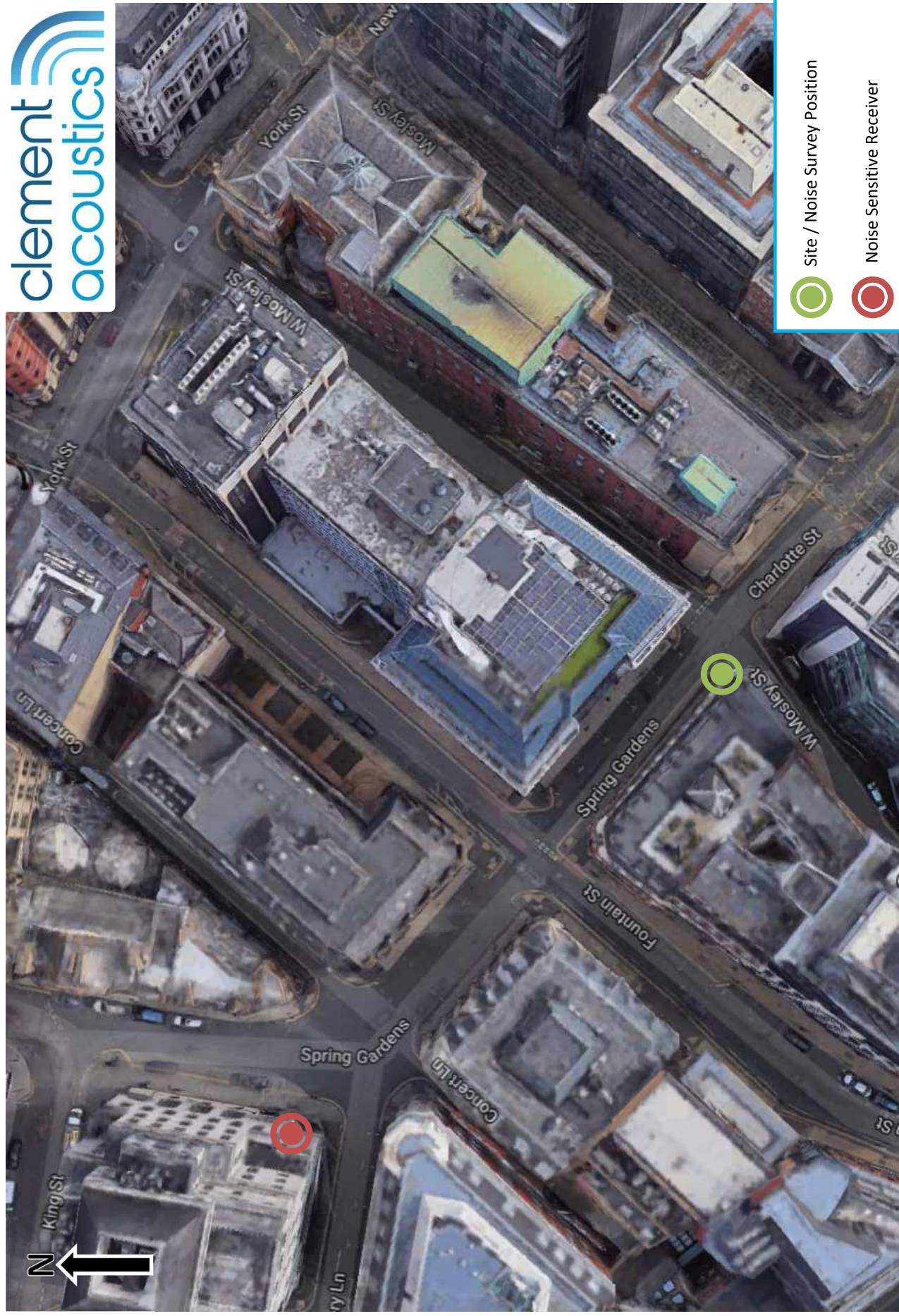


24 September 2021

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24 September 2021



Date: 22 September 2021

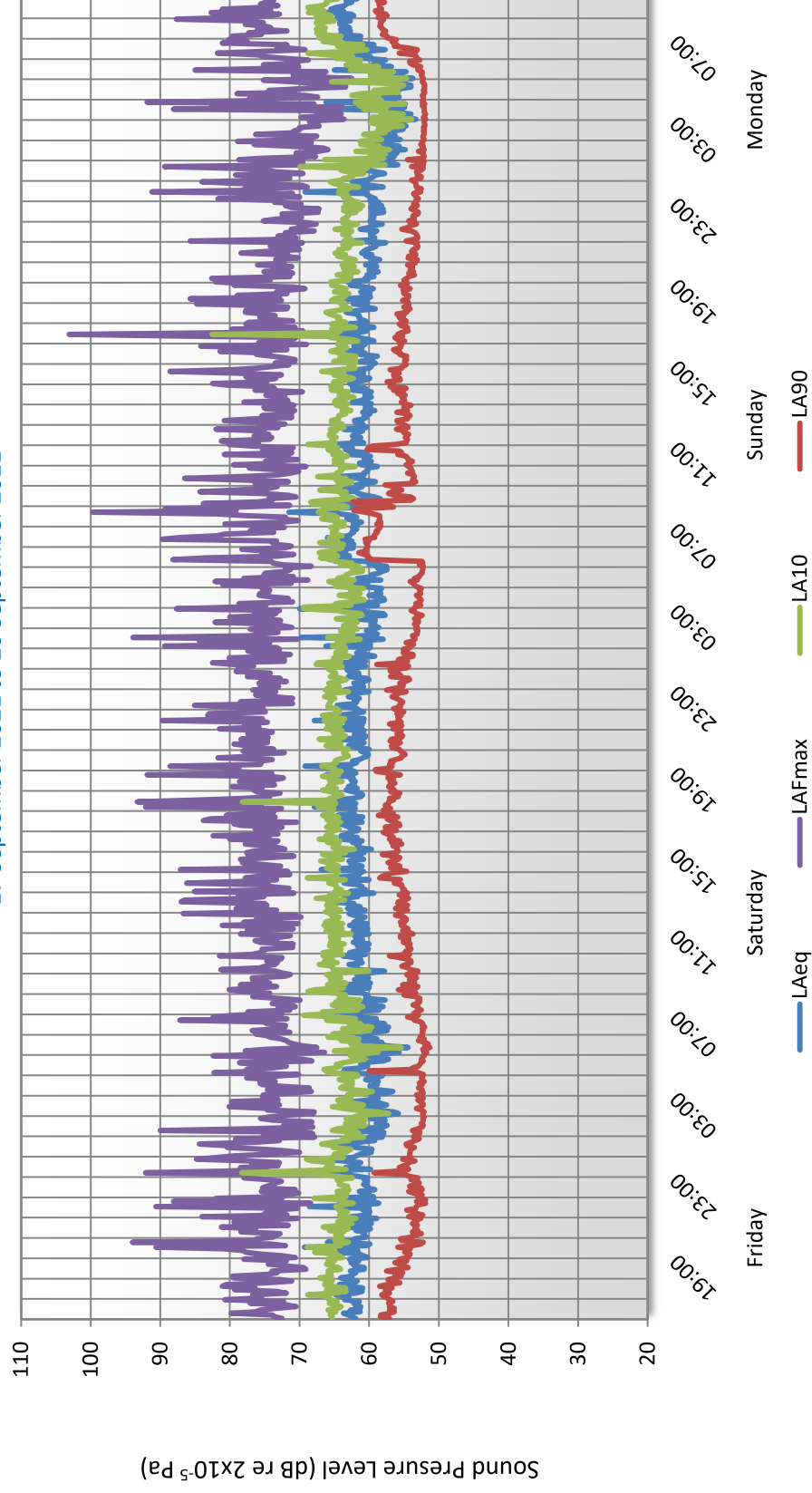
16935-SP1 Indicative site plan indicating noise monitoring position and nearest noise sensitive receiver

Unit 1, 70 Spring Gardens, Manchester

Position 1

Environmental Noise Time History

17 September 2021 to 20 September 2021



GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and 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 not 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 not 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 10 such octave bands whose centre frequencies are defined in accordance with international standards.

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 one alone and 10 sources produce a 10 dB 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

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception 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 reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B2

16935

Unit 1, 70 Spring Gardens, Manchester

Acoustic Calculation used for Room to Room Transmission:

$$SPL_2 = SPL_1 - R + 10 \log_{10} S - 10 \log_{10} A$$

APPENDIX B2: First Floor Office

Source: Music Playback Levels

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Internal Measured Sound Pressure Level									
Predicted Music Source Noise Level Within Ground Floor	93	93	90	91	87	81	71	66	92
Predicted Sound Reduction of separating floor, dB (R)	-26	-34	-38	-46	-50	-51	-50	-50	
Correction for total area of floor (S = 144m ²)	22	22	22	22	22	22	22	22	
Correction for absorption area of receiver room (A = 58m ²)	-18	-18	-18	-18	-18	-18	-18	-18	
Sound pressure level at receiver	71	63	56	49	41	34	25	20	53

Design Criterion

35-40