HOARE LEA

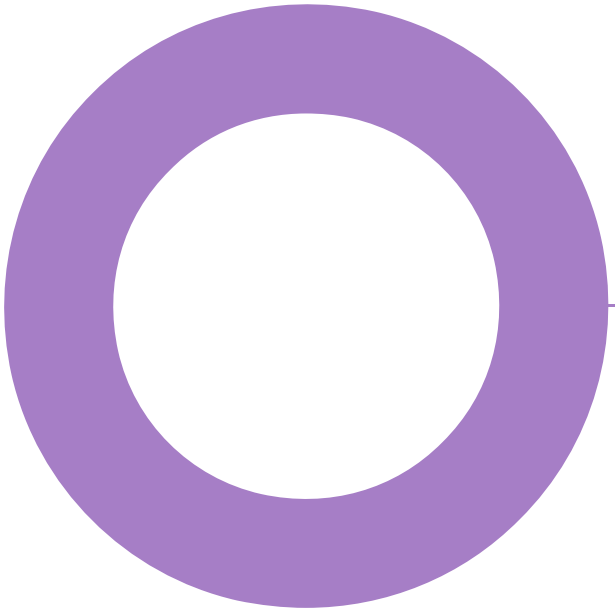
40 Swan Street. Manchester.

Swan Street Firehouse Ltd.

ACOUSTICS

ACOUSTIC PLANNING ASSESSMENT

REVISION 01 – 29 SEPTEMBER 2020



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	25/09/2020	Initial issue for comment	LR/PM	PM/AP	PM
01	29/09/2020	Formal issue	LR	PM	PM

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Executive summary

Hoare Lea Acoustics have been appointed by Swan Street Firehouse Ltd to provide acoustic advice for the proposed temporary development at 40 Swan Street, Manchester. The site is located within the jurisdiction of Manchester City Council (MCC).

An environmental noise survey has been carried out between 3 September and 7 September 2020 and a noise egress assessment undertaken in accordance with the requirements of Manchester City Council (MCC) and guidance set out in the Code of Practice on Environmental Noise Control at Concerts.

Based on the results of the noise survey, the typical existing background noise levels experienced at the worst affected sensitive receptors are $L_{Aeq,5min}$ 47 dB during the daytime (07:00 to 19:00), $L_{Aeq,5min}$ 45 dB during the evening (19:00 to 23:00) and $L_{Aeq,5min}$ 39 dB at night (23:00 to 07:00).

Based on the MCC's requirements, all plant, equipment and machinery associated with the development shall be controlled to ensure that the overall sound pressure levels at 1m from the façade of the nearest noise sensitive premises do not exceed L_{Aeq} 42 dB during the daytime (07:00 to 19:00 hrs), L_{Aeq} 40 dB during the evening (19:00 to 23:00 hrs) and L_{Aeq} 34 dB during the night (23:00 to 07:00 hrs). If the plant contains any tonal or attention catching characteristics, a further correction will be required. In-duct attenuation is understood to be proposed on all external terminations of the wall and roof mounted fans serving the scheme.

An assessment on the control of entertainment noise egress from the temporary site activity at the nearest sensitive premises has also been provided based on guidance set out in The Code of Practice on Environmental Noise Control at Concerts and MCC Guidance on Noise Control for Open Air Concerts and Events dated October 2018. Recommended noise limits for proposed amplified music at the nearest noise sensitive receptor have been provided.

On the basis of the above acoustic control measures being implemented, the proposed temporary use of the site is deemed to be capable of compliance with MCC and best practice requirements.

1. Introduction.

Hoare Lea Acoustics have been appointed by Firehouse Ltd to provide acoustic advice for the proposed temporary restaurant and bar development at 40 Swan Street, Manchester. The site is located within the jurisdiction of Manchester City Council (MCC).

The proposed development comprises the redevelopment of two existing buildings into temporary restaurant premises with additional external dining / drinking areas and temporary tented structures served by an external bar including an informal stage area for occasional events.

An environmental noise survey has been carried out on site between 3 September and 7 September 2020. The aim of the survey was to determine the existing noise levels in the vicinity of the site, including ambient, background and maximum noise levels. From this, appropriate noise egress limits for plant and entertainment noise associated with the development have been determined.

This report presents the findings of the noise survey and sets out the permissible maximum plant noise in accordance with MCC requirements. A strategy for the control of entertainment noise egress is also proposed.

2. Site description.

2.1 Site location.

The proposed development site is located at 40 Swan Street in central Manchester. The site is bounded by Swan Street (i.e. the inner ring road) to the west and minor local roads Mason Street, Cable Street and Cross Keys Street to the north, east, and south respectively.

The site location is indicated in Figure 1. The site is currently unoccupied with partial car parking use at the front along Swan Street.



Figure 1 3D rendered image showing development location and context (courtesy of Google Earth)

2.2 Surrounding area.

The site is located within a primarily commercial area just across from the Northern Quarter along Swan Street. The worst affected sensitive premises are considered to be the Marriott AC Hotel located on the corner of Mason Street and Cable Street approximately 15 m to the north of the site and the Swan Street facing elevations of the residential flats on the upper levels of the Swan Buildings along Swan Street approximately 30 m to the south of the site.

An aparthotel development, Staycity Northern Quarter, lies partly completed across the site on Cable Street. It is understood that this development is currently vacant and is expected to remain non-operational for the duration of the temporary use of the 40 Swan Street site.

2.3 Local noise climate.

The existing local noise climate is currently dominated by a regular and constant flow of road traffic including HGVs and buses along Swan Street. Partially screened road traffic along the Addington Street / Ring Road to the north east and Rochdale Road to the north are also audible.

2.4 Proposed development.

The proposed development comprises the redevelopment of two existing buildings into temporary restaurant premises with additional external dining / drinking areas and temporary tented structures served by an external bar including an informal stage area for occasional events.

It is proposed that the site will be operational Monday to Sunday from the hours of 09:00 to 00:30 hrs. Low level background music is proposal for the majority of these times and controlled amplified music is proposed Friday, Saturday, Sunday and Bank Holidays finishing no later than 22:00 hrs each night.

3. Local Authority planning context.

Criteria for plant noise egress and entertainment noise egress is provided in the Manchester City Council (MCC) "Planning & Noise Technical Guidance (December 2015)" document. This is referenced in the subsequent sections.

3.1 Plant noise egress.

With regards to noise from fixed plant/equipment, MCC refers to BS 4142:2014 and also states the following:

"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."

3.1.1 BS 4142:2014.

The MCC "Planning & Noise Technical Guidance (December 2015)" document refers to BS 4142:2014 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas'. The general principle of the BS 4142 assessment criteria is that noise nuisance can be avoided provided there is no significant change in the prevailing background noise conditions at any surrounding noise sensitive premises once the new equipment is operational.

Where the assessment indicates that the noise rating level of new plant would be 10 dB or greater above the background noise level, the standard judges that sound to be of significant adverse impact. A difference of 5dB is considered to result in adverse impact. Where the rating noise level of the plant is equal to or below background noise, there is likely to be low impact.

Further corrections should be applied if the plant noise contains tonal, intermittent and/or impulsive characteristics. The magnitude of these corrections is dependent upon the subjective perceptibility of the tones/impulses present.

3.2 Entertainment noise egress.

The Code of Practice on 'Environmental Noise Control at Concerts' document, last revised in June 2004 and Manchester City Councils Guidance on Noise Control for Open Air Concerts and Events dated October 2018, sets out best practice noise limits for the control of the environmental noise impact of music events from indoor and outdoor venues at the nearest noise sensitive premises.

The document proposes maximum permissible levels for music noise levels associated with venues at the nearest residential elevations for a range of venue sizes, local environments and event frequency. These are presented within Table 1 of the Code, reproduced below and applicable 'at 1 metre from the façade of any noise sensitive premises for events held between the hours of 09:00 and 23:00':

Concert days per calendar year, per venue	Venue Category	Guidelines
1 to 3	Urban Stadia or Arenas	The MNL[1] should not exceed 75dB(A) over a 15 minute period
1 to 3	Other Urban and Rural Venues	The MNL[1] should not exceed 65dB(A) over a 15 minute period
4 to 12	All Venues	MNL[1] should not exceed the background noise level [2] by more than 15dB(A) over a 15 minute period

[1] Music Noise Level

[2] The value used should be the arithmetic average of the hourly LA90,T measured over the last four hours of the proposed music event or over the entire period of the proposed music event if scheduled to last for less than four hours.

In addition to the above, guideline 3.2 of the Code states that *"For events continuing or held between the hours 2300 and 0900 the music noise should not be audible within noise-sensitive premises with windows open in a typical manner for ventilation."*

For all events, guideline 3.4 of the Code states that *"It has been found that it is the frequency imbalance that causes disturbance. Consequently there is less of a problem from the low frequency content of the music noise near to an open air venue than further away.*

A level up to 70dB in either of the 63Hz or 125HZ octave frequency band is satisfactory; a level of a level of 8OdB or more in either of those, octave frequency bands causes significant disturbance."

4. Environmental noise survey.

The environmental noise survey was carried out on site over a period of 4 days between 3 September 2020 and 7 September 2020. During this time, long-term unattended measurements were carried out. Full details of the method and equipment used, as well as weather information are provided in Appendix A.

The survey measurement position at site is indicated in the annotated 3D render image presented in Figure 2. Position L1 indicates the unattended measurement position.

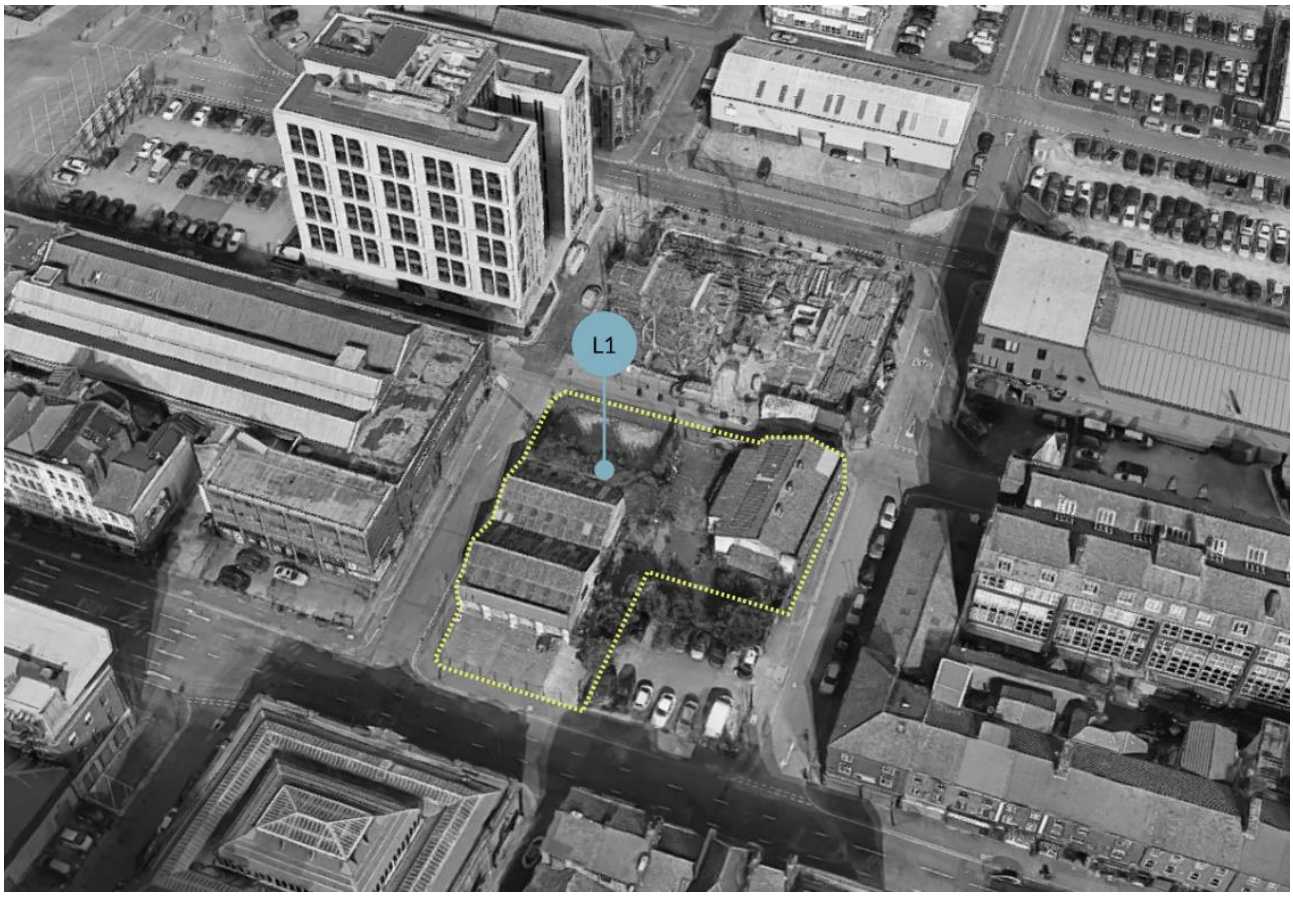


Figure 2 Annotated 3D render image indicating measurement position (courtesy of Google Earth)

4.1 Observations.

As set out in Section 2.3, the noise climate during the attended survey was driven by road traffic along the local roads, including regular bus and HGV events.

4.2 Results.

The results of the unattended noise measurements are presented to follow. A graph showing the results from the unattended logging survey are provided in Appendix B.

Table 1 Ambient noise levels measured during unattended measurements at Position L1

Date	Ambient sound pressure levels measured (dB) at position L1		
	Daytime (07:00 - 19:00) $L_{Aeq, 12hr}$	Evening (19:00 - 23:00) $L_{Aeq, 4hr}$	Night (23:00 - 07:00) $L_{Aeq, 8hr}$
03/09/2020	62 [1]	53	50
04/09/2020	60	54	53
05/09/2020	54	55	52
06/09/2020	53	53	51
07/09/2020	61 [1]	-	-
Average	58	54	51

[1] – Measurement not made over full period but considered representative of daytime conditions due to the relatively constant character of noise sources in the area (road traffic along ring road and Rochdale Road).

In line with BS 4142:2014, for the purpose of analysis and establishing representative background noise levels during the periods of interest, the background noise levels have been quantified using statistical analysis from the continuous logging measurements. These are presented in Appendix C.

From the analysis carried out, the representative background noise levels measured during the survey were as follows:

- Daytime (07:00 - 23:00) - $L_{A90,5min}$ 47 dB
- Evening (19:00 – 23:00) - $L_{A90,5min}$ 45 dB
- Night-time (23:00 - 07:00) - $L_{A90,5min}$ 39 dB.

These levels are based on the 30th percentile of measured background noise levels. The octave band values for these levels are presented in Appendix C.

5. Plant noise egress.

5.1 Plant noise.

5.1.1 Plant noise limits.

Based on the MCC criterion set out in Section 3.1 and the survey results, the cumulative maximum sound pressure levels for fixed plant, equipment and machinery associated with the development shall not exceed the levels presented in Table 2 at 1m from the nearest noise sensitive premises.

Table 2 Maximum permissible sound pressure levels at 1m from the nearest noise sensitive premises from plant and equipment noise

Time of day	Maximum allowable sound pressure level at 1m from the nearest noise sensitive premises (L_{Ar}, dB) *
Daytime (07:00 to 19:00)	42
Evening (19:00 to 23:00)	40
Night (23:00 to 07:00)	34

*If plant noise contains any tonal or impulsive characteristics, a further correction shall be applied to the levels set out above, see Section 3.1.1 for details.

5.1.2 Attenuation measures.

In accordance with the Mechanical Engineer's ventilation statement received via email on 28/09/2020, and the mechanical ventilation drawings received on 29/09/2020 the proposed ventilation scheme is as follows:

- Front of house spaces (4no. fans total)

  2no. wall mounted fans are proposed to each enclosed trading area to provide supply and extract air into the front of house spaces.

- Kitchen exhausts (2no. fans total)

  Dedicated kitchen exhaust systems will be provided to the main food preparation areas within the enclosed spaces with ducted terminations at roof level.

- Back of house spaces (2no. fans total)

  1no. extract fan to wash-up area and 1no. extract fan to accessible WC.

Acoustic mitigation is understood to be incorporated within the proposed ventilation scheme in the form of in-duct attenuators on all extract fan outlets.

The above mitigation measures shall be sufficiently designed against the final selections of plant to comply with the limits set in Table 2. On this basis the above mitigation measures would be capable of controlling plant noise break-out from the proposed ventilation scheme.

6. Entertainment noise egress assessment.

6.1 Summary of proposed activities.

The proposed outdoor yard area will be predominantly dominated by patron and general staff activity. It is understood that background music provision and the possibility of limited live music performances at the weekends and on bank holidays is envisaged. The two refurbished indoor spaces are understood to operate without live music.

6.2 Basis of assessment.

In line with Manchester City Councils Guidance on Noise Control for Open Air Concerts and Events and The Code of Practice on 'Environmental Noise Control at Concerts' for 'All Venue' types, desktop calculations have been carried out to determine the recommended maximum amplified music noise limits at 1 m from the nearest noise sensitive receptor. In addition, an initial assessment taking into account distance attenuation, as well as façade corrections outside the identified sensitive windows has been undertaken to determine typical levels likely within the bar / stage area. It is worth noting however, that this is only indicative and the actual on-site noise levels would need to be measured with synchronised measurements at the hotel to ensure the requirements are not being exceeded.

The nearest Marriott AC hotel elevations have been determined as the worst-affected noise sensitive facades due to their close unscreened proximity to the proposed outdoor area as indicated on the proposed site layouts received on 15 September 2020.

Although some acoustic screening protection will be provided by the surrounding WC and Storage containers it is likely that there will be gaps and line of sight to hotel rooms and therefore acoustic screening has not been assumed within the assessment. Adequately controlling amplified music to this receptor will inherently control noise egress to the residences on Swan Street further to the south.

6.3 Noise assessment.

The results of the desktop assessment carried out are presented in Table 3 along with initial comments on the permissible types of entertainment noise that are likely.

Table 3 Resulting limits for amplified music at 1 m from the nearest noise sensitive premises

Time period (Friday, Saturday, Sunday, Bank Holidays)	Proposed maximum amplified music noise limits at 1 m from the nearest noise sensitive premises	Commentary on likely entertainment noise activities at the venue based on distance attenuation to nearest receptors
Daytime (07:00 – 19:00)	$L_{Aeq,15min}$ 62 dB $L_{eq,63Hz}$ and $L_{eq,125Hz}$ ≤ 70dB	Low to mid-level amplified music Acoustic live music such as singer/songwriter with limited amplification
Evening (19:00 – 22:00)	$L_{Aeq,15min}$ 60 dB$L_{eq,63Hz}$ and $L_{eq,125Hz}$ ≤ 70dB	Low to mid-level amplified music Acoustic live music with limited amplification

6.4 Recommendations.

Given the temporary nature of the proposed site use and its outdoor location, the limits set out in Table 3 are advised along with the following best practice control measures:

- Use of noise limiters and sound level meters on house PA and any external equipment brought in by guests to control amplified music levels within the venue and at the nearest noise sensitive receptor
- Use of smaller, directional loudspeakers to provide coverage across outdoor area and limiting noise spill outside of the site boundary
- Limiting reproduced and live music to the daytime and evening hours (up to 22:00).

7. Patron and anti-social behaviour noise.

It should be noted that conversation noise from patrons is assumed to fall with the 'Security and Crowd Management Plan' and not part of the typical entertainment noise.

8. Conclusion.

Hoare Lea Acoustics have been appointed by Swan Street Fire House Ltd to provide acoustic advice for the proposed temporary development at 40 Swan Street, Manchester. The site is located within the jurisdiction of Manchester City Council (MCC).

An environmental noise survey has been carried out between 3 September and 7 September 2020 to establish typical ambient and background sound pressure levels on and around the site.

Cumulative plant noise limits for the scheme have been set based on the survey results and on MCC requirements, If the plant contains any tonal or attention catching characteristics, a further correction will be required. An overview of the understood acoustic mitigation measures proposed for the scheme (developed by others) has been provided.

Based on the results of the noise survey, an assessment on the control of entertainment noise egress from the temporary site activity at the nearest sensitive premises has also been provided based on guidance set out in The Code of Practice on Environmental Noise Control at Concerts and MCC Guidance on Noise Control for Open Air Concerts and Events dated October 2018. Recommended noise limits for proposed amplified music at the nearest noise sensitive receptor have been provided.

Appendix A: Survey and equipment details.

Unattended noise measurements were carried out between 13:10 on 3 September 2020 and 13:30 on 7 September 2020.

Prior to commencement of the unattended survey, a subjective assessment of the noise climate was undertaken and compared to that of the immediate vicinity of the nearby residential premises. The chosen logger position at position L1 was deemed to be representative of the noise levels at the nearest noise sensitive premises.

The microphone was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted. A photo of the equipment is provided in Figure 3.

Equipment details.

Table B1 summarises the details of the equipment used during the environmental noise survey. All equipment used was within dates of calibration and calibration certificates are available on request.

Table B1 Equipment used during environmental noise survey

Item	Description	Serial Number	Calibration Date
Attended sound level meter	Rion - Microphone: UC-59 Rion - Pre-amplifier: NH-25 Rion - Sound Level Meter: NL-52	16798 32190 00732162	02/03/2020

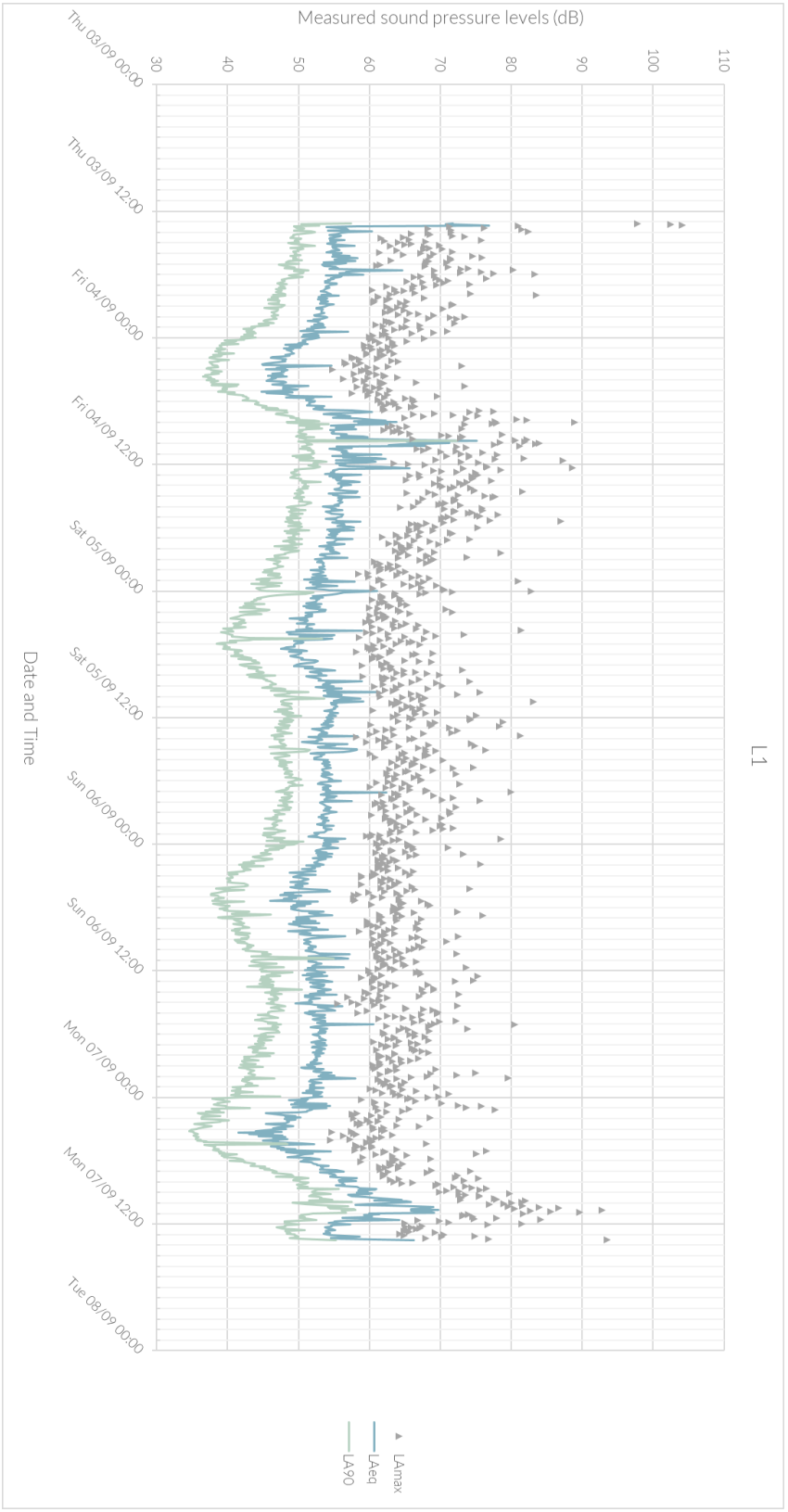
Weather information.

Weather reports for the area indicate that temperatures ranged between 9 °C to 22 °C. Wind speeds and rain were minimal and not expected to contribute adversely, therefore the measured data is considered suitable as being representative of typical conditions.



Figure 3 Photo showing noise monitoring position

Appendix B: Time history of unattended measurements.



Appendix C: Representative octave band background noise levels.

Table C1 Results of typical octave band background levels during attended noise measurements at position L1

Period	$L_{A90,5min}$ (dB)	Measured octave band background levels (L_{Z90}, dB)							
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Daytime (07:00 – 19:00)	51	59	51	48	50	48	41	30	17
Evening (19:00 – 23:00)	48	60	51	45	43	44	37	22	13
Night (23:00 – 07:00)	45	54	46	43	41	41	34	21	12

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