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Rutherford Building, University of Manchester

Noise planning report

**SANDY
BROWN**
ACOUSTICS

post@sandybrown.com
sandybrown.com

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A	2 Feb 26		JP	JA

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Summary

Sandy Brown has been appointed by IBI Group (UK) Ltd to provide acoustic advice in relation to the rooftop condenser unit proposed to the Rutherford Building, Manchester, M13 9GP.

An environmental noise survey has been carried out, the purpose of which has been to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant. The representative background sound levels measured during the survey were $L_{A90,15min}$ 43 dB during the day and $L_{A90,15min}$ 41 dB at night.

Based on the requirements of Manchester City Council and on the results of the environmental noise survey, the new plant installation must be designed such that the cumulative noise levels at 1 m from the worst affected window of the nearest noise sensitive premises are controlled to be at least 5 dB below the measured background level. The limits are cumulative, and apply with all plant operating under normal conditions.

If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

This report presents the survey method and results, a discussion of acceptable limits for noise emissions from building services plant and an assessment of noise egress associated with the proposed rooftop condenser unit.

The proposed condenser units are predicted to comply with required noise egress criteria without additional acoustic mitigation.

Contents

1 Introduction 5

2 Site description..... 5

3 Development proposals 6

4 Building services noise egress criteria..... 6

5 Noise survey method..... 7

6 Noise survey results 9

7 Plant noise egress assessment..... 13

8 Conclusion..... 16

Appendix A 17

 Survey Details 17

Appendix B..... 20

 Results of unattended measurements at Position ‘L’ 20

1 Introduction

Sandy Brown has been appointed by IBI Group (UK) Limited to provide acoustic advice in relation to the rooftop condenser unit proposed to the Rutherford Building, Manchester, M13 9GP.

As part of this, an environmental noise survey has been carried out, the purpose of which has been to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from the building services plant.

This report presents the survey method and results, a discussion of acceptable limits for noise emissions from building services plant and an assessment of noise egress based on received plant selections.

2 Site description

The site location in relation to its surroundings is outlined in red in Figure 1.

The site is bounded by Bridgeford Street to the north and Coupland Street to the south which are understood to be service roads used mainly for deliveries.

Oxford Road is located approximately 40 m east of the site and includes heavy bus traffic.

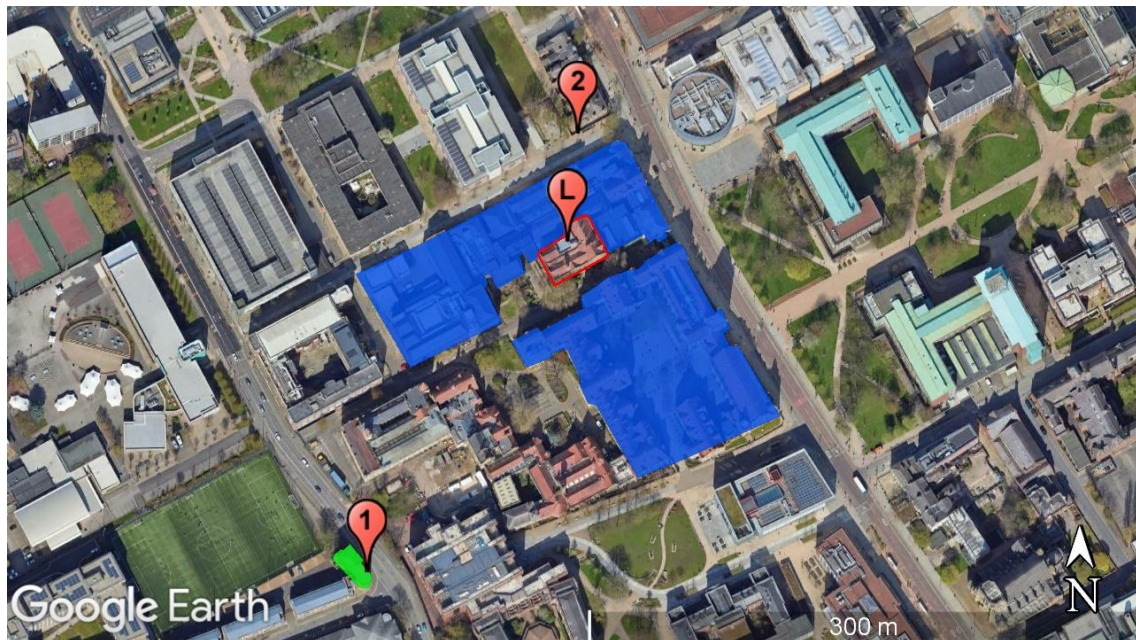


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

2.1 Adjacent premises

The nearest noise sensitive premises are summarised below with respect to mark-ups shown in Figure 1 and site boundary outlined in red.

- Existing University of Manchester educational buildings directly adjacent to the site are highlighted in blue in Figure 1.
- Residential dwellings located along Higher Cambridge Street, approximately 200 m west of the site, highlighted in green in Figure 1.

3 Development proposals

A condenser unit is proposed on the rooftop of the Rutherford Building, as shown in Figure 2, outlined in blue.

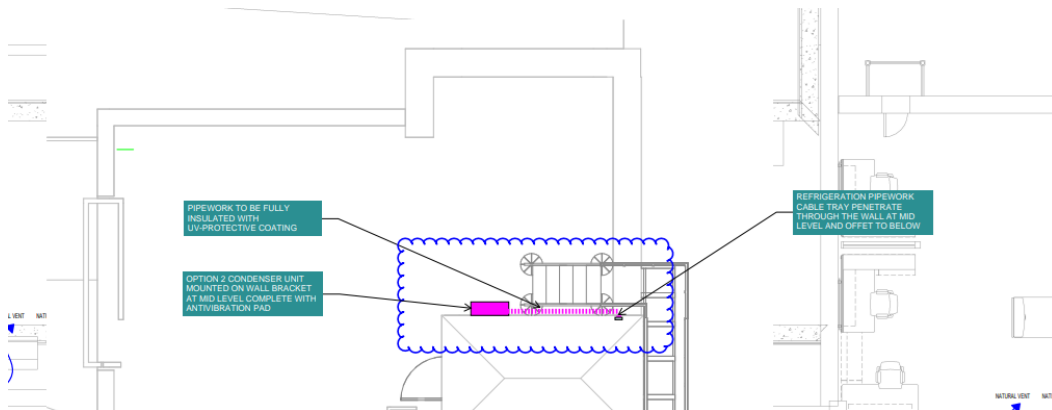


Figure 2 Proposed condenser unit location

4 Building services noise egress criteria

4.1 Standard guidance

BS 4142:2014:+A1:2019 Methods for rating and assessing industrial and commercial sound (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background sound level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

4.2 Local Authority criteria

Manchester City Council (MCC) provides guidance in relation to plant noise emissions in Planning and Noise Technical Guidance document dated October 2022 states the following in relation to plant noise egress:

'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'

Corrections for tonal or attention catching characteristics would need to be applied to the rating level in accordance with BS4142:2014.

5 Noise survey method

The survey included unattended and attended noise measurements.

The measurements and information provided in this report are in accordance with requirements of BS 7445, as referenced in Appendix A.

Details of the equipment used and the noise indices measured are provided in Appendix A.

5.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 3 days.

Measurements were taken over 15-minute periods between 14:20 on 28 January 2026 and 13:35 on 30 January 2026. The microphone for the sound level meter was installed on a tripod at least 1.5 m above roof level and approximately 17 m above ground level.

The measurement position is indicated in Figure 1, denoted by the letter 'L', and a photograph showing the measurement position is provided in Figure 3. This measurement position is considered to be free field.



Figure 3 Photograph of unattended measurement position 'L'

This location was chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.

5.2 Attended measurements

Attended sample measurements were taken at 2 positions around the site. These are indicated in Figure 1 as positions 1 to 2. These measurements were undertaken on 28 January 2026. All attended measurements were 5 minutes in duration. These measurements were undertaken to determine existing noise levels around the site.

Dominant noise sources occurring during the measurements were noted. Photographs of the measurement positions are shown in Figure 4.



Figure 4 Photographs of attended measurement positions 1 to 2 (left to right)

Measurement position 1 was carried out at 1 m from a reflective surface and considered to be facade measurement. Measurement position 2 was carried out at 3 m from a reflective surface and considered to be free field measurement.

5.3 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Noise survey results

6.1 Observations

The dominant noise sources noted at the site during measurements were noted to be road traffic from Oxford Road, particularly buses and plant noise from nearby rooftop plant compound located directly north of the Rutherford Building.

Less significant noise sources included distant construction noise from nearby university buildings undergoing works and distant aircraft passes overhead.

6.2 Noise measurement results

6.2.1 Unattended measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

Ambient noise levels measured during the unattended survey are presented in Table 2.

Table 1 Ambient noise levels measured during the unattended survey

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Wednesday 28 January 2026	46 ^[1]	44
Thursday 29 January 2026	50	46
Friday 30 January 2026	52 ^[1]	–

^[1] Measurement not made over full period due to logger start and end time (the measurement on 28 January 2026 was over 8 hours, and on 30 January 2026 over 3 hours).

In line with BS 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Day and night statistical analysis of representative values for the site are given in Figure 5.

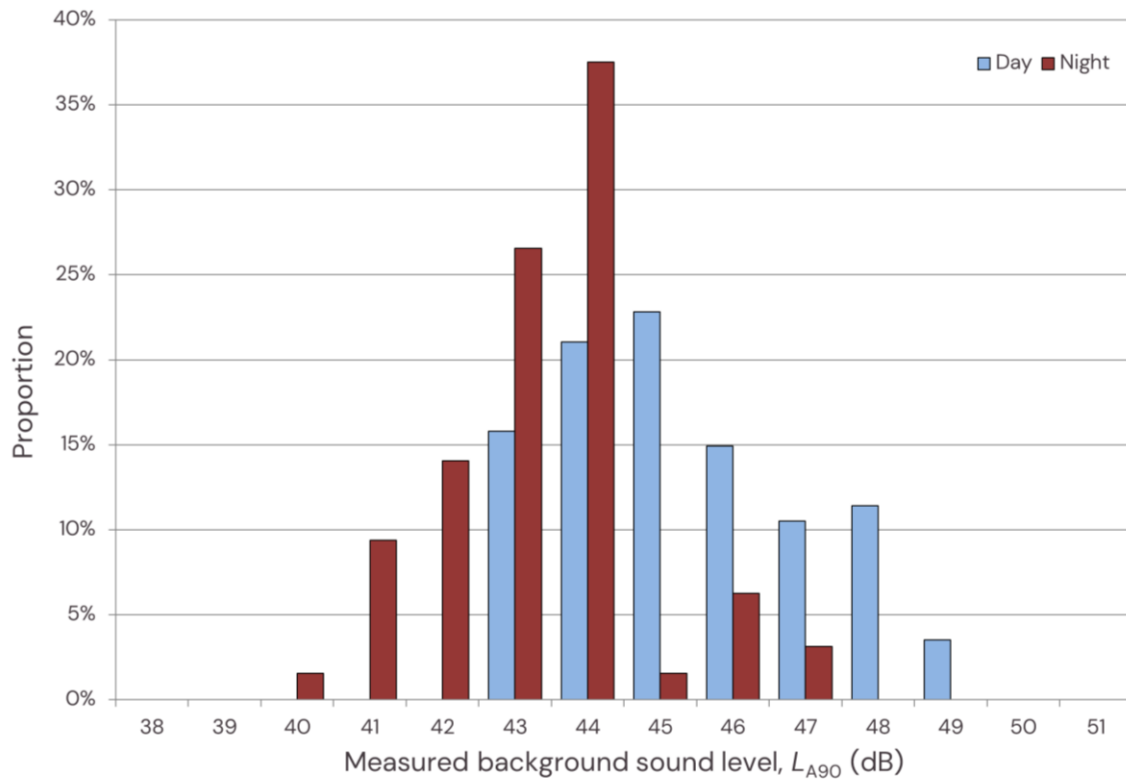


Figure 5 Statistical analysis of background sound levels

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 43 dB during the day and $L_{A90,15min}$ 41 dB at night.

6.2.2 Attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 2.

Table 2 Attended measurements results and key noise sources

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$	
1	14:23	72	79	62	Dominated by traffic noise egress from Higher Cambridge Street. Less significant sources included birdsong from trees located nearby measurement position and pedestrians walking by measurement position. L_{AFmax} were caused by large vehicles (ie, buses) passing by the measurement position and sirens from emergency services vehicles.
1	14:28	70	82	58	
1	14:33	75	98	62	
1	14:38	70	81	60	
1	14:44	71	81	59	
1	14:49	72	81	62	
2	14:25	60	70	54	Dominated by traffic noise egress from Oxford Road and plant noise egress contributions from nearby kitchen extract fan serving University of Manchester café / canteen. Less significant sources included pedestrians walking past the measurement position in conversation and intermittent noise from nearby pedestrian crossing
2	14:30	57	69	53	
2	14:35	59	74	54	
2	14:45	58	78	53	
2	14:50	58	78	53	
2	14:55	63	84	54	

7 Plant noise egress assessment

7.1 Plant noise limits

Based on the above criteria and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from the worst affected windows of the nearest noise sensitive premises should not exceed the limits set out in Table 3.

These limits are applicable 1 m from the facade of noise sensitive receptors and are presented as free-field levels.

Table 3 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises ($L_{Aeq,15min}$ dB)
Day (07:00–23:00)	38
Night (23:00–07:00)	36

The plant noise egress levels should not contain any attention catching features with reference to BS4142:2014.

The background sound level measured at position 1 close to the residential premises on Higher Cambridge Street is significantly higher than the background sound level measured by the unattended noise equipment, as such setting the plant noise egress limits based on the unattended equipment is worst case.

7.2 Proposed plant items

A condenser unit is proposed on the rooftop of the Rutherford Building, as shown in Figure 2, outlined in blue.

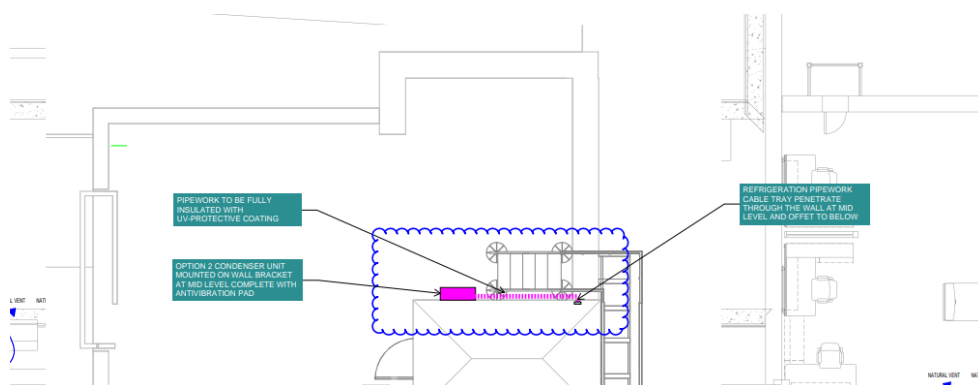


Figure 6 Proposed condenser unit location

The noise data for the proposed condenser unit is set out in Table 4.

Table 4 Noise data for proposed condenser unit

Plant item	Sound pressure level at 1 m, L_p (dB)							
	Octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Mitsubishi PUZ-ZM6OVHA2	53	52	53	44	43	39	33	27

7.3 Predicted noise egress levels and assessment

An assessment has been undertaken to predict the plant noise egress levels for the new chillers at the nearby noise sensitive receptors. The calculations include losses due to geometry as well as distance attenuation and screening.

For the purpose of this calculation, a worst-case existing university building window has been identified as the window shown in Figure 7 highlighted in red.



Figure 7 Mark-up of worst affected window in relation to rooftop plant location

Compliance at this receptor is expected to result in compliance at university receptors located further away, due to distance attenuation.

Based on the information outlined above, the predicted condenser noise egress levels are detailed in Table 5.

Table 5 Plant noise egress assessment results

NSP location	Day criterion (07:00–23:00), L_{Aeq} (dB)	Predicted plant noise egress level (day 07:00–23:00), L_{Aeq} (dB)	Night criterion (23:00–07:00), L_{Aeq} (dB)	Predicted plant noise egress level (night 23:00–07:00) L_{Aeq} (dB)
Worst- affected University of Manchester window	38	32	–	–
Residential premises along Higher Cambridge Street	38	6	36	6

It is predicted that the proposed condenser unit will be compliant with normally operating plant noise egress criteria. This is on the basis that there are no attention catching features with reference to BS4142.

8 Conclusion

Sandy Brown has been appointed by IBI Group (UK) Limited to provide acoustic advice in relation to the rooftop condenser unit proposed to the Rutherford Building, Manchester, M13 9GP.

An environmental noise survey has been carried out, the purpose of which has been to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

The representative background sound levels measured during the survey were $L_{A90,15min}$ 43 dB during the day and $L_{A90,15min}$ 41 dB at night.

Based on the requirements of Manchester City Council and on the results of the environmental noise survey, the new plant installation must be designed such that the cumulative noise levels at 1 m from the worst affected window of the nearest noise sensitive premises are controlled to be at least 5 dB below the measured background level. The limits are cumulative, and apply with all plant operating under normal conditions.

If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

It is predicted that the proposed condenser unit will be compliant with normally operating plant noise egress criteria.

Appendix A

Survey Details

Reference standards

- BS 7445 Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*
- BS 7445: Part 2: 1991 *Description and measurement of environmental noise, Part 2. Guide to the acquisition of data pertinent to land use.*

Equipment

The unattended and attended noise measurements were taken using two Rion NL-52 sound level meters and a Bruel and Kjaer 2250 sound level meter.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	2250/3011964	Brüel & Kjær	14 April 27	UCRT25/1609 UCRT25/1610
Microphone	4189/3100176	Brüel & Kjær	14 April 27	UCRT25/1609 UCRT25/1610
Pre-amp	ZC0032/26376	Brüel & Kjær	14 April 27	UCRT25/1609 UCRT25/1610
Calibrator	4231/3019123	Brüel & Kjær	14 April 27	UCRT25/1603
Sound level meter	NL-52/00932326	Rion	24 Apr 26	TCRT23/1806
Microphone	UC-59/09251	Rion	24 Apr 26	TCRT23/1806
Pre-amp	NH-25/32354	Rion	24 Apr 26	TCRT23/1806
Calibrator	NC-74/34536129	Rion	24 Apr 26	TCRT23/1576
Sound level meter	NL-52/01010788	Rion	24 Sep 27	TRAC25/09422
Microphone	UC-59/20416	Rion	24 Sep 27	TRAC25/09422
Pre-amp	NH-25/11436	Rion	24 Sep 27	TRAC25/09422
Calibrator	SV30A/10559	Svantek	24 Sep 27	TRAC25/09422

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg, L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS 7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

Weather conditions

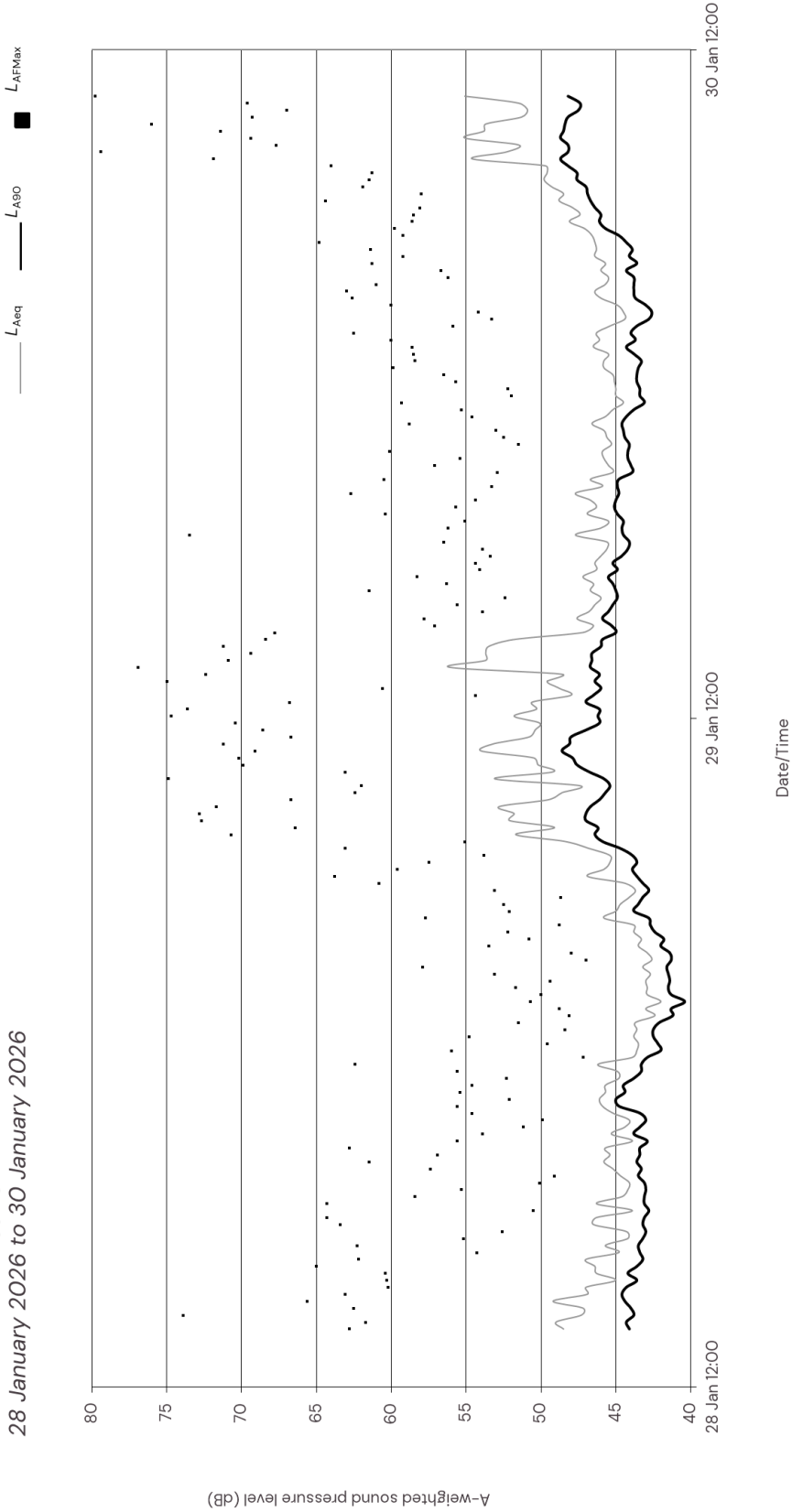
During the unattended noise measurements, weather reports for the area indicated that temperatures varied between -1°C at night and 14°C during the day. The weather was generally dry and clear.

Wind speeds varied between 0 m/s and 4 m/s throughout the survey. These weather conditions are considered to be suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Position 'L'

The Rutherford Building, Manchester
Results of noise logging survey at 'L'
28 January 2026 to 30 January 2026



London
Manchester
Edinburgh
Birmingham
Leeds
Bristol

post@sandybrown.com

sandybrown.com

Sandy Brown Ltd

Registered in England & Wales No.13227735

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