

# SANDY BROWN

*Consultants in Acoustics, Noise & Vibration*

**023700-R03-B**

**10 October 2023**

## 49 South Audley Street

*Noise survey and plant noise assessment*

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

**Sandy Brown Ltd**

Registered in England & Wales

No. 13227735

[post@sandybrown.com](mailto:post@sandybrown.com)

[www.sandybrown.com](http://www.sandybrown.com)

Registered Office: 55 Charterhouse Street, London EC1M 6HA

# SANDY BROWN

*Consultants in Acoustics, Noise & Vibration*

---

<b>Version</b>	<b>Date</b>	<b>Comments</b>	<b>Author</b>	<b>Reviewer</b>
A	5 Oct 23		Julian Martinez	Anthony Harper
B	10 Oct 23	Update to plant layout	Bob Albon	Anthony Harper

---

## **Disclaimer**

This report has been prepared for the sole benefit and use of our client based on their instructions and requirements. Sandy Brown Ltd extends no liability in respect of the information contained in the report to any third party.

## Summary

Sandy Brown has been commissioned by HSQ Hospitality Ltd to provide acoustic advice in relation to a planning application for the installation of new building services plant at 49 South Audley Street, London, WK1 2QE.

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was carried out between 19 January 2023 and 24 January 2023.

Based on the requirements of the Westminster City Council and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed  $L_{Aeq,15min}$  41 dB during the daytime, and  $L_{Aeq,15min}$  41 dB during the night. These have been corrected relative to the measured free-field background sound levels by the addition of 3 dB (as per the guidance provided in BS 8233:2014 Section G.2.1).

These 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.

An assessment has been undertaken of noise egress resulting from the operation of the proposed plant to the nearest sensitive receptors, taking into account distance attenuation and screening. The results of the assessment show that the noise egress limits can be met with the provision of attenuation to the proposed plant.

## Contents

1	Introduction.....	5
2	Site description .....	5
3	Development proposals .....	6
4	Building services noise egress criteria.....	6
5	Noise survey method .....	8
6	Noise survey results .....	9
7	Plant noise assessment .....	11
8	Conclusion .....	16
	Appendix A .....	17
	Survey details.....	17
	Appendix B .....	20
	Results of unattended measurements at Location L .....	20

## 1 Introduction

Sandy Brown has been commissioned by HSQ Hospitality Ltd to provide acoustic advice in relation to a planning application for the installation of new building services plant at 49 South Audley Street, London, WK1 2QE.

As part of this, an environmental noise survey is required, the purpose of which is 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.

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

An initial assessment of external plant was undertaken and the results and mitigation requirements were set out in the Sandy Brown report '23025-R01-A Noise survey and plant noise assessment'. This report includes a reassessment of plant noise egress and mitigation requirements based on an updated scheme of external plant, which includes the reselection and relocation of plant.

## 2 Site description

### 2.1 The site and its surrounding

The site is situated on the junction of Audley Street and Reeves Mews as highlighted in blue in Figure 1.

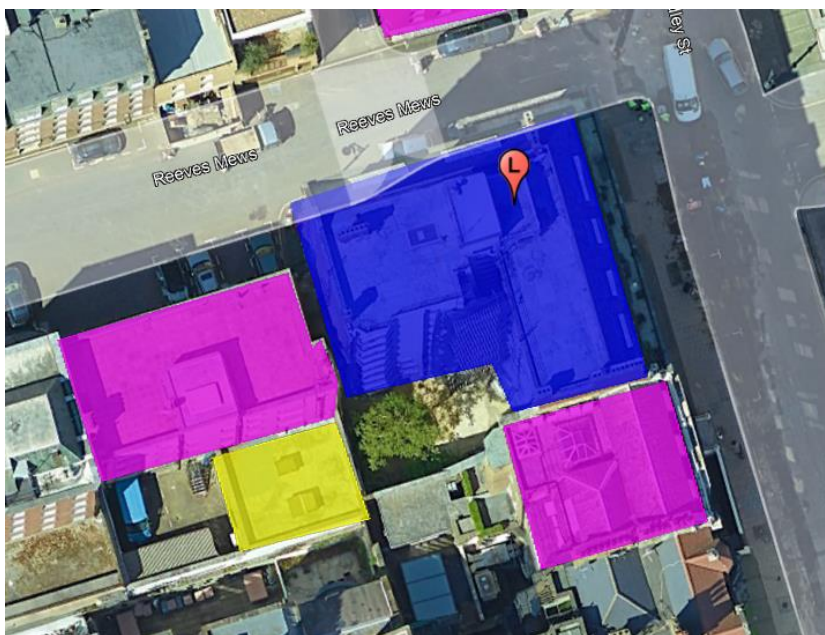


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

## 2.2 Adjacent premises

The upper floors (Level 2 and above) of 49 South Audley Street are in residential use. The site is also surrounded by other residential receptors, these have been highlighted in pink on Figure 1 and include:

- 34 Reeves Mews to the north
- Park Lane apartments (6 Reeves mews) to the west (Level 1 to Level 3)
- 50 South Audley Street to the south.

The nearest residential receptors are the residential dwellings of 49 South Audley Street.

6A Reeves Mews, a ground floor office development, is located on the western border of the site (highlighted in yellow on Figure 1).

## 3 Development proposals

The proposed development consists of a ground floor restaurant and basement level kitchen, this includes the installation of new external building services plant at an internal courtyard of 49 South Audley Street and at the west facade of the building. The proposed plant is expected to operate between 07:00 and 00:00.

## 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

The site lies within the jurisdiction of the Local Authority, Westminster City Council (WCC). The Westminster requirements for the control of noise from building services plant is set out in their Draft Noise Technical Guidance Note (September 2020).

### 4.2.1 Draft Noise Technical Guidance Note (September 2020)

The Draft Noise Technical Guidance Note (September 2020) states the following:

*A development including plant or machinery, or containing activities that cause noise from amplified and unamplified music or human voices both internally and externally should achieve the following standards:*

Table 1 Noise criteria for plant machinery and internal /external activities

<i>Existing External Ambient Noise Level</i>	<i>Tonal or Intermittent Noise / Noise Source</i>	<i>Sound Emission Level that should not be Exceeded at the nearest Noise Sensitive Receptor<sup>1</sup></i>
<i>Exceed WHO Guideline levels</i>  <i>L<sub>Aeq</sub> 55 dB over periods of daytime (07:00-23:00 hrs) and L<sub>Aeq</sub> 45 dB at night-time (23:00-07:00 hrs)</i>	<i>Does not contain tones or intermittent noise sufficient to attract attention</i>	<i>10 dB below the minimum external background noise level</i>
	<i>Contain tones or be intermittent noise sufficient to attract attention</i>	<i>15 dB below the minimum external background noise level</i>
	<i>Noise emitted from emergency plant or an emergency life supporting generators<sup>2</sup></i>	<i>10 dB above the lowest background noise level within a 24-hour period</i>
<i>Does not exceed WHO guideline levels</i>  <i>L<sub>Aeq</sub> 55 dB over periods of daytime (07:00-23:00 hrs) and L<sub>Aeq</sub> 45 dB at night-time (23:00-07:00 hrs)</i>	<i>Does not contain tones or intermittent noise sufficient to attract attention</i>	<i>5 dB below the minimum external background noise level</i>
	<i>Contain tones or be intermittent noise sufficient to attract attention</i>	<i>10 dB below the minimum external background noise level</i>
	<i>Noise emitted from emergency plant or an emergency life supporting generators<sup>2</sup></i>	<i>10 dB above the lowest background noise level within a 24-hour period</i>

<i>Existing External Ambient Noise Level</i>	<i>Tonal or Intermittent Noise / Noise Source</i>	<i>Sound Emission Level that should not be Exceeded at the nearest Noise Sensitive Receptor<sup>1</sup></i>
<i>Below 30 dB <math>L_{A90,15min}</math> at the nearest noise sensitive receptors</i>	<i>Noise contains and/or does not contain tones or intermittent noise</i>	<i>Site specific standards that avoid noise disturbance to nearest noise sensitive receptors may be considered.</i>
<i>Both daytime (07:00-23:00 hrs) and night-time (23:00 – 07:00 hrs)</i>		

<sup>1</sup> Measured at the nearest noise sensitive receptors 1m from the most affected facade, relative to the existing external background noise level in this location and including the quietest time during which the plant operates, or when there is internal activity at the development site. The background noise levels should be expressed in terms of the lowest  $L_{A90,15min}$  during daytime or night-time (depending on the hours of use being applied for)

<sup>2</sup> Where emergency plant or a generator is installed testing times will be regulated

## 5 Noise survey method

The survey included unattended and attended noise measurements.

### 5.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 6 days.

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

The unattended measurements were taken over 15-minute periods between Thursday 19 January 2022 and Tuesday 24 January 2022.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. A photograph showing the measurement location is provided in Figure 2. This location was chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.





Figure 2 Photograph of unattended monitoring position

## 5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

## 6 Noise survey results

### 6.1 Observations

The dominant noise source observed at the site during the survey was road traffic on South Audley Street.

Less significant noise sources included aircraft serving London City airport and construction on Mount Street and Upper Grosvenor Street.

### 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.

Day and night-time ambient noise levels measured during the unattended survey are presented in Table 2.

Measured minimum background sound levels are given in Table 3.

The measured levels are free field sound pressure levels.

Table 2 Ambient noise levels measured during the unattended survey

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{Aeq,16h}$ (dB)	$L_{Aeq,8h}$ (dB)
Wednesday 19 January 2022	-	53
Thursday 20 January 2022	56	53
Friday 21 January 2022	56	54
Saturday 22 January 2022	56	51
Sunday 23 January 2022	56	51
Average	56	52

Table 3 Minimum background sound levels measured during the unattended survey

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{A90,15min}$ (dB)	$L_{A90,15min}$ (dB)
Wednesday 19 January 2022		48
Thursday 20 January 2022	51	49
Friday 21 January 2022	50	48
Saturday 22 January 2022	48	48
Sunday 23 January 2022	50	48

<sup>[1]</sup> Measurement not made over full period due to monitoring start and end time.

The lowest background sound levels measured during the survey were  $L_{A90,15min}$  48 dB during the daytime and  $L_{A90,15min}$  48 dB at night.

## 6.3 Basic limits

Based on the above criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 4.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. These have been corrected relative to the measured free-field background sound levels by the addition of 3 dB (as per the guidance provided in BS 8233:2014 Section G.2.1). In this case these limits would apply at residential apartments at 49 South Audley Street.

Table 4 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)
Daytime (07:00-23:00)	41
Night-time (23:00-07:00)	41

<sup>[1]</sup> The limits set out in Table 4 do not include any attention catching features. Attention catching features such as tones or impulsive sounds would incur a further 5 dB penalty in line with Westminster City Council criteria.

## 7 Plant noise assessment

### 7.1 Proposed plant

The proposed plant is comprised of:

- 1 x Helios GBD 710/4 T120 extract fan unit with rooftop extract duct
- 1 x JEHR-0150-B2-M-1 condensing unit serving the cold room
- 1 x JEHR-0150-B2-L-3 condensing unit serving the freezer room
- 1 x Mitsubishi PURY-P450 condensing unit serving the restaurant

The extract fan, cold room and freezer room condensing units will be installed on the southwestern facade of the building as indicated in Figure 3

The condenser unit serving the restaurant will be installed at an external courtyard of the building to the south as indicated in Figure 4.

Noise data for the proposed plant items have been provided by the building services consultant.

Manufacturer's octave band sound pressure levels have been provided for the cold room, freezer room and AC condensing units.

Manufacturer's A-weighted octave band sound power levels have been provided for the extract fan.

A summary of the data is outlined in Table 5.

# SANDY BROWN

Consultants in Acoustics, Noise & Vibration

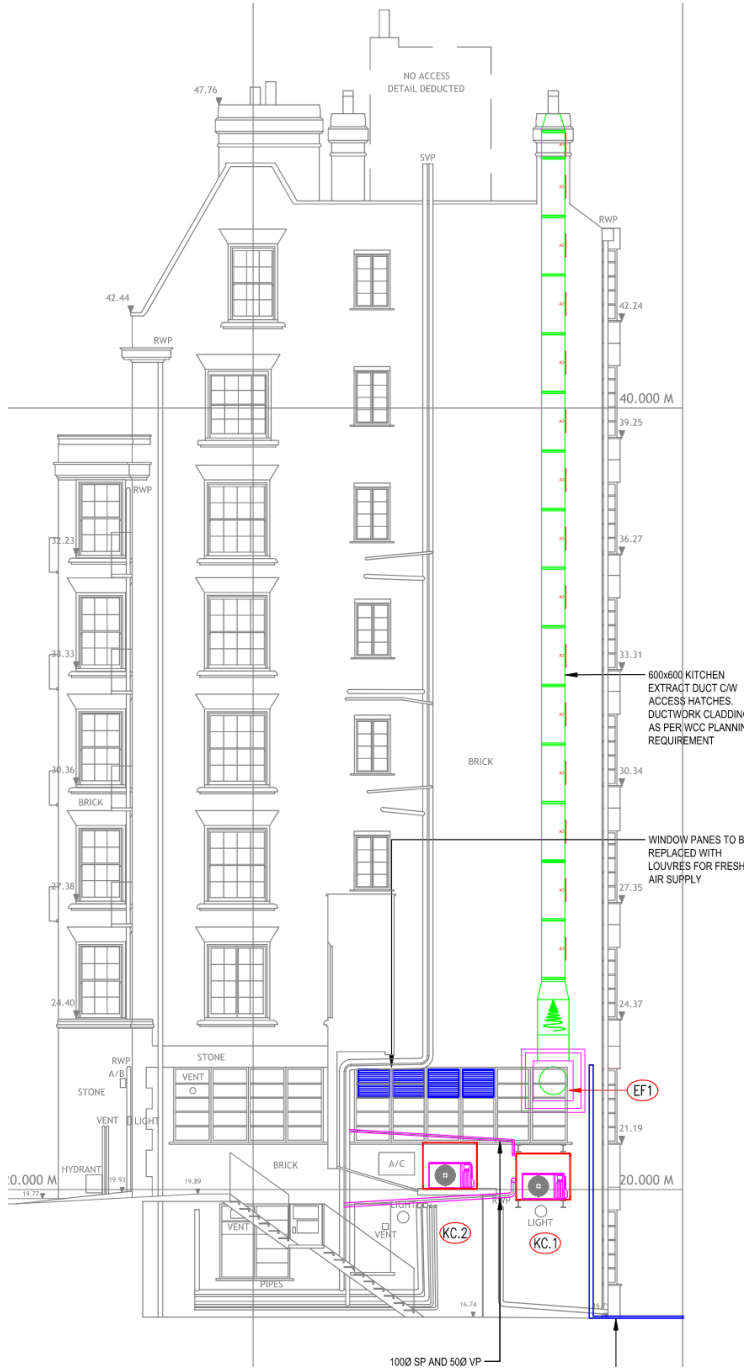


Figure 3 Cold room condenser, Freezer room condenser and extract fan on West facade of 49 South Audley Street

# SANDY BROWN

Consultants in Acoustics, Noise & Vibration

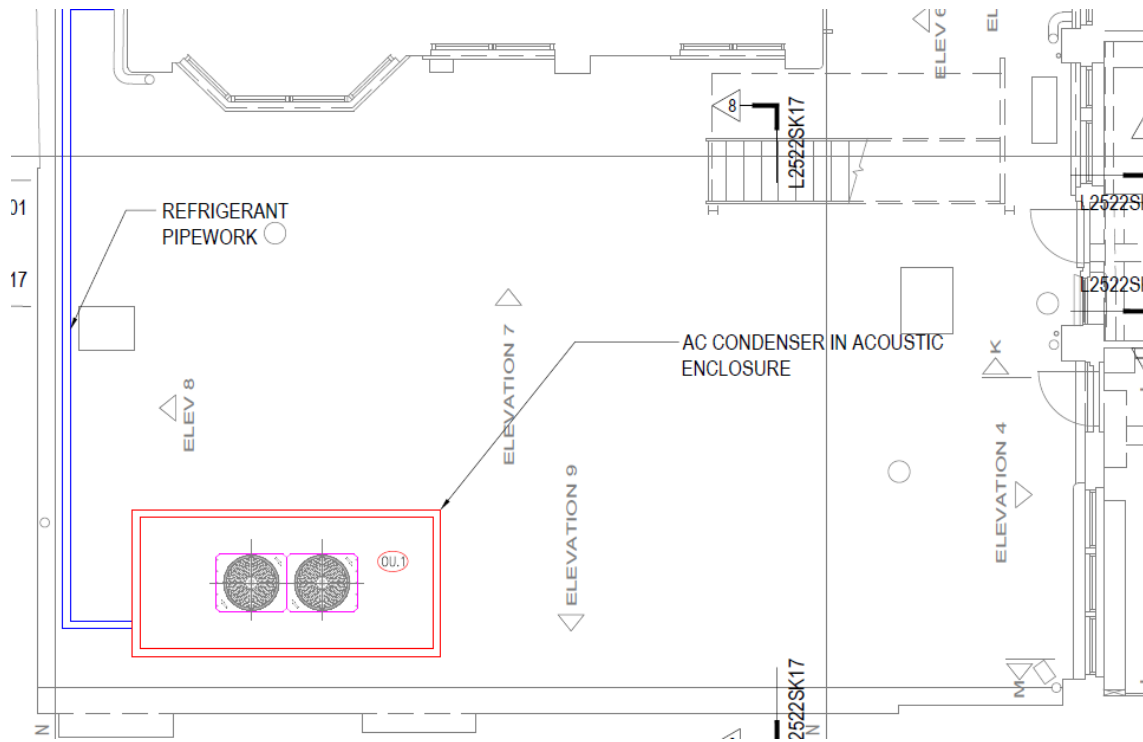


Figure 4 AC condensing unit on internal courtyard to the south of 49 South Audley street

Table 5 Manufacturer's octave band data

Item	Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
<b>Helios extract fan unit</b>									
Case radiated sound power levels, $L_w$ (dB)	-	86	76	68	68	64	63	62	72
Extract sound power levels, $L_w$ (dB)	-	93	87	83	81	81	76	71	87
<b>Cold room condenser – JEHR-0150-B2-M-1</b>									
Sound pressure levels, $L_p$ @1m (dB)	-	58	60	58	49	44	34	32	57
<b>Freezer room condenser – JEHR-022-B2-L-3</b>									
Sound pressure levels, $L_p$ @1m (dB)	-	60	58	60	57	48	44	38	60
<b>AC Condenser – PURY P450</b>									
Sound pressure levels, $L_p$ @1m (dB)	81	65	64	62	55	52	50	46	63

The manufacturer's octave band sound pressure levels have been converted to octave band sound power levels using the 5-sided box calculation methodology.

## 7.2 Calculation methodology

- Noise levels at the nearest noise sensitive receivers have been calculated based on the noise level data shown in Table 5.
- Distance attenuation has been based on the geometric spreading of sound power.
- Screening effects from building mass and screens has been included in the calculation wherever applicable.
- A +3dB correction has been applied at the receptors adjacent to the extract ductwork to account for reflections from the opposing wall.
- A +3 dB facade level correction has been applied at the receptors.
- Tonality corrections have not been applied as it is understood that the noise associated with the plant is not particularly tonal in nature.
- No intermittency or impulsive corrections have been applied on the basis that the plant is expected to operate relatively consistently when operational, rather than having clear on/off states.

## 7.3 Assessment

As a result of the varying location of the plant, assessments of noise impact have been carried out at each residential receptor.

Based on the proposed plant selections and arrangement, noise associated with plant is predicted to exceed the noise limits stated in Table 4. Mitigation is required to achieve the plant noise limits, as detailed to follow.

## 7.4 Mitigation measures

### 7.4.1 Acoustic enclosures

In order to meet noise limits at the nearest noise sensitive receptors all plant must be housed in acoustic enclosures. Minimum insertion losses for the plant selection are set out in Table 6.

Table 6 Minimum insertion losses for acoustic enclosure

Item	Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
<b>Helios extract fan unit</b>								
Minimum insertion loss, (dB)	6	12	15	21	24	27	25	20
<b>Cold room condenser – JEHR-0150-B2-M-1</b>								
Minimum insertion loss, (dB)	5	8	12	16	22	18	15	14
<b>Freezer room condenser – JEHR-022-B2-L-3</b>								
Minimum insertion loss, (dB)	5	8	12	16	22	18	15	14
<b>AC Condenser – PURY P450</b>								
Minimum insertion loss, (dB)	14	16	23	30	30	30	30	30

The acoustic enclosures for the PURY P450 condensing unit will require full acoustic enclosures, such as those available from Environ ([www.environ.co.uk](http://www.environ.co.uk)).

A full enclosure will also be required for the extract fan, however, it is recommended that the manufacturer is consulted regarding a suitable system. Alternatively, a solid panelled enclosure could be provided, such as those available from IAC (<https://www.iacacoustics.global/>) or Allaway Acoustic ([www.allawayacoustics.co.uk](http://www.allawayacoustics.co.uk)).

For the freezer room and cold room condensers insertion loss performances can typically be achieved by an enclosure formed of a 300 mm thick acoustic louvre. Suitable enclosures can be obtained from Environ ([www.environ.co.uk](http://www.environ.co.uk)), IAC (<https://www.iacacoustics.global/>), Allaway Acoustic ([www.allawayacoustics.co.uk](http://www.allawayacoustics.co.uk)) or Caice ([www.caice.co.uk](http://www.caice.co.uk)).

### 7.4.2 Rooftop extract duct

Mitigation measures are also required for the extract duct of the kitchen extract fan. To meet noise limits at the nearest noise sensitive receptor an attenuator on the atmosphere side of the fan needs to achieve the minimum insertion losses specified in Table 7. Regenerated noise will need to be controlled such that the sound power levels in Table 7 are not exceeded.

Table 7 Minimum insertion losses for kitchen extract fan extract duct

Item	Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Minimum insertion loss, (dB)	12	19	31	36	40	27	22	16
Maximum regenerated sound power level, $L_w$ (dB)	46	42	45	43	45	49	44	37

The required insertion losses can typically be achieved by an attenuator 1500 mm in length.

In addition, the full length of the vertical duct will need to be lagged with acoustic lagging containing a mass barrier compatible with a minimum surface mass of 5 kg/m<sup>2</sup>, compatible with a Sound Reduction Index (SRI) of 25 dB. A suitable duct lagging is [Muftilag SP25](#).

## 8 Conclusion

A noise survey has been carried out at the site. The noise sources at the site were noted as traffic on South Audley Street, construction on Mount Street and Upper Grosvenor Street and aircraft arriving and departing from London City Airport.

The representative background sound levels from the noise survey were  $L_{A90,15min}$  48 dB during the day, and  $L_{A90,48min}$  48 dB during the night.

Based on the requirements of the Westminster City Council, the relevant plant noise limits at the worst affected existing noise sensitive premises are  $L_{Aeq}$  41 dB during the day, and  $L_{Aeq}$  41 dB during the night. These have been corrected relative to the measured free-field background sound levels by the addition of 3 dB (as per the guidance provided in BS 8233:2014 Section G.2.1).

These limits are cumulative and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be 5 dB more onerous.

An assessment of the proposed plant items associated with the development has been carried out. Provided the recommended mitigation measures are incorporated within the design, the proposed plant items are expected to comply with the relevant noise limits.



# SANDY BROWN

*Consultants in Acoustics, Noise & Vibration*

## Appendix A

### Survey details

## Equipment

The unattended measurements were taken using a Rion NL 52 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	NL-52/00264531	Rion	5 Jul 24	TCRT22/1430
Microphone	UC-59/09678	Rion	5 Jul 24	TCRT22/1430
Pre-amp	NH-25/64656	Rion	5 Jul 24	TCRT22/1430
Calibrator	NC-75/35013664	Rion	5 Jul 24	TCRT22/1427

[1] Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meter 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 BS7445: 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  $-8^{\circ}\text{C}$  at night and  $8^{\circ}\text{C}$  during the day, and the wind speed was less than 4 m/s. Occasional rain showers occurred throughout the survey however the survey duration was sufficiently long to include periods unaffected by adverse weather and no variation in noise levels was seen to correlate with the weather. These measurements are consequently considered to have obtained a representative sample of noise data.

## Appendix B

### Results of unattended measurements at Location L

# SANDY BROWN

Consultants in Acoustics, Noise & Vibration

## 49 South Audley Street

Results of noise logging survey at unattended monitoring location L  
19 January 2023 to 24 January 2023

