SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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182-184 High Holborn, London WC1

Acoustic planning report

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Version	Date	Comments	Author	Reviewer
A	25 Aug 16		Jose M. Gonzalez	Andrew Long
B	30 Aug 16	Minor amendments	Jose M. Gonzalez	Helen Sheldon

Summary

Sandy Brown Associates LLP (SBA) has been commissioned by High Holborn Investment Ltd to provide acoustic advice in relation to the proposed development at 182-184 High Holborn, London,WC1.

An environmental noise survey has been carried out to determine the existing background and ambient sound levels in the area and setting appropriate plant noise limits in line with the requirements of London Borough of Camden.

The noise survey was performed between 12:30 on 4 August 2016 and 13:30 on 4 August 2016.

The environmental noise survey consisted of unattended long term noise monitoring and attended measurements that were used to supplement the long term monitoring.

Weekday measurement results are summarised as:

- To the north of the site the representative background sound levels were considered to be:
  - $L_{A90,15min}$ 60 dB during the daytime
  - $L_{A90,15min}$ 57 dB during the evening
  - $L_{A90,15min}$ 53 dB at night.
- To the south of the site the representative background sound levels were considered to be:
  - $L_{A90,15min}$ 58 dB during the daytime
  - $L_{A90,15min}$ 56 dB during the evening
  - $L_{A90,15min}$ 53 dB at night.

Weekend measurement results are summarised as:

- To the north of the site the representative background sound levels were considered to be:
  - $L_{A90,15min}$ 57 dB during the daytime
  - $L_{A90,15min}$ 57 dB during the evening
  - $L_{A90,15min}$ 54 dB at night.
- To the south of the site the representative background sound levels were considered to be:
  - $L_{A90,15min}$ 56 dB during the daytime
  - $L_{A90,15min}$ 56 dB during the evening
  - $L_{A90,15min}$ 53 dB at night.

Based on the requirements of London Borough of Camden 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 5 dB below the representative background noise level in the vicinity during the daytime, evening and during the night. These limits are cumulative, and apply with all plant operation 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.

The proposed plant items have been assessed in relation to noise egress and attenuation measures have been recommended.

An initial facade sound insulation assessment has been carried out to determine the required acoustic performance of the facade, and provide guidance on the ventilation strategy. Based on the measured external noise levels and the required indoor ambient noise levels in office accommodation, guidance on example glazing configurations and ventilation strategies capable of meeting the facade sound insulation requirements are provided.

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1 Introduction

Sandy Brown Associates LLP (SBA) has been commissioned by High Holborn Investment Ltd to provide acoustic advice in relation to the proposed development at 182-184 High Holborn, London, WC1.

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.

The background sound levels measured are used as the basis for setting limits for noise emission from proposed building services plant in accordance with the requirements of London Borough of Camden.

This report presents the survey method, results of the environmental noise survey, a discussion of acceptable limits for noise emission from new building services plant, an assessment of the noise egress levels from the proposed plant items and minimum sound insulation requirements for the building envelope.

2 Site description

2.1 The site and its surrounding

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

182-184 High Holborn is located within the London Borough of Camden.

The building is bound by High Holborn to the north, Smart's Place to the east, Stukeley Street to south and the rear facades of buildings on Stukeley Street and High Holborn to the west.

Figure 1 Site map (courtesy of Google Earth Pro)

2.2 Adjacent premises

The site is located in a mixed-use area, with residential apartments, hotel office accommodation and commercial units close by. An educational building is also close to the site, with the Language school at 16 Stukeley Street shown in red in Figure 1.

The nearest residential dwellings are understood to be the apartments at 10 Stukeley Street, located approximately 13 m to the south of the site. This is highlighted in blue in Figure 1. Other residential dwellings are located at 185 Drury Lane approximately 35 m to the south west, and 187, 189 and 191 Drury Lane approximately 50 m to the south west. These are highlighted in brown respectively in Figure 1.

The Parker Place Travelodge is located approximately 90 m to the North West, and highlighted in orange in Figure 1.

In addition, there are office accommodations close to site: 190 High Holborn approximately 9 m to the east and the adjacent building 181A High Holborn to the west. These are highlighted in light blue and green respectively in Figure 1. There is an undergoing refurbishment at the Commonwealth House at 1 New Oxford Street and the building adjacent to the west, these are considered to be future noise sensitive premises and are highlighted in pink in Figure 1. There is a terrace on the roof top of an office building at 15 Stukeley Street. This is highlighted in purple in Figure 1.

3 Method

Details of the equipment used, the noise indices and the weather conditions during the survey are provided in Appendix A. Further information on the specific survey method is provided in this section.

3.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 5 days to determine the existing background sound levels in the vicinity of nearby noise sensitive premises.

The unattended measurements were performed over 15 minute periods between 12:30 on 4 August 2016 and 13:30 on 9 August 2016 at Position A and between 13:15 on 4 August 2016 and 14:00 on 9 August 2016 at Position B. These positions are indicated in Figure 1.

The equipment was installed by Francis Goodall and James Thurston and collected by James Thurston.

At Position A the microphone was on the roof top of the west facade of the building, and had an unobstructed view of Smart's Place and Stukeley Street. The microphone was extended approximately 1.2 m above the roof top and approximately 25 m above the local ground level.

At Position B the microphone was on the roof top of the north faced of the building, and had an unobstructed view of High Holborn. The microphone was extended approximately 2 m above the roof top and approximately 23m above the local ground level.

Photographs showing the unattended measurement locations are provided in Figure 2.

Figure 2 Measurement positions of the unattended measurements, Position A (Left), Position B (right)

These locations were chosen because the acoustic conditions were considered to be reasonably representative of those experienced at the nearest noise sensitive premises, and also to provide an understanding of the noise levels likely to be incident on the facades of the proposed building.

3.2 Attended measurements

Daytime attended sample measurements were performed by James Thurston at three locations around the proposed site. These are indicated in Figure 1 as positions 1 to 3. The attended measurements were carried out between 11:30 and 13:30 on 9 August 2016, over 15 minute periods, with the purpose of determining the existing noise levels from road traffic, pedestrians and other significant noise sources in the area.

For positions 1 and 2 measurements were undertaken at 1 m from existing building facades. For position 3 measurements were undertaken at least 3 m from any other reflective surface.

For all measurements the microphone was positioned on a tripod approximately 1.5 m above ground level.

4 Measurement results

4.1 Observations

The dominant noise sources observed at the site during the survey consisted of road traffic and construction works from the development of the Commonwealth House and the adjacent building to the west.

Less significant noise sources included pedestrians passing by, occasional car horn and car door slams.

4.2 Unattended measurement results

The results of the unattended noise measurements are summarised in the following tables. A graph showing the results of the unattended measurements is provided in Appendix B.

4.2.1 Position A

The day and night time ambient noise levels measured during the unattended survey at Position A are presented in Table 1.

Table 1 Ambient noise levels measured during the survey at Position A

Date	Daytime (07:00 – 19:00) $L_{Aeq,12h}$ (dB)	Evening (19:00 – 23:00) $L_{Aeq,4h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 4 August 2016	63*	57	55
Friday 5 August 2016	63	58	55
Saturday 6 August 2016	62	58	55
Sunday 7 August 2016	58	57	55
Monday 8 August 2016	66	57	55
Tuesday 9 August 2016	67*	-	-
Average	62	57	55

* Measurement not made over full period due to monitoring start and end time (the measurement on 4 August 16 was over 6.5 hours, and on 9 August 16 over 6.25 hours); not included in the average.

The representative background sound levels measured during the unattended survey are given in Figure 2.

Table 2 Representative background sound levels measured during the survey at Position A

Day	Daytime (07:00 – 19:00) $L_{A90,15min}$ (dB)	Evening (19:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Weekday	58	56	53
Weekend	56	56	53

4.2.2 Position B

The day and night time ambient noise levels measured during the unattended survey at Position B are presented in Table 3.

Table 3 Ambient noise levels measured during the survey at Position B

Date	Daytime (07:00 – 19:00) $L_{Aeq,12h}$ (dB)	Evening (19:00 – 23:00) $L_{Aeq,4h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 4 August 2016	69*	61	60
Friday 5 August 2016	69	62	60
Saturday 6 August 2016	69	61	60
Sunday 7 August 2016	61	60	59
Monday 8 August 2016	72	62	60
Tuesday 9 August 2016	75*	-	-
Average	68	61	60

* Measurement not made over full period due to monitoring start and end time (the measurement on 4 August 16 was over 5.75 hours, and on 9 August 16 over 6.75 hours); not included in the average.

The representative background sound levels measured during the unattended survey are given in Table 4.

Table 4 Representative background sound levels measured during the survey at Position B

Day	Daytime (07:00 – 19:00) $L_{A90,15min}$ (dB)	Evening (19:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Weekday	60	57	53
Weekend	57	57	54

4.3 Attended measurement results

The sound pressure levels recorded during the attended measurements are summarised in Table 5. The dominant noise sources noted during the measurements are also described in Table 5. All the attended measurements were performed over 15 minute periods.

Table 5 Sound pressure levels from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
A	11:30	73	90	66	Road traffic on High Holborn, construction works (including hammering and saw cutting), pedestrians passing by talking
	12:31	78	108*	70	As above plus loud van delivery (including door slams and unloading), L_{Amax} caused by a door slam.
B	12:00	70	86	65	Distant road traffic on High Holborn, distant construction works (including hammering and saw cutting), pedestrians passing by talking, occasional car passing by Smart's Place.
	12:46	68	86	63	
C	12:15	66	88	60	Distant road traffic, car horn, distant construction works, distant undetermined drop, pedestrians, car door slams.
	13:15	67	87	62	

5 Assessment criteria

5.1 External noise levels – noise egress

5.1.1 Standard guidance

Guidance for noise emission from proposed new items of building services plant is given in BS 4142: 2014 '*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 the nearest noise sensitive.

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 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.

5.1.2 Local Authority criteria

London Borough of Camden requirements relating to noise emissions from building services are given in the DP28- Table E of the Development Policy adoption version 2010 document, which is reproduced in Table 6.

Table 6 London Borough of Camden plant noise emission limits taken from Table E of DP28

Noise description and location of measurement	Period	Time	Noise Level
Noise at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	5 dB < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive facade.	Day, evening and night	0000-2400	10 dB < L_{A90}
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	10 dB < L_{A90}
Noise at 1 metre external to a sensitive facade where L_{A90} >60 dB	Day, evening and night	0000-2400	$L_{Aeq,T}$ 55 dB

5.1.3 Emergency (life safety) plant limits

The London Borough of Camden's DP28 does not specifically reference dedicated life safety plant (eg smoke extract fans). However, on other projects it is understood that a limit of 5 dB higher than the standard plant limits has been accepted. It may be necessary to review this with the London Borough of Camden's Environmental Health department depending on the requirements of any related planning conditions.

5.2 Internal noise levels - noise ingress

5.2.1 BS 8233:2014

Guidance on acceptable internal noise levels is given in BS 8233:2014 *Guidance on Sound insulation and noise reduction for buildings* and the appropriate criteria from it are summarised in Table 7.

Table 7 Internal noise criteria for offices from BS 8233:2014

Internal space	Design range for indoor ambient noise level L_{Aeq} (dB)
Executive office	35-40
Staff room	35-45
Meeting room	35-45
Training room	35-45
Open plan office	45-50

5.2.2 BCO 2014

The guidance given by British Council for Offices (BCO) Guide to Specification 2014 for external noise intrusion is summarised in Table 8.

Table 8 BCO 2014 recommended internal noise levels due to external noise ingress

Internal space	Indoor ambient noise rating
Open plan office	NR 40
Speculative office	NR 38
Cellular office	NR 35
Meeting rooms	NR 35

5.2.3 Recommended internal ambient noise level due to external noise

It is understood that the building is to comprise speculative open plan office space and therefore, based on the guidance in BS 8233:2014 and BCO, a target noise criterion of L_{Aeq} 40 dB is recommended for environmental noise ingress to the offices.

5.3 Noise egress limits

5.3.1 Basic limits

Section 4 summarizes the measured background noise level around the proposed development. Based on the DP28 criteria and the background noise measurements, the cumulative noise levels resulting from the operation of all new plant at 1 m from the worst affected window of the nearest noise sensitive premises have been set.

5.3.2 Noise sensitive receptors along High Holborn

The plant noise levels at the noise sensitive properties located along High Holborn are not to exceed those presented in Table 9.

Table 9 Plant noise limits at 1 m from the nearest noise sensitive receptor along High Holborn

Day	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
	L_{Aeq} (dB)	L_{Aeq} (dB)	L_{Aeq} (dB)
Weekday	55	52	48
Weekend	52	52	49

5.3.3 Noise sensitive receptors along Smart's Place

The plant noise levels at the noise sensitive properties located along Smart's Place are not to exceed those presented in Table 10.

Table 10 Plant noise limits at 1 m from the nearest noise sensitive receptor along Smart's Place

Day	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
	L_{Aeq} (dB)	L_{Aeq} (dB)	L_{Aeq} (dB)
Weekday	53	51	48
Weekend	51	51	48

5.3.4 Noise sensitive receptors along Stukeley Street

The plant noise levels at the noise sensitive properties located along Stukeley Street are not to exceed those presented in Table 11.

Table 11 Plant noise limits at 1 m from the nearest noise sensitive receptor along Stukeley Street

Day	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
	L_{Aeq} (dB)	L_{Aeq} (dB)	L_{Aeq} (dB)
Weekday	53	51	48
Weekend	51	51	48

5.3.5 Noise sensitive receptor at rear facade of 181 High Holborn

The plant noise levels at the noise sensitive properties located at the rear facade of 181 High Holborn are not to exceed those presented in Table 12.

Table 12 Plant noise limits at 1 m from the nearest noise sensitive receptors at the rear facade of 181 High Holborn

Day	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
	L_{Aeq} (dB)	L_{Aeq} (dB)	L_{Aeq} (dB)
Weekday	53	51	48
Weekend	51	51	48

5.3.6 Corrections for attenuation catching features

The limits set out in Table 9 to Table 12 do not include any attention catching features. If the selected plan is tonal the proposed plant noise limits will need to be reduced by 5 dB, ie a more stringent limit will need to be met.

5.4 Assessment

5.4.1 Proposed plant items

The proposed plant is to be located on the rooftop of 182-184 High Holborn, London, WC1. The number of proposed units along with the noise data received for each of the proposed units are presented in Table 13.

Table 13 Noise data and proposed number of units

Number of units	Plant unit	L_w (dB)
3	Panasonic U-10MF2E8	74
2	Panasonic U-12ME1E81	76
7	Panasonic U-12MF2E	76
2	Panasonic U-20ME1E81	78
6	Panasonic U-8MF2E8	72
2[1]	-	-

[1]Smoke ventilation fans are proposed in the development, however no noise data have been received.

The above noise levels are understood to be for the plant units running at the required duty.

The proposed location for the above items of plant are shown in Figure 3.

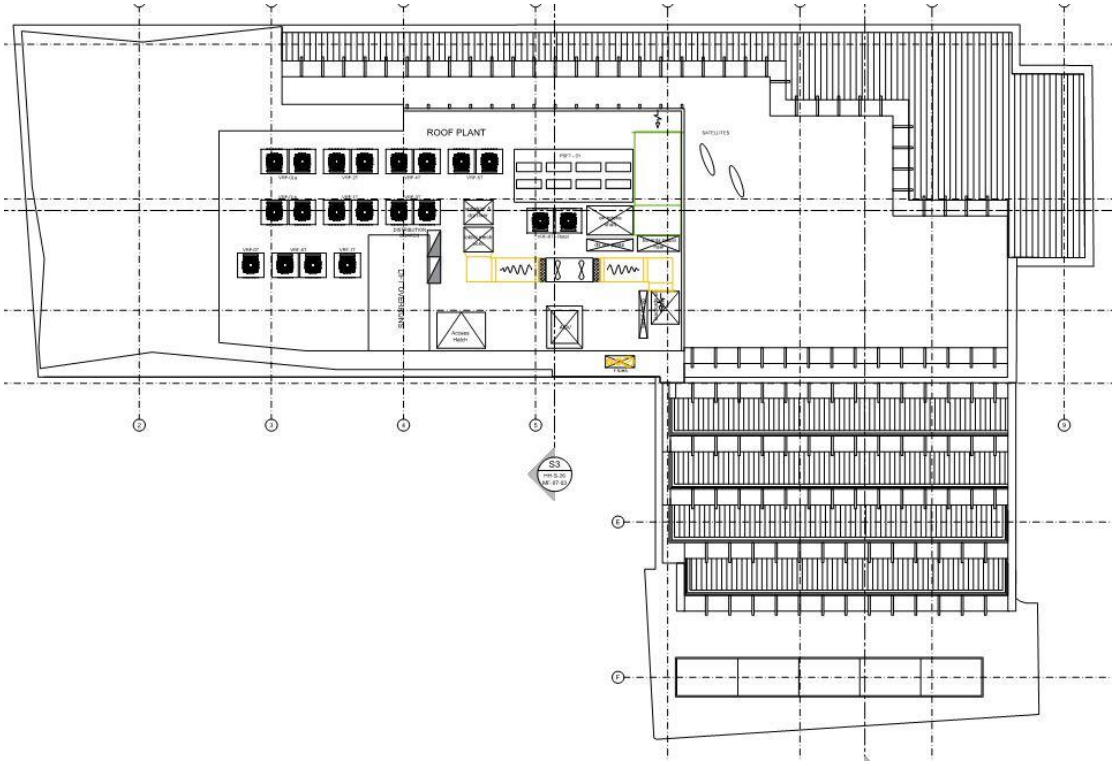


Figure 3 Location of the proposed plant units on the rooftop of 182-184 High Holborn

5.4.2 Predicted noise rating level

Calculations have been carried out to determine the noise level from the proposed plant items. The calculation takes into consideration the following:

- Attenuation due to distance.
- Attenuation due to screening presented by the building edge.
- Assumption that the proposed units are only required to operate during the day time between 07:00 -23:00, and that the noise generated neither contains tonal elements nor is impulsive.
- At this stage the exact location of each individual item of plant is not known, and calculations are based on the overall sound power level calculated from individual units. This assessment may be reviewed as the design progresses
- The calculations take into account that the plant units radiate hemi-spherically and also include a 3 dB facade correction for reflections at the nearest noise sensitive receptor.

The predicted noise egress level from the proposed plant items at the most affected residential window at 10 Stukeley Street meets the criteria for day, evening and night time. However, the predicted noise levels from the proposed plant items at the most affected office building at 190 High Holborn exceed the criteria by 7 dB.

5.4.3 Proposed mitigation measures

To ensure the London Borough of Camden day time noise egress criteria are achieved, one of the following mitigation measures could be adopted :

1. Provide a localised solid screen located no more than 1 m from the plant unit arrays and at least 2.3 m high from roof top level. The screen should be constructed with a minimum mas per unit area of at least 15 kg/m^2 and have a sound absorbent finish to the plant side of α_w ≥0.8 to minimise any reflections.
   The continuous screen would need to horizontally extend at least 0.6 m to the north side of the unit arrays and at least 0.8 m to the south side of the unit arrays.

Figure 4 shows the recommended screen location and extension to the plant unit arrays.

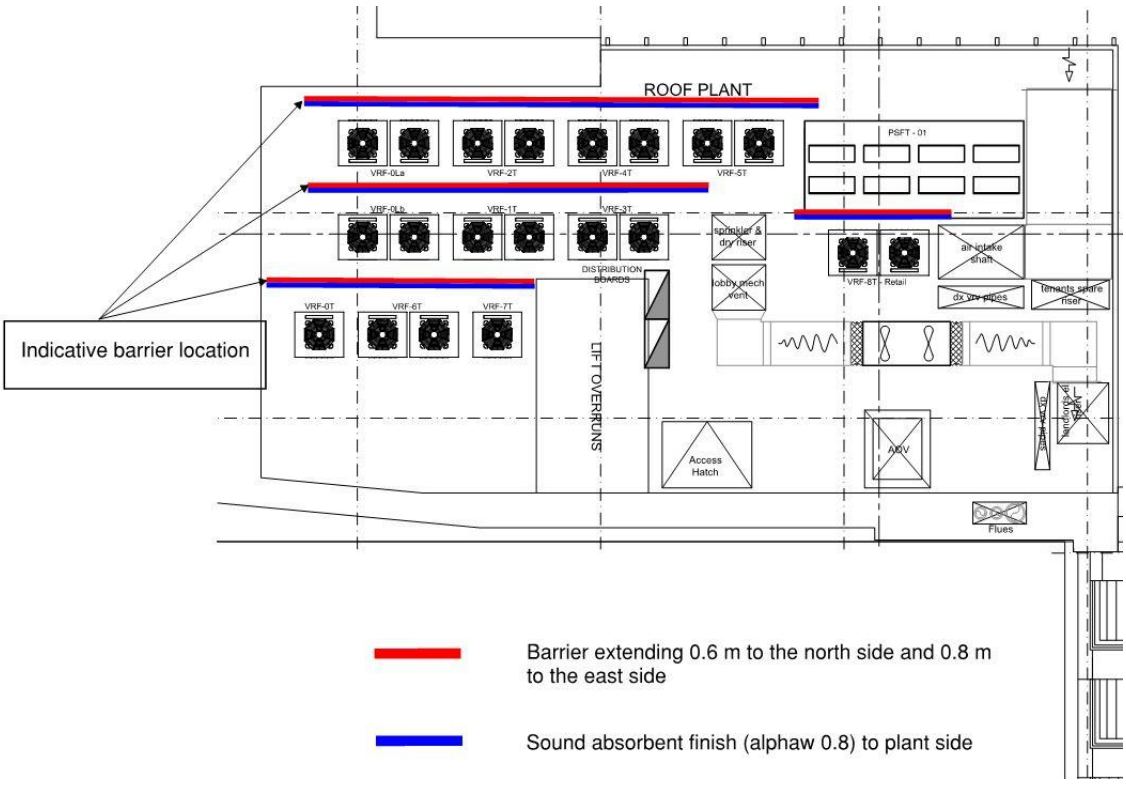


Figure 4 Excerpt from drawing HH-S20-08-09-01 rev S1 showing the recommended indicative screen location to plant unit arrays

2. Re-selection of the proposed plant units for quieter ones.
3. Provide with an acoustic enclosure capable of reducing noise egress to some units. Suitable products capable of achieving the required minimum insertion loss will be reviewed once the exact location of each unit is clarified.

5.4.4 Rooftop emergency plant

Two smoke extract fan units are proposed at the roof top level for emergency plant. At this stage there is no acoustic information in relation to the proposed emergency plant units.

Proposed emergency plant noise limits have been set out in Table 14 outside nearby noise sensitive premises.

Table 14 Emergency plant limits at 1 m from nearby noise sensitive premises

Time of day	Maximum sound pressure level (dB)	
	At noise sensitive receptors to the north of the site	At noise sensitive receptors to the west, east and south of the site
Daytime (07:00 - 19:00)	57	56
Evening (19:00 - 23:00)	57	56
Night-time (23:00 - 07:00)	54	53

Recommended localised limits at 1 m from each atmospheric emergency termination have been set in Table 15.

Table 15 Localised limits at 1 m for each atmospheric emergency plant termination

Location	Maximum sound pressure level limit at 1 m from each termination L_{Aeq} (dB)
Flue termination (rooftop) each	75
Fan intake (rooftop)	70
Fan exhaust (rooftop)	73

6 Facade sound insulation- noise ingress

This section discusses internal noise level criteria and assesses the required facade sound insulation performance.

6.1 External noise levels

Based on the results of the environmental noise survey detailed in Table 5, external noise levels at each facade of the proposed development during day time (07:00 - 23:00) are presented in Figure 5. A key to the predicted facade noise level zones is provided in Table 16.

Table 16 Day time external facade level at proposed facade zones

Facade zone (refer to Figure 5)	External noise level, L_{Aeq} (dB)
A	73
B	70
C	62

On this basis, the predicted external noise levels at the facades of the proposed development are set out and shown in Figure 5 for the day time.

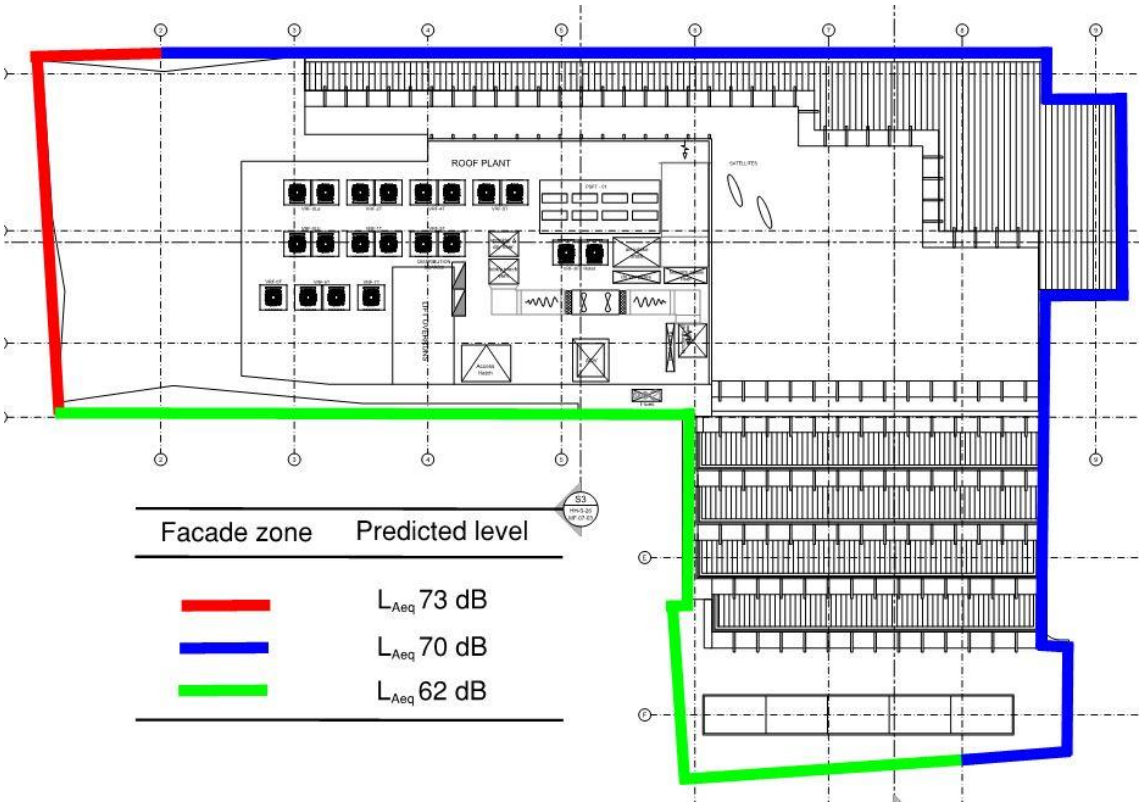


Figure 5 Day time predicted facade noise levels

6.2 Facade sound insulation

In principle, the required facade specification depends on two factors – the external noise levels at the site (refer to Section 6.1) and the internal noise criteria (refer to Section 5.2.3).

The minimum overall sound insulation requirements for the different facade zones are provide in Table 17.

Table 17 Facade sound insulation performance requirements

Facade zone	Overall sound insulation performance R'_w+C_{tr} (dB)
A	33
B	30
C	22

6.3 Guidance on facade construction, glazing, and ventilation strategy

Table 18 sets out some examples of glazing build ups and ventilation strategies that could be employed to achieve the required sound insulation performance for the various elevations.

Table 18 Example glazing configurations and ventilation strategies

Sound insulation R_w+C_{tr} (dB)	Example glazing configuration	Ventilation Strategy [1]
30-33	6.4 mm laminate glazing/12 mm air-space/10 mm glazing	High performance acoustically attenuated passive ventilation

[1] If natural ventilation is required. It is understood that the building may be mechanically ventilated.

The performance required by each element will depend on the construction of the solid elements, the glazing specification, the relative areas of the solid and glazed elements, and the ventilation strategy (including the acoustic performance of the trickle ventilators and the number of ventilators required to serve individual rooms, if applicable).

As the design progresses, a more detailed facade sound insulation assessment may need to be performed, taking into account the factors listed above, to ensure that the overall performance requirements will be met.

7 Conclusion

A noise survey has been carried out to determine the existing background sound levels in the vicinity of the site and surrounding noise sensitive premises.

The results of the measurements have been used to determine limiting noise egress levels for proposed items of building services plant and also to predict noise levels at the facades of the proposed development.

An initial assessment of plant noise emissions has been undertaken and appropriate mitigation measures outlined.

An assessment of the likely required facade sound insulation has also been undertaken.

Appendix A

Survey details

Equipment

A Rion NL-32 and a sound level meter and a Svantek 957 sound level meter were used to undertake the unattended measurements. The attended measurements were carried out using a Svantek 957 sound level meter. The 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	SVAN957/12327	Svantek	2 Nov 17	1511575
Microphone	ACO7052H/43273	Svantek	2 Nov 17	1511575
Pre-amp	SV12L/13569	Svantek	2 Nov 17	1511575
Calibrator	SV30A/7451	Svantek	30 Oct 17	1510572
Sound level meter	SVAN957/12326	Svantek	01 Jul 18	1607402
Microphone	7052E/62919	Svantek	01 Jul 18	1607402
Pre-amp	SV12L/13571	Svantek	01 Jul 18	1607402
Calibrator	SV30A/10931	Svantek	01 Jul 18	1607350
Sound level meter	NL-32/00623769	Rion	05 Oct 17	1510538
Microphone	UC-53A/319244	Rion	05 Oct 17	1510538
Pre-amp	NH-21/36677	Rion	05 Oct 17	1510538
Calibrator	NC-74/34336009	Rion	02 Oct 17	1510531

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

The sound level meters and microphones were calibrated at the beginning and end of the measurements using their respective sound level calibrators. No significant deviation in calibration occurred.

Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. 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 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.

The L_{A90} is considered most representative of the background sound level for the purposes of complying with any local authority requirements.

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

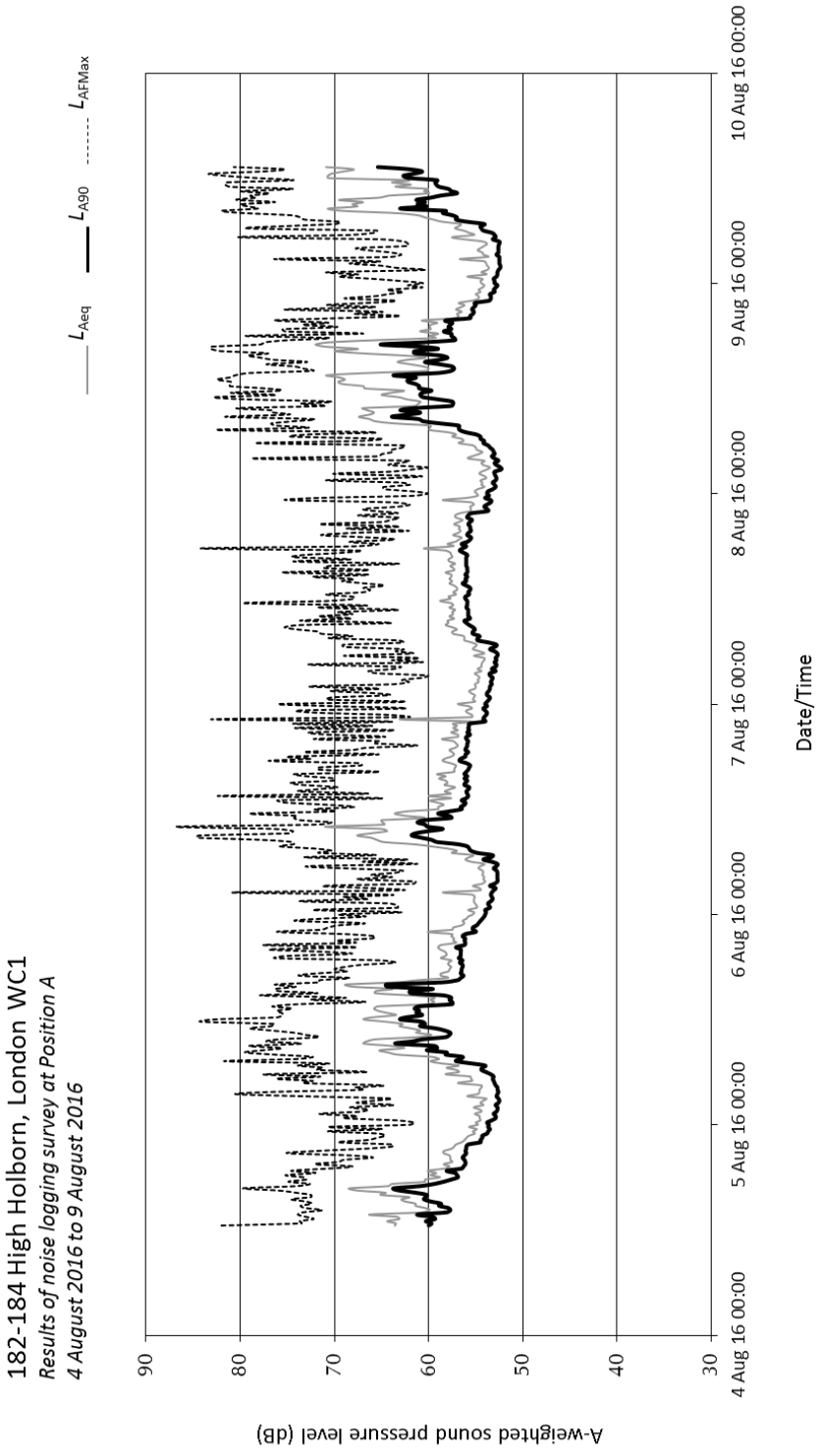
During the attended measurements carried out on 9 August 2016, the weather was clear and dry and no rain occurred. Wind speeds were less than 3 m/s.

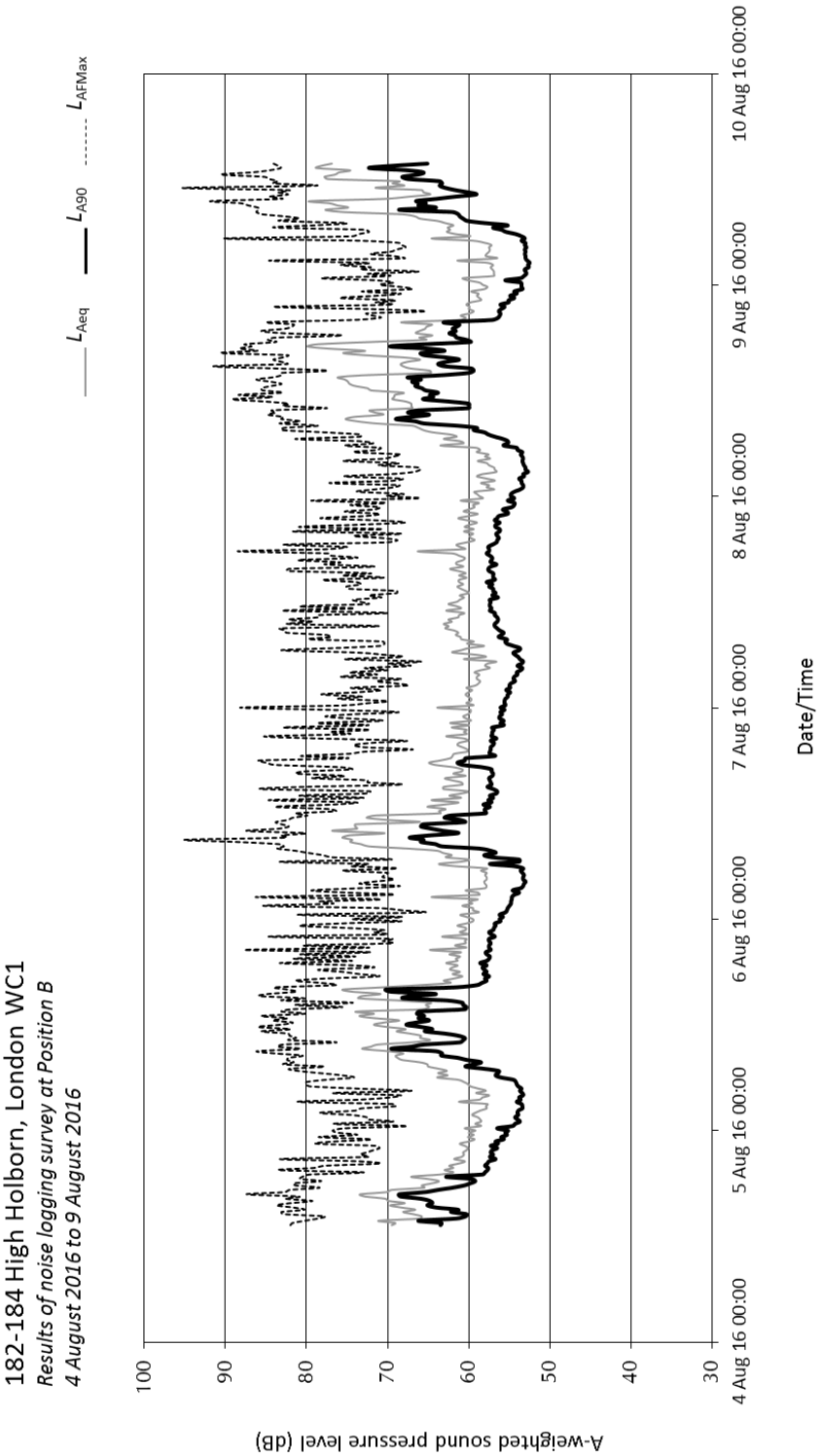
During the unattended noise measurements between 4 August 2016 and 9 August 2016, weather reports for the area indicated that temperatures varied between 10°C at night and 27°C during the day, and the wind speed varied between 2.5 m/s and 6 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Positions A and B


182-184 High Holborn, London WC1
Results of noise logging survey at Position A
4 August 2016 to 9 August 2016
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
90
80
70
60
50
40
30
4 Aug 16 00:00
5 Aug 16 00:00
6 Aug 16 00:00
7 Aug 16 00:00
8 Aug 16 00:00
9 Aug 16 00:00
10 Aug 16 00:00
Date/Time


182-184 High Holborn, London WC1
Results of noise logging survey at Position B
4 August 2016 to 9 August 2016
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
4 Aug 16 00:00
5 Aug 16 00:00
6 Aug 16 00:00
7 Aug 16 00:00
8 Aug 16 00:00
9 Aug 16 00:00
10 Aug 16 00:00
Date/Time