JOHNSON BUILDING
LONDON
EC1N

Plant Noise Assessment

REPORT 6261/PNA
Prepared: 9 July 2014
Revision Number: 3

Bollingbrook LLP
55 Greek Street
London
W1D 3DT

Plant Noise Assessment

THE JOHNSON BUILDING
LONDON
EC1N

REPORT 6261/PNA
Prepared: 9 July 2014

Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	4 June 2014	Paul Taylor	Russell Richardson
1	Included retrospective assessment of existing plant items	3 July 2014	Paul Taylor	Russell Richardson
2	Updated Site Plans	8 July 2014	Paul Taylor	Russell Richardson
3	Amended wording relating to existing plant	9 July 2014	Paul Taylor	Russell Richardson

RBA ACOUSTICS
44 Borough Road
London SE1 0AJ
T. +44 (0) 20 7620 1950
W. www.rba-acoustics.co.uk

Contents

1.0 INTRODUCTION

In order to complete the planning application for the location of two new mechanical services units, for the refurbishment of the 4th, 5th and 6th floors of The Johnson Building, 77 Hatton Garden, London EC1N, the London Borough of Camden requires consideration be given to atmospheric noise emissions from the proposed equipment at the nearest noise-sensitive property.

RBA Acoustics have been commissioned to undertake measurements of the prevailing noise conditions at the site and to determine the atmospheric noise emissions in accordance with Camden Borough Council's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

This report has been revised to also include an assessment of two existing units on the rooftop plant space, which have been installed in connection with the ongoing Grey refurbishment works at the above property. Retrospective planning permission is now being sought for their use.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 General

Monitoring of the prevailing background noise was undertaken between Tuesday 27 May and Wednesday 28 May 2014.

During the survey period there were long periods of light rain, with periods of dry weather in between. Rain was noted not to fall during the early hours in the morning. It is during this time that noise levels are anticipated to be at a minimum. We therefore believe that the minimum background noise levels measured are representative of this location.

Measurements were made of the L_{A90}, L_{AMax} and L_{Aeq} noise levels over sample periods of 15 minutes duration.

2.2 Measurement Location

Measurements were undertaken with the microphone positioned on a short boom attached to railing on a 5th floor terrace to the south-west of the building. The measurement position was considered as being representative of the worst-case (lowest) noise levels as experienced around the building. It was not possible to undertake measurements at roof level, due to noise from existing plant interfering with the background noise measurements on both the north and south side of the roof.

The prevailing noise climate was noted to be quiet as the rear of the building was generally screened from local traffic.

The noise climate as experienced at the nearest residential window on St. Cross Street is likely to be higher than that measured to the rear (south-west) of the building at the measurement location, due to the direct exposure to the road. Our assessment is therefore worst-case, as the difference between the minimum background $L_{A90,15min}$ at the nearest residential window and contribution from the plant noise is only likely to be greater in reality than that reported herein.

The measurement position is also illustrated on the attached Site Plan 6261/SP2.

2.3 Instrumentation

The following equipment was used for the measurements.

Table 6261/T1 – Equipment Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
01dB A&V Type 1 Sound Level Meter	Black Solo 01	65630	01797/2	30 April 2016
01dB A&V Pre Amplifier	PRE 21 S	16254		
Gras ½" Microphone	MCE 212	166570		
01dB-Stell Calibrator	Cal 21	50241574	01797/1	30 April 2016

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed.

3.0 RESULTS

The noise levels at the measurement positions are shown as time-histories on the attached Graphs 6261/G1-2.

In order to ensure a worst case assessment the lowest background L_{A90} noise levels measured have been used in our analyses. The lowest L_{A90} and the period averaged L_{Aeq} dB noise levels measured are summarised below.

Table 6261/T2 – Measured Levels

Measurement Period	Position 1 – South End of The Johnson Building	
	L_{90} (dBA)	L_{eq} (dBA)
Daytime (07:00 – 19:00)	46.9	52.6
Evening (19:00 – 23:00)	44.4	50.5
Night-Time (23:00 – 07:00)	42.7	47.0

4.0 CRITERIA

The general requirements of Camden Council for noise from mechanical plant items are outlined within the LDF *Camden Local Development Framework: Camden Development Policies (2010).* Table E: *Noise levels from plant and machinery at which planning permission will not be granted.* This table is reproduced in Table 5736/T3 for convenience.

Table 6261/T3 – Table E from Camden LDF (2010)

Noise Description and Measurement Location	Period	Time	Noise Level
Noise at 1 metre external to a sensitive façade	Day, evening and night	00:00 – 24:00	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	00:00 – 24:00	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	00:00 – 24:00	10dB(A) <LA90
Noise at 1 metre external to a sensitive façade where LA90>60dB	Day, evening and night	00:00 – 24:00	55dB L_{Aeq}
*As compared to the same measured, from the same position, and over a comparable period, with no entertainment taking place			

Based on information of the proposed units (provided in Table 6261/T4), we conclude that there are no tonal characteristics.

In line with the above requirements and taking our worst-case (minimum measured) night-time $L_{A90,15minute}$ background noise level, we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following levels when assessed at the nearest noise sensitive location (5dB(A) below the minimum $L_{A90,15min}$):

- All Hours (00:00 - 24:00) 38 dB

5.0 ASSESSMENT OF PROPOSED UNITS

Our assessment has been based upon the following information:

5.1 Proposed Air Conditioning Units

1No. Mitsubishi PURY-P400YJM-A (REF: CON/1)
1No. Mitsubishi PUHZ-ZRP35VKA (REF: CON/2)

5.2 Position of Units

The equipment is to be located within the designated rooftop plant area to the north of the building. The equipment positions are indicated on the attached Site Plan 6261/SP1.

5.3 Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the units. The octave band sound pressure levels of the units (at 1m) are detailed as follows:

Table 6261/T4 – Manufacturer's Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
PURY P400 Standard	L_p at 1m	65	64	61	56	53	48	42	39
PUHZ-ZRP35VKA	L_p at 1m	59	51	45	44	40	37	32	31

Review of the octave band data concludes that there are no tonal characteristics associated with the proposed plant.

5.4 Location of Nearest Residential Windows

The closest residential windows to the plant are at the 4th floor level on the opposite side of St. Cross Street, approximately 25m away from the proposed plant location. The nearest residential window is identified on Site Plan 6261/SP2.

5.5 Calculation of Noise Levels at Nearest Residential Window

Our calculation method for predicting noise levels from the proposed mechanical services units at the nearest residential window, based on the information stated above, is summarised below.

- Source Term SPL
- 20LogR Distance Attenuation
- Reflections
- Applicable Screening Losses

Calculation sheets are attached for further information in Appendix B.

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 6261/T5 – Predicted Noise Levels

Nearest residential window (25m from proposed plant location)	
Prediction (dB L_{Aeq})	Criterion (dB L_{Aeq})
29	38

Noise from the two proposed rooftop plant items is predicted to be significantly below the target criteria at the nearest residential window. Additional noise control measures are therefore not required.

6.0 ASSESSMENT OF EXISTING UNITS

We understand that retrospective planning permission is being sought for an additional two existing units on the plant roof space.

6.1 Proposed Air Conditioning Units

1No. Mitsubishi PUHZ-RP100VHA2 (REF: CON/3)
1No. Mitsubishi PUHZ-RP35VHA4 (REF: CON/4)

6.2 Position of Units

The equipment is located within the designated rooftop plant area to the north of the building. The equipment positions are indicated on the attached Site Plan 6261/SP1.

6.3 Noise Levels

Information regarding the noise levels of the existing plant has been provided by the manufacturer of the units. The octave band sound pressure levels of the units (at 1m) are detailed as follows:

Table 6261/T6 – Manufacturer's Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
PUHZ-RP100VHA2 (CON/3)	L_p at 1m	57.5	52	49	48	40.5	40	34	37
PUHZ-ZRP35VKA (CON/4)	L_p at 1m	50.5	54	47	41	42	35	30	29

Review of the octave band data concludes that there are no tonal characteristics associated with the proposed plant.

In order to ensure these existing plant items did not interfere with our background noise level measurements, we have predicted the noise level at the measurement location due to these plant items.

From the information provided by the manufacturer, we predict that noise levels at the measurement location will be negligible (the calculated level is below 0dB) at the measurement location (greater than

40dB below background noise levels). Therefore, noise levels measured during the background noise survey were not influenced by these existing items of plant operating.

6.4 Calculation of Noise Levels at Nearest Residential Window

Our calculation method for predicting noise levels from the existing mechanical services units at the nearest residential window, based on the information stated above, is summarised below.

- Source Term SPL
- 20LogR Distance Attenuation
- Reflections
- Applicable Screening Losses

Calculation sheets are attached for further information in Appendix B.

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 6261/T7 – Predicted Noise Levels

Nearest residential window (25m from proposed plant location)	
Prediction (dB L_{Aeq})	Criterion (dB L_{Aeq})
21	38

Noise from the two existing rooftop plant items is predicted to be significantly below the target criteria at the nearest residential window. The existing plant items assessed should therefore be considered acceptable.

7.0 ASSESSMENT SUMMARY

In summary, the overall noise levels at the nearest residential window due to proposed items of plant and existing items of plant assessed within this report are as follows:

Table 6261/T8 – Predicted Noise Levels

Parameter	Nearest residential window (25m from proposed plant location) Prediction (dB L_{Aeq})	Criterion (dB L_{Aeq})
Proposed Items of Plant	29	38
Existing Items of Plant	21	38
Overall	**30**	**38**

From Table 6261/T8, overall noise levels due to operation of all assessed plant items at the nearest residential window are below the criterion noise level of 38dB L_{Aeq} and should therefore be considered acceptable.

8.0 CONCLUSION

Measurements of the existing background noise levels at The Johnson Building, London EC1N have been undertaken. The results of the measurements have been used in order to determine the required criteria for atmospheric noise emissions from the future plant installations.

The results of the assessment indicate atmospheric noise emissions from the proposed and existing plant are within the criteria required by the London Borough of Camden. As such, the proposed and existing plant installations should be considered acceptable with respect to atmospheric noise emissions.

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g L_{A10}, L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B – Plant calculations

Received Noise Levels Summary

Unit	Predicted Receive Levels at Nearest Residential Window on St. Cross Street
Proposed Plant Items	
PURY P400 Standard	29
PUHZ-ZRP35VKA	16
Total Received Level for Proposed Plant (dBA)	29
Existing Plant Items	
PUHZ-RP100VHA2	19
PUHZ-ZRP35VKA	16
Total Received Level for Existing Plant	21
Total Received Level	**30**

Predicted Noise Levels Example Calculation

Unit	Lp @ 1m (dB)	Reflections (dB)	Distance Loss (25m) (dB)	Applicable Screening Loss (dB)	Received Level (dBA)
PURY P400 Standard	46	+3	-28	-5	16

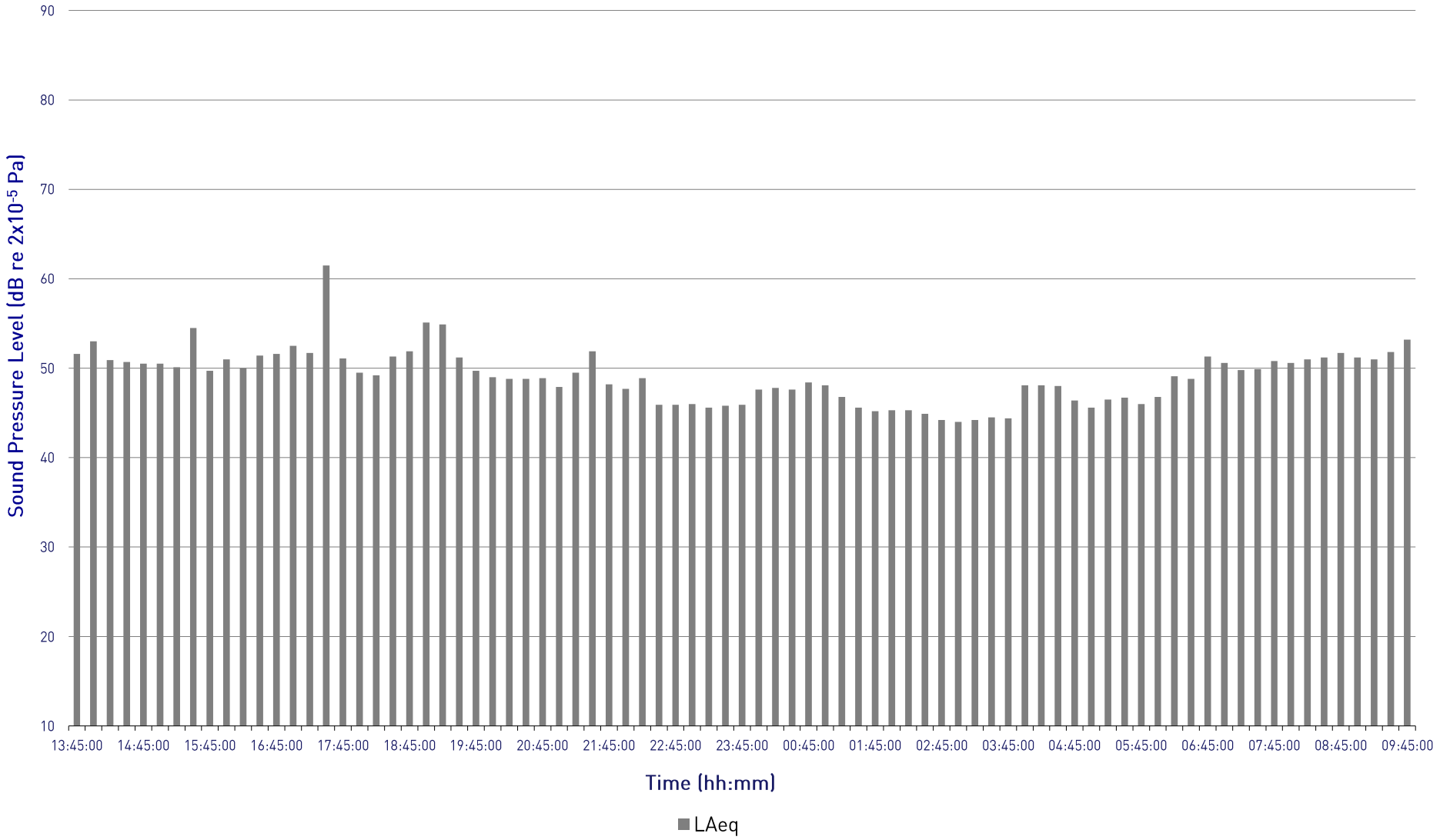
The Johnson Building

L_{Aeq} Time History

Measurement Position 1, Tuesday 27th May 2014 to Wednesday 28th May 2014

RBA ACOUSTICS

Graph 6261/G1



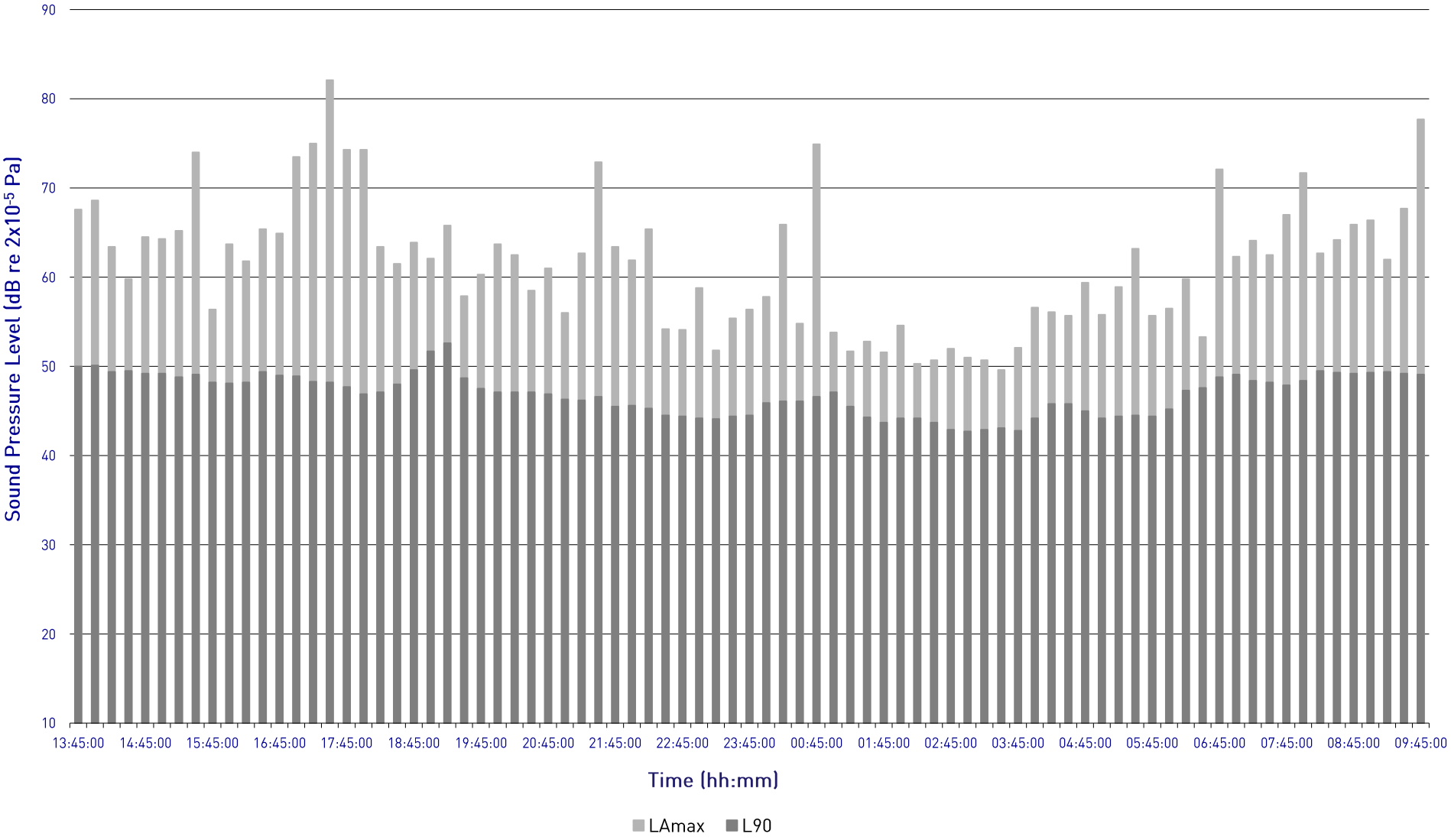
The Johnson Building

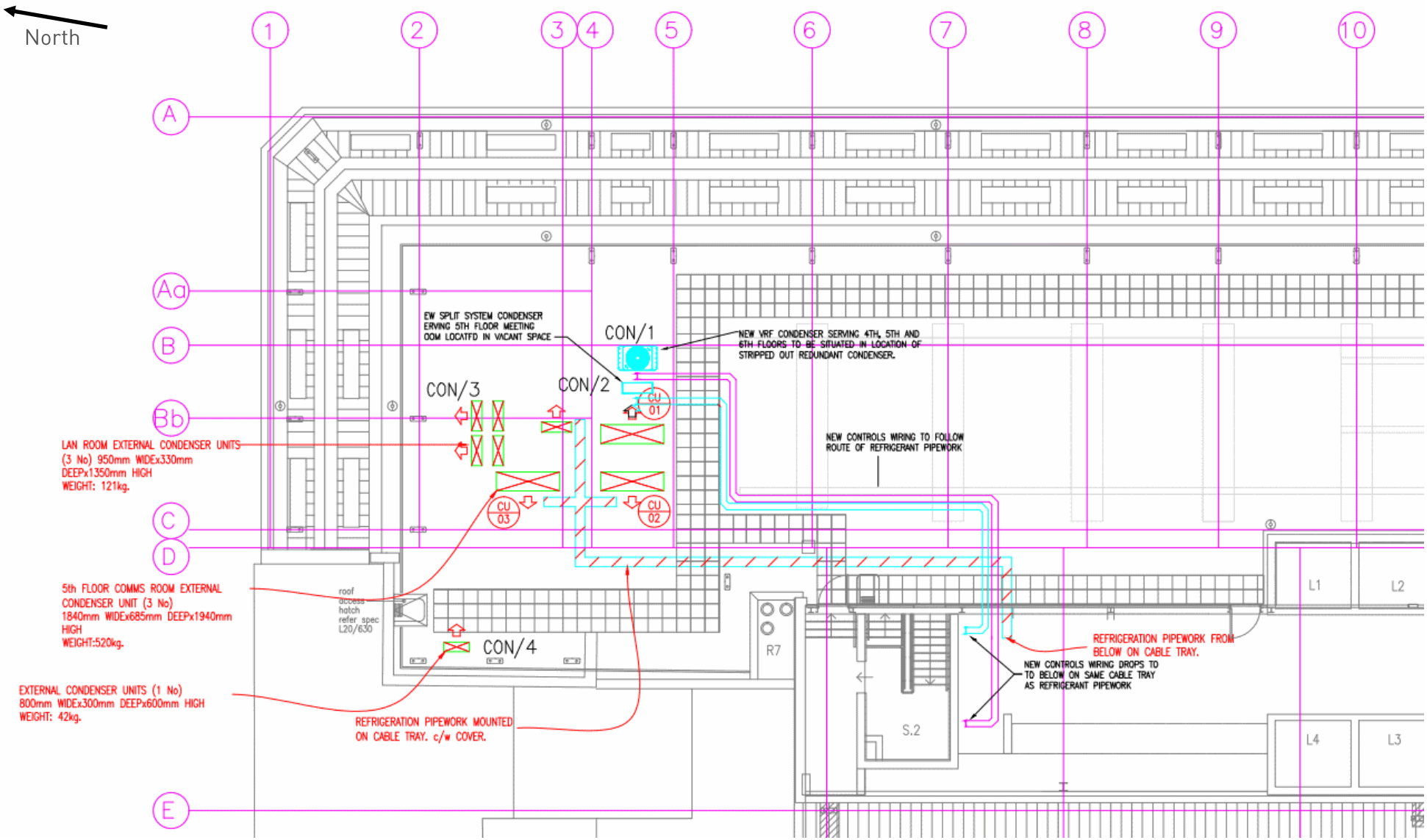
L_{Amax} and L_{A90} Time History

Measurement Position 1, Tuesday 27th May 2014 to Wednesday 28th May 2014

RBA ACOUSTICS

Graph 6261/G2





The Johnson Building

Site Plan Indicating Existing and Proposed Plant Locations

(Extract from CLS Surveys Proposed Roof Plan, Rev F0, Dated June 2014)

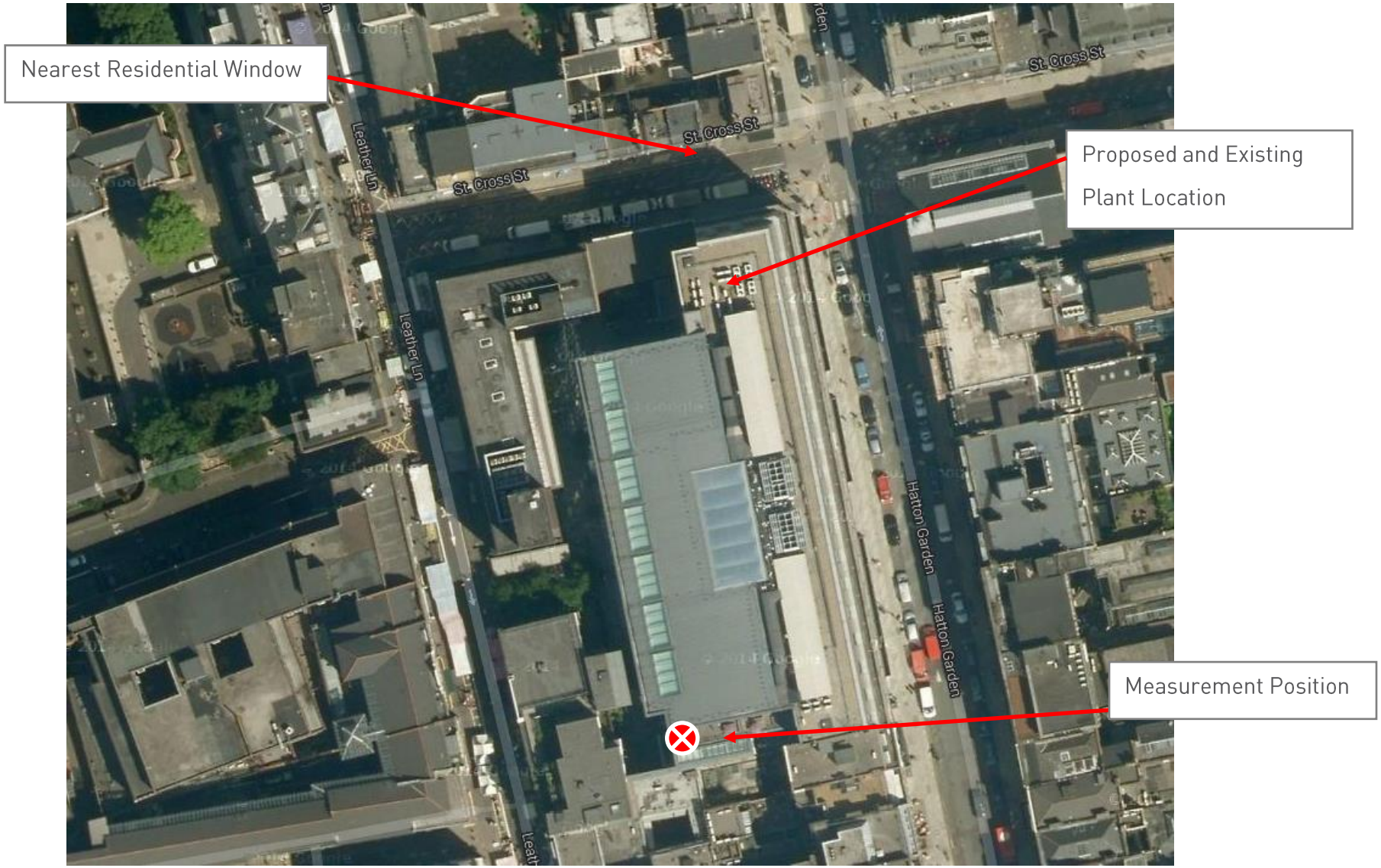
Figure 6261/SP1

8 July 2014

Not to Scale

RBA ACOUSTICS

Graph 4374/G6



The Johnson Building

Site Plan Indicating Measurement Position and Plant Location

Figure 6261/SP2

8 July 2014

Not to Scale

RBA ACOUSTICS

RBA ACOUSTICS
44 Borough Road
London SE1 0AJ

T. +44 (0) 20 7620 1950
W. www.rba-acoustics.co.uk