



29 TOTTENHAM STREET,  
W1T 4RP

## Plant Noise Assessment

Reference: 10245.RP01.PNA.0

Prepared: 26 June 2020

Revision Number: 0

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W1T 4RP

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	26 June 2020	Josh Evans	Martin Raisborough

### *Terms of contract:*

RBA Acoustics Ltd has prepared this report in accordance with our Scope of Work 10245/MJR dated 23 April 2020. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.



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## 1.0 INTRODUCTION

It is proposed to locate new items of plant to the rear of 29 Tottenham Street, London W1. As part of the planning application, Camden Council requires that consideration be given to atmospheric noise emissions from the proposed equipment at the nearest affected noise-sensitive property.

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

This report occasionally employs technical acoustic terminology. A glossary of acoustic terms is presented in Appendix A.

## 2.0 ENVIRONMENTAL NOISE SURVEY

### 2.1 General

In accordance with the requirements of the Local Authority, monitoring of the prevailing background noise was undertaken over the following periods:

Monday 18 May to Wednesday 20 May 2020

During the survey periods the weather conditions were generally appropriate for the noise measurement exercise, it being dry with light winds.

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 tripod to the rear of the property in a rear lightwell which backs onto a residential courtyard. This measurement position was considered as being representative of the noise climate as experienced at the closest residential receptors to the proposed plant. The prevailing noise climate was noted to consist mainly of construction works which were being undertaken in the surrounding area. Some low-level noise from existing building services plant serving neighbouring buildings was also audible at the measurement position.

It is worth noting that due to the ongoing Covid-19 restrictions the noise survey was being undertaken at a time when noise levels in the area are significantly reduced. The roads in the area were experiencing a significantly reduced level of traffic. Additionally, there are several other restaurants in the area which back onto the rear of this restaurant with a large amount of building services plant, although this was not noted to be operating during the survey.

The measurement position is also illustrated on the site plan in Figure 1 in Appendix B.

### 2.3 Instrumentation

Details of the instrumentation used to undertake the survey are provided in Appendix C.

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

### 3.0 RESULTS

The noise levels at the measurement position are shown as time-histories on the attached Graphs 1 and 2 in Appendix D.

It is understood that the restaurant will be trading up to 23:00 hours. In order to represent a worst-case scenario, the typically lowest background  $L_{A90}$  noise levels at this time of night has been used in our analyses, and are summarised below.

Table 1 – Measured Levels

Measurement Period	$L_{90}$ (dBA)
Daytime (07:00 – 23:00)	33dB $L_{A90}$ , 15 minutes

### 4.0 CRITERIA

Policy A4 of Camden Local Plan 2017 provides the following information regarding the required noise levels for proposed plant items:

*A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS4142) will be used. For such cases a 'Rating Level' of 10dB below background (15dB if tonal components are present) should be considered as the design criterion.*

Notwithstanding the above, however, as the survey was undertaken during the period of COVID 19 lockdown and travel restrictions in the UK, background sound levels are considered to have been abnormally low. Given this, RBA has been in discussions with Mr. Edward Davis of Camden Council Environmental Health team to discuss a relaxation from the above standard criteria. From our conversations, it was agreed that a reasonable approach should be taken in order to determine appropriate plant noise emissions and the Local Authority will take a pragmatic view on the assessment in this context.

Based on the above, and given that recorded background sound levels were very low, it is considered a reasonable approach to relax Camden's standard criteria by 5dB (i.e. a 'Rating Level' of 5dB below background) so that noise emissions from the plant do not exceed the following level when assessed at the nearest noise sensitive receptor:

- Daytime (07:00-23:00)                      28 dBL<sub>Ar, T</sub>

In line with the requirements of the Local Authority should the proposed plant be identified as having tonal features, the above limits should be reduced by 5dB.

## 5.0 NOISE IMPACT ASSESSMENT

Our noise impact assessment has been based upon the following information:

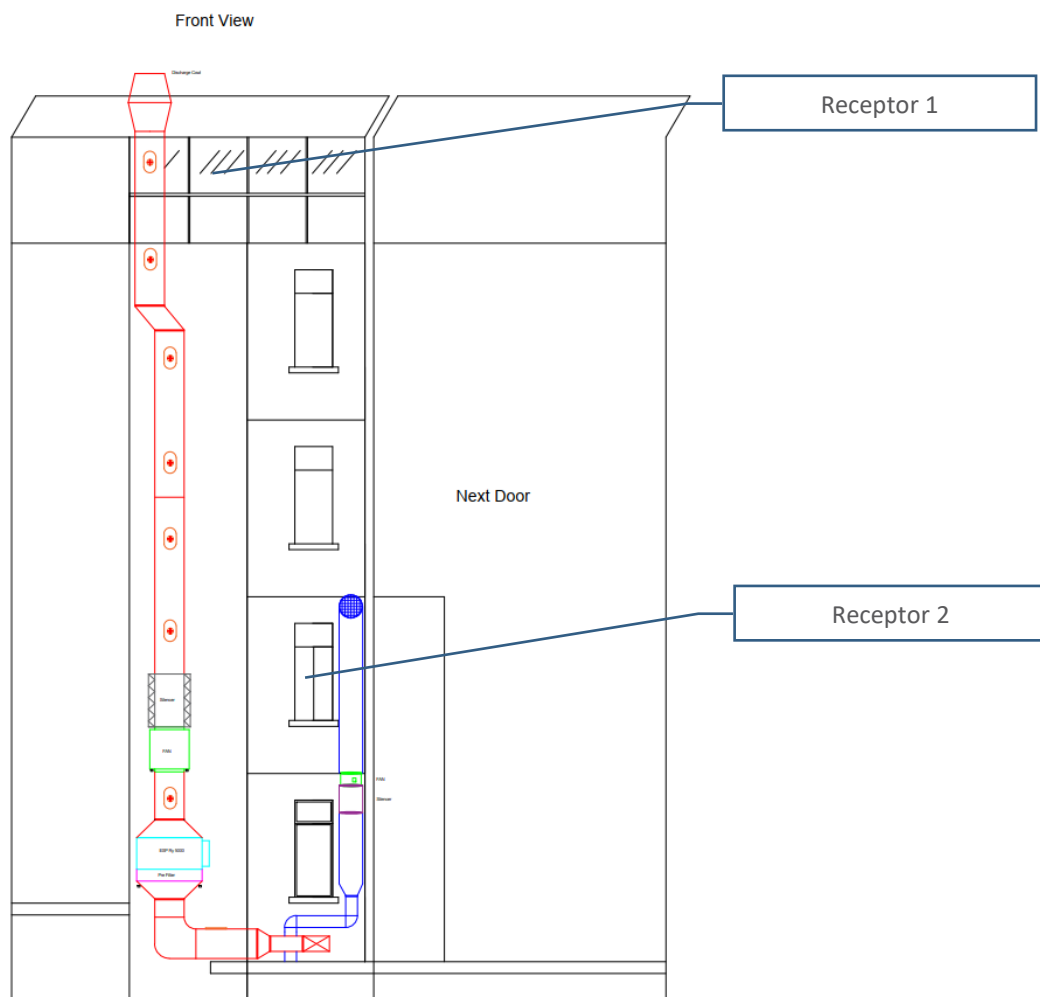
### 5.1 Proposed Plant Items

Two items of plant are proposed to the rear of the property, a supply and extract fan, the details of which are presented below:

Extraction Fan	Supply Fan
<b>Model:</b> GBW500/4	<b>Model:</b> TCBB/4/450H
<b>Air Flow Rate:</b> 2.31M3/s	<b>Air Flow Rate:</b> 1.93M3/s
<b>Pressure Level:</b>	<b>Pressure Level:</b>

### 5.2 Position of Units

The arrangement of the equipment, in addition to the windows of the nearest affected noise sensitive receptors is as indicated on the plan below:



### 5.3 Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the unit. The associated plant noise levels are detailed as follows:

Table 2 – Plant Noise Levels

Unit	Path	Sound Power Levels (dB re 1 x 10 <sup>-12</sup> Pa.) @ Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Extract Fan	Inlet	63	63	72	72	74	72	66	59
	Exhaust	72	72	75	76	78	75	71	67
	Casing Breakout	64	64	63	53	52	50	46	40
Supply Fan	-	67	73	69	72	77	71	64	56

Review of the octave band data provides no indication of any tonal characteristics associated with the proposed plant.

### 5.1 Recommended Mitigation

In order that noise from the atmospheric terminals of the fans, noise breakout from the connecting ducts and noise breakout from the fan casings, may be adequately controlled, it is recommended that the fans be fitted with the following attenuators.

Table 3 – Recommended Attenuators

Unit	Path (indicative attenuator spec.)	Silencer Dynamic Insertion Losses (dB) @ Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Extract Fan	Inlet (600mm long, 35% free area)	3	6	10	14	20	19	14	13
	Exhaust (1200mm long, 30% free area)	4	12	27	33	37	37	35	33
Supply Fan	Fresh Air Inlet (1200mm long, 30% free area)	4	12	27	33	37	37	35	33
	Supply (600mm long, 35% free area)	3	6	10	14	20	19	14	13

The supply and extract fans themselves should be fitted with acoustic enclosures that provide the following insertion losses as a minimum:

Table 4 – Insertion Loss for Fan Enclosures

Minimum Insertion Losses for Fan Enclosures @ Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
10	12	15	20	25	30	30	30

In addition to the above, the connecting ductwork between the fan enclosures/casing and the attenuators (including the attenuators themselves) should be acoustically lagged in accordance with the specification below.

*The duct shall be wrapped with 50mm thick mineral fibre having a density of 80 – 100 kg/m<sup>3</sup>, with an outer mass barrier of 10 kg/m<sup>2</sup> sound barrier mat. Joints between sections of sound barrier mat shall be*

*overlapped by at least 100mm, and be sealed using either a non-hardening mastic or preferably duct jointing tape.*

*Should additional weatherproofing be required for externally mounted ducts, this shall be applied in accordance with the Mechanical Services Consultants specifications.*

Suitable suppliers for acoustic fan enclosures, attenuators and duct lagging are:

<http://www.environ.co.uk/>

<http://eec.co.uk/>

<https://www.caice.co.uk/acoustic-enclosures/>

## 5.2 Calculation of Noise Levels at Nearest Residential Windows

Our calculation method for predicting noise levels from the proposed plant at the nearest residential windows, based on the information stated above, is summarised below.

- Source Term SPL / SWL
- 10LogR Distance Attenuation
- Directivity
- Reflections

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

Table 5 – Predicted Noise Levels

	Receptor 1	Receptor 2
Extract Fan Discharge	25dBA	7dBA
Extract Fan Breakout	10dBA	26dBA
Supply Fan Fresh Air Inlet	7dBA	22dBA
Supply Fan Breakout	4dBA	22dBA
<b>TOTAL</b>	<b>25dBA</b>	<b>28dBA</b>
<b>Criterion</b>	<b>28dBA</b>	<b>28dBA</b>
<b>Exceedance</b>	-	-

Noise from the proposed units to the rear of the property is above the target criteria. We therefore recommend mitigation is included in the design and installation.

## 6.0 VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We advise that the fan casings be isolated from the supporting structure by means of either steel spring isolators or neoprene in shear mounts with a static deflection of not less than 8mm. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not “short-circuited” by associated pipework or conduits. To this end, any conduits should be looped and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

## 7.0 CONCLUSION

It is proposed to locate new items of plant to the rear of 29 Tottenham Street, London W1. As part of the planning application, Camden Council requires that consideration be given to atmospheric noise emissions from the proposed equipment at the nearest affected noise-sensitive property.

Monitoring of the prevailing background noise was undertaken between Monday 18 May to Wednesday 20 May 2020 in order to determine noise emission limits for the plant. As the survey was undertaken during the period of COVID 19 lockdown and travel restrictions in the UK, however, background sound levels are considered to have been abnormally low. Given this, RBA Acoustics has been in discussions with Mr. Edward Davis of Camden Council Environmental Health team to discuss a relaxation from the above standard criteria. From our conversations, it was agreed that a reasonable approach should be taken in order to determine appropriate plant noise emissions and the Local Authority will take a pragmatic view on the assessment in this context.

Based on the above, a reasonable approach has been considered to relax Camden's standard criteria by 5dB (i.e. a 'Rating Level' of 5dB below background) so that noise emissions from the plant do not exceed 28dBA when assessed at the nearest noise sensitive receptors.

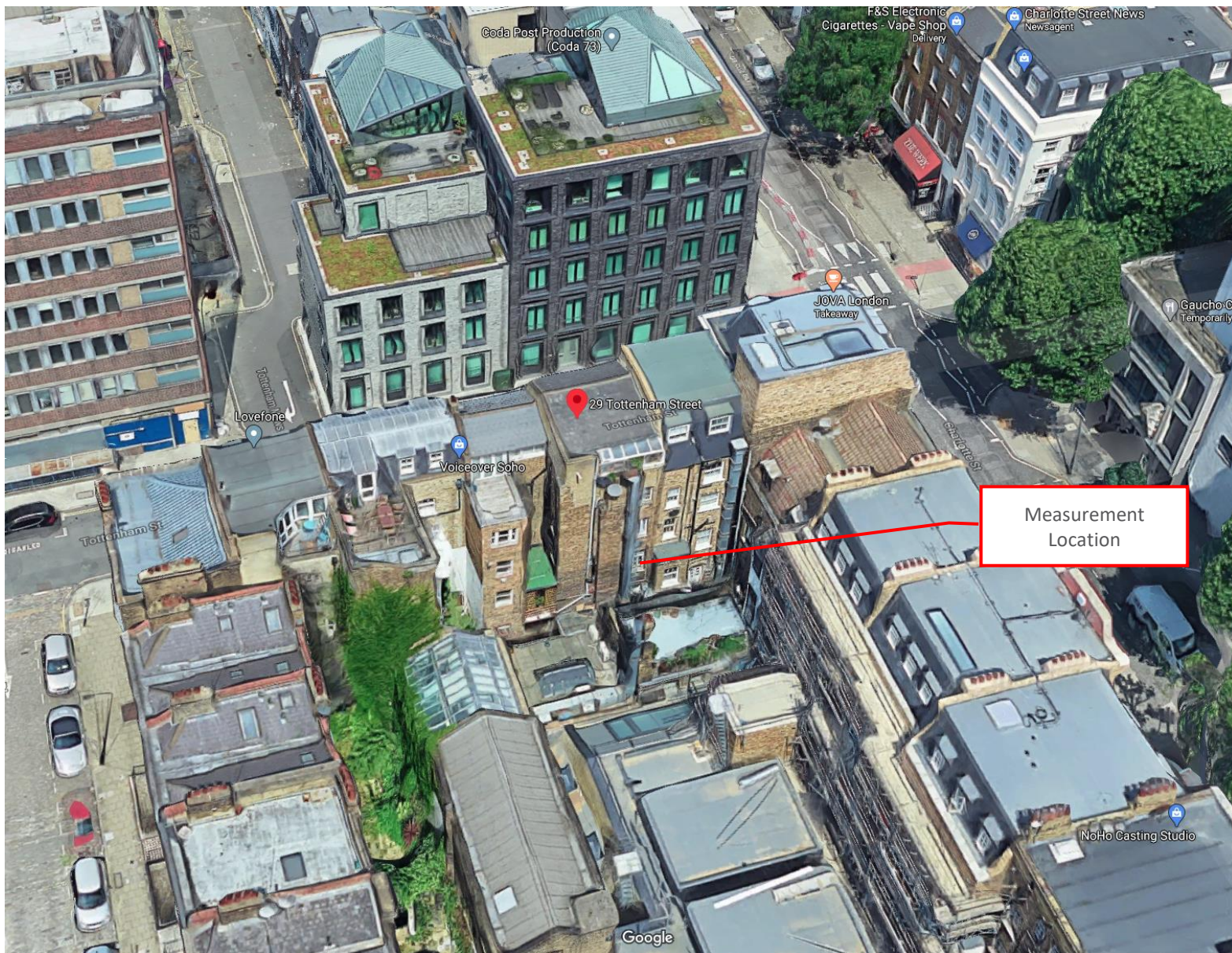
From the results of our assessments, a number of mitigation measures are recommended in order that noise emissions may accord with the adopted plant noise emission limit. These mitigation measures are outlined in Section 5.1 of this report.

Assuming these mitigation measures are implemented, the results of the assessments indicate atmospheric noise emissions from the plant will be in accordance with the adopted noise emission limit.

## 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 – Site Plan



29 Tottenham Street, W1T 4RP  
 Site Plan  
 Project 10245

Figure 1  
 26 June 2020  
 Not to Scale

## Appendix C - Instrumentation

The following equipment was used for the measurements:

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
Norsonic Type 1 Sound Level Meter	Nor140	1406969	U32668 32667	22 August 2021 22 August 2021
Norsonic Pre Amplifier	1209	21204		
Norsonic ½" Microphone	1225	285599		
Norsonic Sound Calibrator	1251	34966	U32666	22 August 2021

## Appendix D – Results of Environmental Noise Monitoring

29 Tottenham Street, London W1

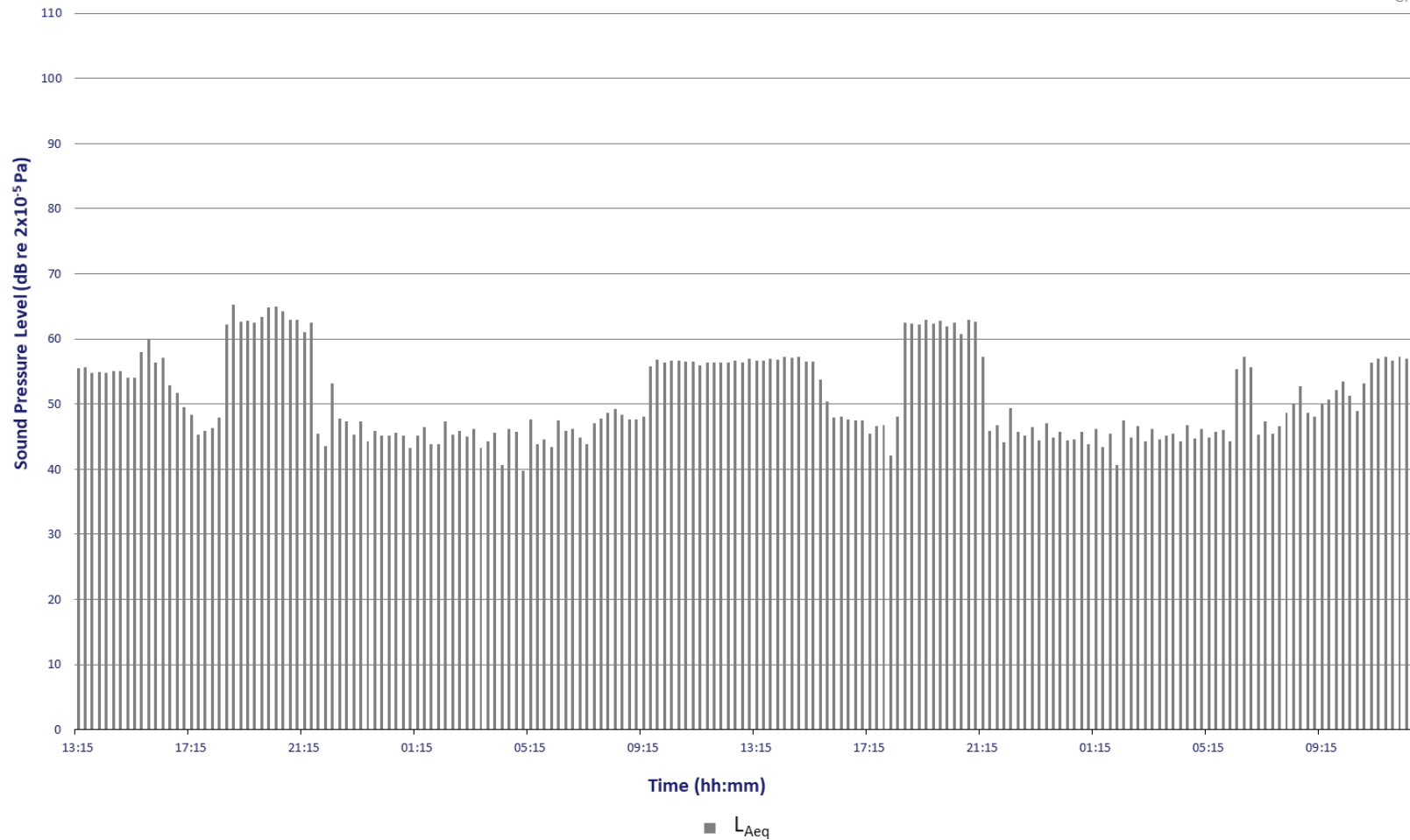
$L_{Aeq}$  Time History

Measurement Position 1, Monday 18 May to Wednesday 20 May 2020



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Graph 1



29 Tottenham Street, W1T 4RP  
Environmental Noise Survey Results  
Project 10245

Graph 1  
26 June 2020



29 Tottenham Street, London W1

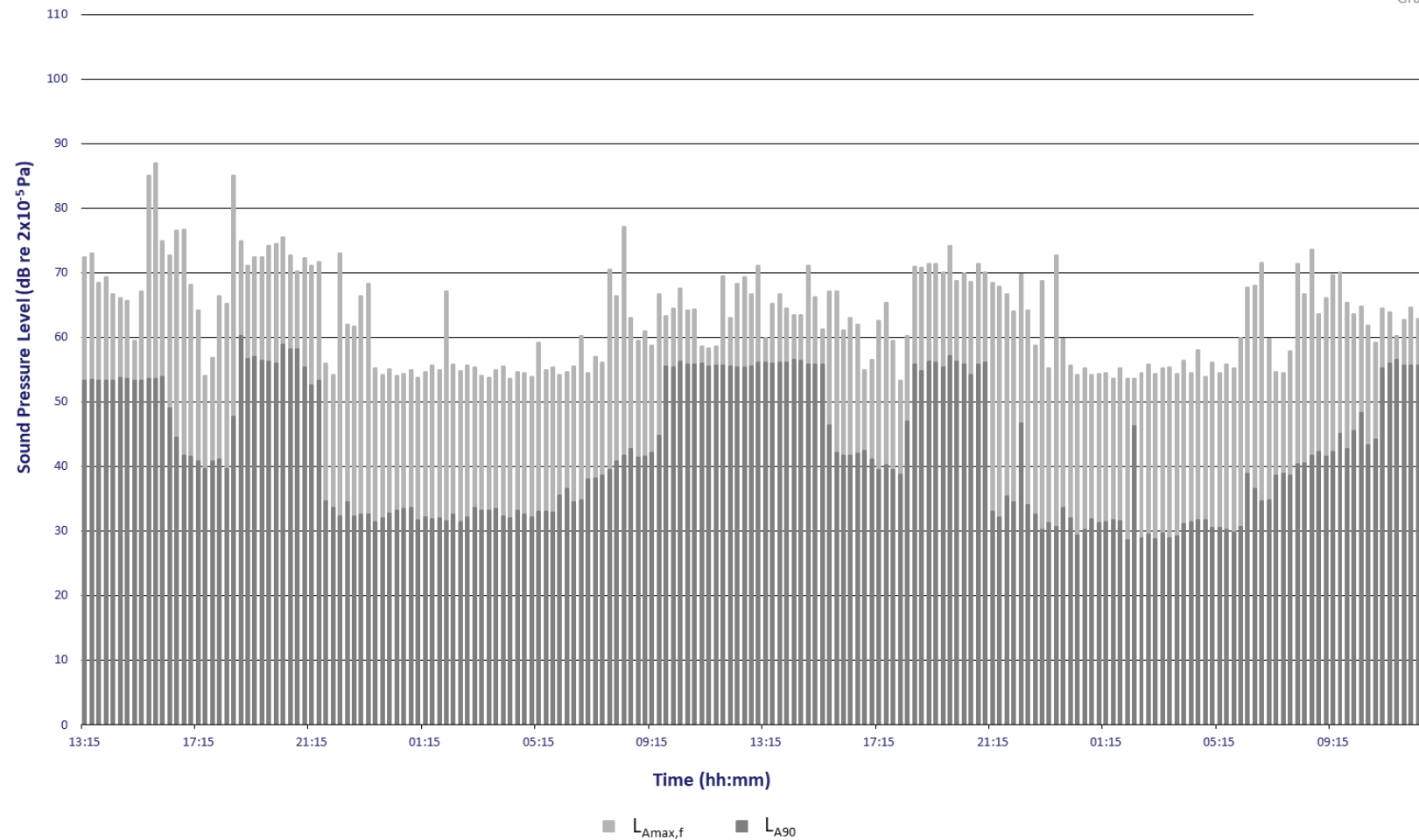
$L_{Amax,f}$  and  $L_{A90}$  Time History

Measurement Position 1, Monday 18 May to Wednesday 20 May 2020



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Graph 2



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