31-32 & 33-34 Alfred Place London

Environmental Noise Survey and Plant Noise Assessment Report

29661/PNA5

24 July 2024

For:
Faithdean PLC
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Document Control

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Environmental Noise Survey and Plant Noise Assessment Report 29661/PNA5

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1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by Faithdean PLC to undertake a noise assessment for a site in Camden, London.

The site, which is located in 31-32 & 33-34 Alfred Place, is proposing to install new external building services plant, which includes 2No. condensers in a lightwell, at ground floor level.

Hann Tucker Associates has therefore been commissioned to undertake a detailed environmental noise survey at the site to establish baseline noise conditions as presented herein.

Suitable plant noise emission criteria based on the requirements of the of the Local Authority and have been established, and a plant noise impact assessment undertaken.

2.0 Objectives

To undertake an environmental noise survey to establish the existing L_{Amax}, L_{Aeq} and L_{A90} environmental noise levels at selected accessible positions.

To identify noise emission limits from the development with reference to the requirements of the Local Authority and to minimise the possibility of noise nuisance to neighbours.

To assess the noise emissions from the proposed plant, based upon data with which we are provided, and comment upon the acceptability.

To advise on noise control measures if required.

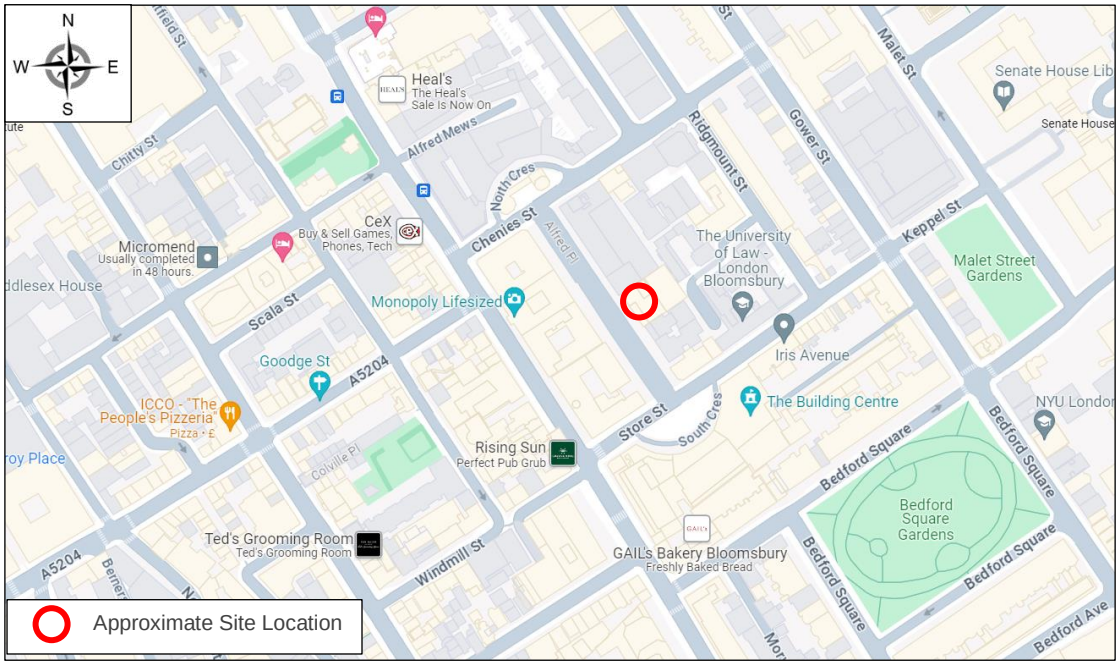
3.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

4.0 Site Description

4.1 Location

The site is located at 31-32 & 33-34 Alfred Place, London, WC1E 7DP. The location is shown in the Location Map below.



Location Map (Map data © 2024 Google)

The site falls within the jurisdiction of London Borough of Camden.

4.2 Description

The site is bounded to the north-west with office premises, to the southwest with Alfred Place (currently a plaza) and mixed-use buildings (commercial/office/residential), to the southeast with office premises and the University of Law-London Bloomsbury, and to the north-east with residential premises and Ridgmount Place. The offices at the north-west have a height of ground plus 7 storeys. The mixed-use buildings at the southwest and the offices at the southeast have a height that ranges from ground plus 3 to ground plus 4 storeys. The university has a height of ground plus 5 storeys. The residential dwellings have a height that ranges from ground plus 2 to ground plus 3 storeys.

The site is shown in the Site Plan below.

Site Plan (Imagery © 2024 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map Data © 2024 Google)

5.0 Planning Policies, Standards & Guidance

5.1 Policies & Guides

In order to provide a suitable assessment a number of national planning policies have been considered.

All guidance used to form a noise impact assessment is taken from various standards, guidance, and Local Authority requirements as summarised below:

- Local Planning Policy
- British Standard 4142:2014 + A1:2019
- Statutory Noise Nuisance

Detailed information for relevant planning policies and guidance can be found within Appendix B.

5.2 Specific Local Authority Criteria

The site lies within the jurisdiction of London Borough of Camden. Their advice regarding criteria for atmospheric noise emissions from building service plant is as follows:

"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' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	***Assessment Location***	***Design Period***	***LOAEL (Green)***	***LOAEL to SOAEL (Amber)***	***SOAL (Red)***
*Dwellings***	*Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)*	*Day*	*'Rating level' 10dB* below background*	*'Rating level' between 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings***	*Outside bedroom window (façade)*	*Night*	*'Rating level' 10dB* below background and no events exceeding 57dB L_{Amax}*	*'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}*	*'Rating level' greater than 5dB above background and/or events exceeding 88dB L_{Amax}*

**10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to

0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area."

6.0 Baseline Noise Survey

6.1 Procedure

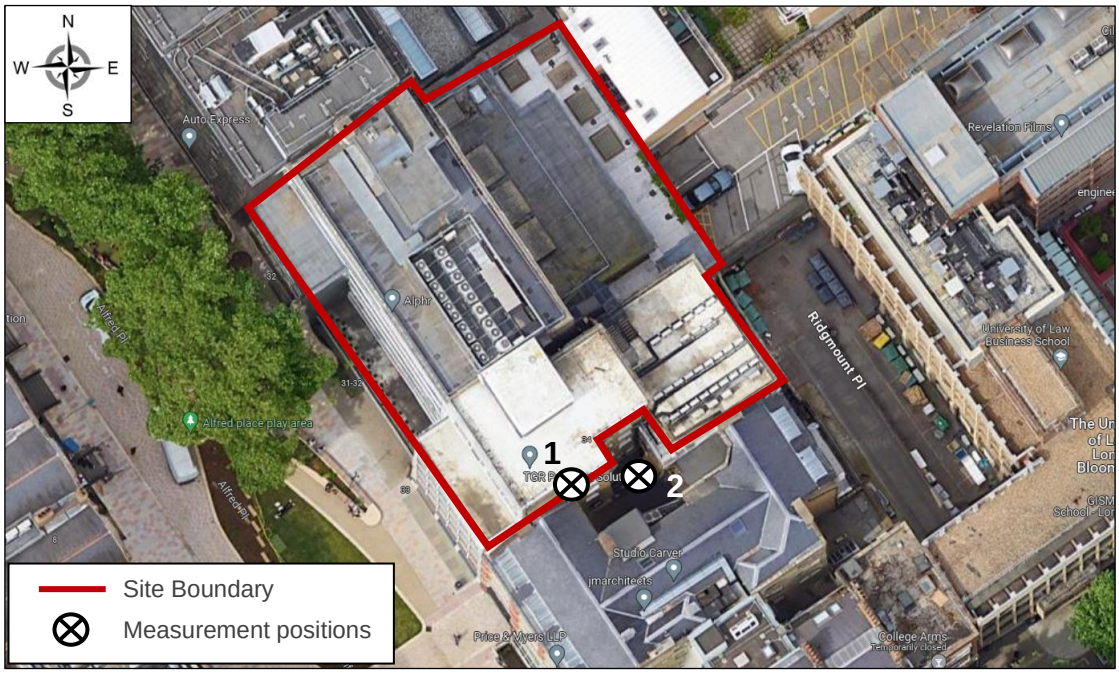
Fully automated environmental noise monitoring was undertaken by Rodrigo Espinosa-Garcia BEng(Hons), MSc, MIOA from approximately 11:30 hours on Wednesday 17 July 2024 to 11:30 hours on Thursday 18 July 2024, to establish existing baseline noise levels. Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq}, and L_{max} sound pressure levels over discrete 15-minute periods.

6.2 Measurement Positions

The noise level measurements were undertaken at 2No. positions as described in the table below.

Position	Type	Description
1	Unattended	The microphone was positioned on the southwest boundary of the roof, at a height of approximately 1.5 metres above roof level (approximately 22.5 metres above ground level). The microphone is considered to be in free-field conditions. Dominant noise was from distance road traffic and plant from the commercial/office premises at the south of the site.
2	Unattended	The microphone was positioned on the south lightwell, at a height of approximately 1 metre above first floor level and at least 1 m from the façade. Dominant noise was from the commercial/office premises at the south of the site. Measurements includes local reflections.

The positions are shown on the plan below.



Plan Showing Measurement Positions (Imagery © 2024 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map Data © 2024 Google)

6.3 Weather Conditions

For the unattended survey between Wednesday 17 July 2024 and Thursday 18 July 2024, local weather reports indicated no rainfall, with temperatures ranging from 15°C (night) to 24°C (day) and wind speeds less than 4 m/s. During our time on site, skies were largely clear with patchy cloud cover, wind conditions were calm and from a western direction and road surfaces were dry.

6.4 Instrumentation

The instrumentation used during the survey is presented in the table below:

Position	Description	Manufacturer	Type	Serial Number	Calibration
1	Type 1 ½" Condenser Microphone	ACO Pacific	7052E	71839	Calibration on 02/08/2023
	Preamp	Svantek	SV18	75733	Calibration on 02/08/2023
	Type 1 Data Logging Sound Level Meter	Svantek	971	74415	Calibration on 02/08/2023

Position	Description	Manufacturer	Type	Serial Number	Calibration
2	Type 1 ½" Condenser Microphone	ACO Pacific	7052E	67976	Calibration on 05/07/2023
	Preamp	Svantek	SV18	71473	Calibration on 05/07/2023
	Type 1 Data Logging Sound Level Meter	Svantek	971	80232	Calibration on 05/07/2023
-	Type 1 Calibrator	Bruel & Kjaer	4230	1558535	Calibration on 27/07/2023

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.2 dB).

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. Each microphone was fitted with a windshield.

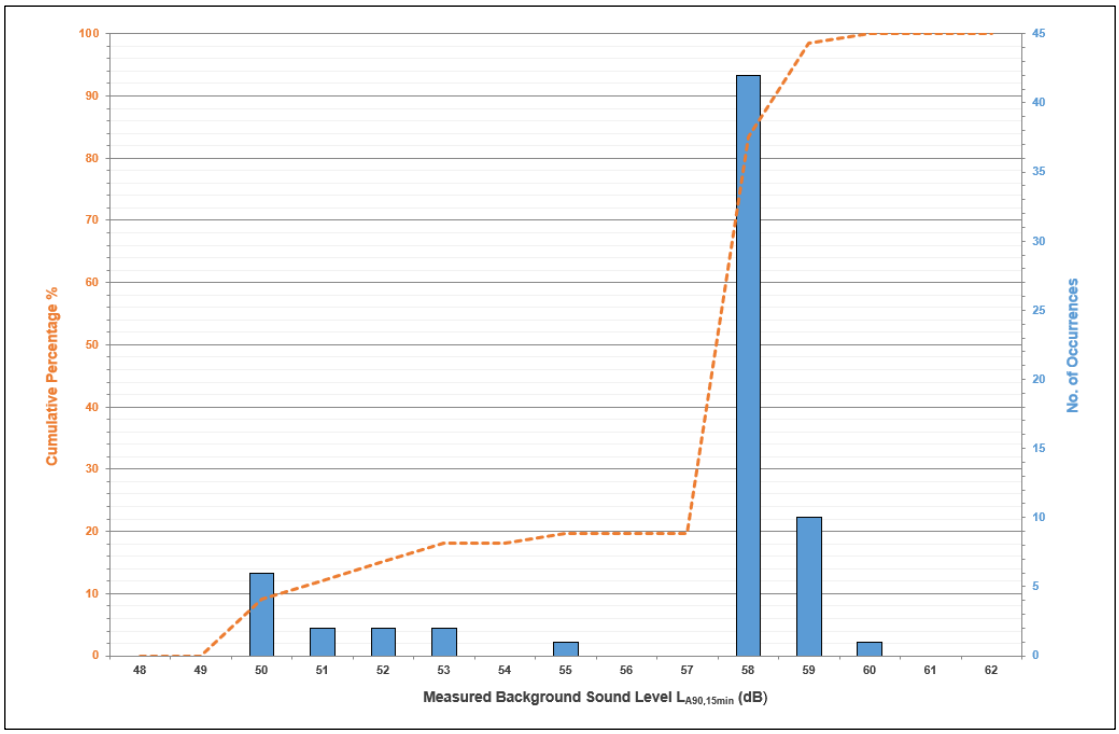
6.5 Results

The results have been plotted on Time History Graphs 29661/TH1 and 29661/TH2 enclosed presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

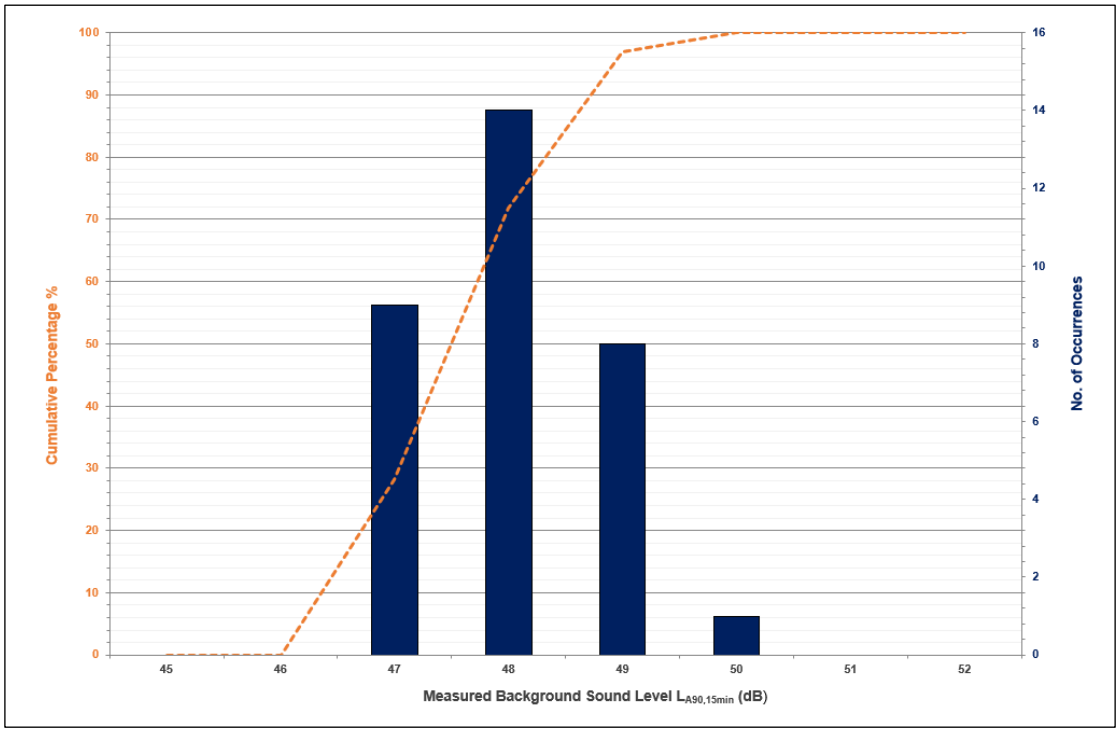
BS 4142 states that *"the background sound level must be reliable and suitably represent the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."* Taking this into account, the following histograms have been created which display the occurrence of each sound level (L_{A90}) for the day and night-time periods.

At positions 1 and 2, the noise levels were dominated by building services plant. We have therefore taken the lowest level L_{A90} when the plant was not in operation.

Position 1

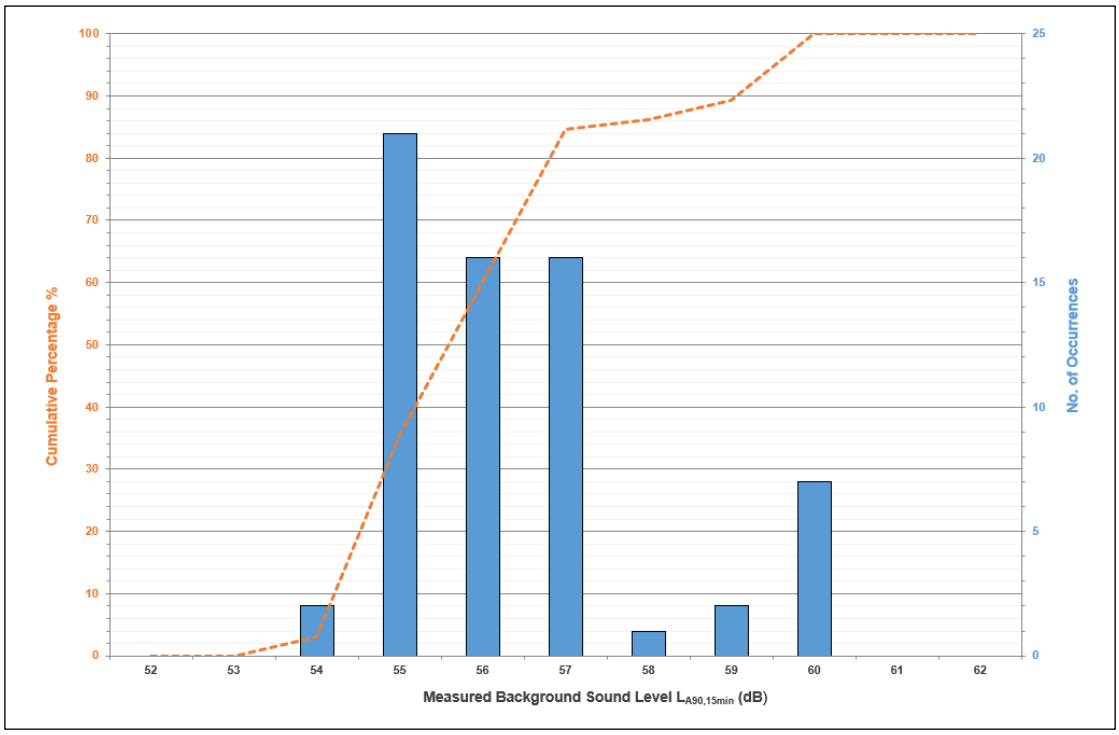


Statistical analysis of daytime background noise levels (7:00-23:00 hrs) at Position 1

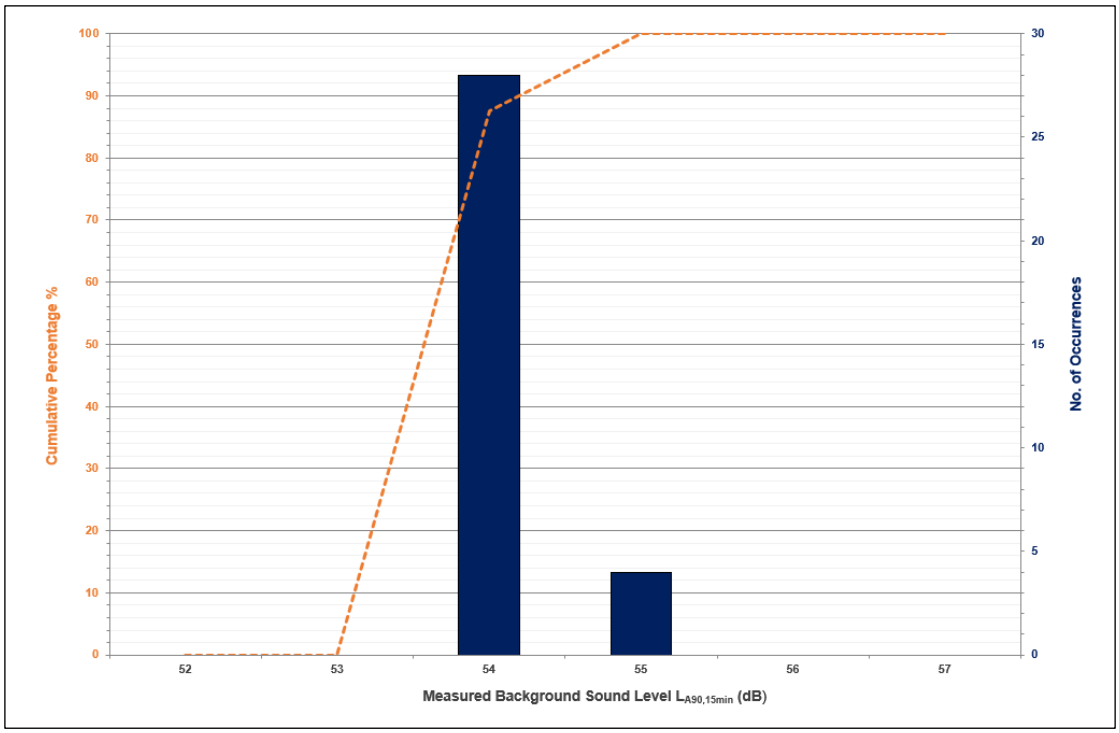


Statistical analysis of night-time background noise levels (23:00-7:00 hrs) at Position 1

Position 2



Statistical analysis of daytime background noise levels (7:00-23:00 hrs) at Position 2



Statistical analysis of night-time background noise levels (23:00-7:00 hrs) at Position 2

Based on the above plots the L_{A90} values presented below are considered to be the 'representative' background sound levels determined through statistical analysis of the 15-minute readings.

Daytime (07:00 – 23:00 hrs)				Night-Time (23:00 – 07:00 hrs)			
Position 1[1]		Position 2[2]		Position 1[1]		Position 2[2]	
$L_{Aeq,16h}$	Typical $L_{A90,15\ min}$	$L_{Aeq,16h}$	Typical $L_{A90,15\ min}$	$L_{Aeq,8h}$	Typical $L_{A90,15\ min}$	$L_{Aeq,8h}$	Typical $L_{A90,15\ min}$
60 dB	50 dB	60 dB	54 dB	50 dB	47 dB	55 dB	54 dB

[1] The measurements are in free-field conditions
[2] The measurements include local reflections

The above levels are as measured at the measurement positions.

6.6 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unattended, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However, at the beginning and end of the survey period the noise climate was noted to be dominated by road traffic noise from the nearby road network and plant noise from commercial/office premises at the south of the site.

7.0 Plant Noise Emission Criteria

Building services plant external noise emission levels will need to comply with Local Authority requirements and statutory noise nuisance legislation.

7.1 Residential Properties

Based on the results of the noise survey and the requirements of the Local Authority (as outlined in Section 5.2), we propose that the following plant noise emission criteria be achieved incident at the nearest noise sensitive residential windows, with all plant operating simultaneously.

Location	Rating Plant Noise Emission Criteria ($L_{Ar,Tr}$, dB)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Position 1 (Residential)	40 dBA	37 dBA

The above criteria are to be achieved with all of the proposed plant operating simultaneously. It should be noted that the above are subject to the final approval of the Local Authority.

7.2 Office/Commercial Properties

As per Section 5.2, the local authority guidance noise levels are given for “Dwellings” (residential use) only as reproduced below:

> *“**levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.”*

It is not clear from the Camden Local Plan as to how to apply their requirements for offices/commercial receptors, however the following approach should be acceptable based on achieving the guideline noise levels of BS 8233:2014 in offices with open windows.

In relation to the office/commercial properties within the vicinity of the proposed location of the new plant, BS 8233:2014 proposes the following internal ambient noise level design range should be satisfied.

Internal Ambient Noise Level Design Range, $L_{Aeq,T}$ (dB)
45-50 dB

In addition, BS 8233 states that attenuation of 10 to 15 dB can be provided by an open window. Hence the following external noise level criteria must be satisfied outside the nearest office façade (based on achieving the lower limit of the above design range):

External Ambient Noise Level Limit, $L_{Aeq,T}$ (dB)
55 dB

It should be noted that the above criteria are subject to final approval by the London Borough of Camden.

8.0 Plant Noise Impact Assessment

8.1 Proposed Plant

We understand the proposed plant comprises the following:

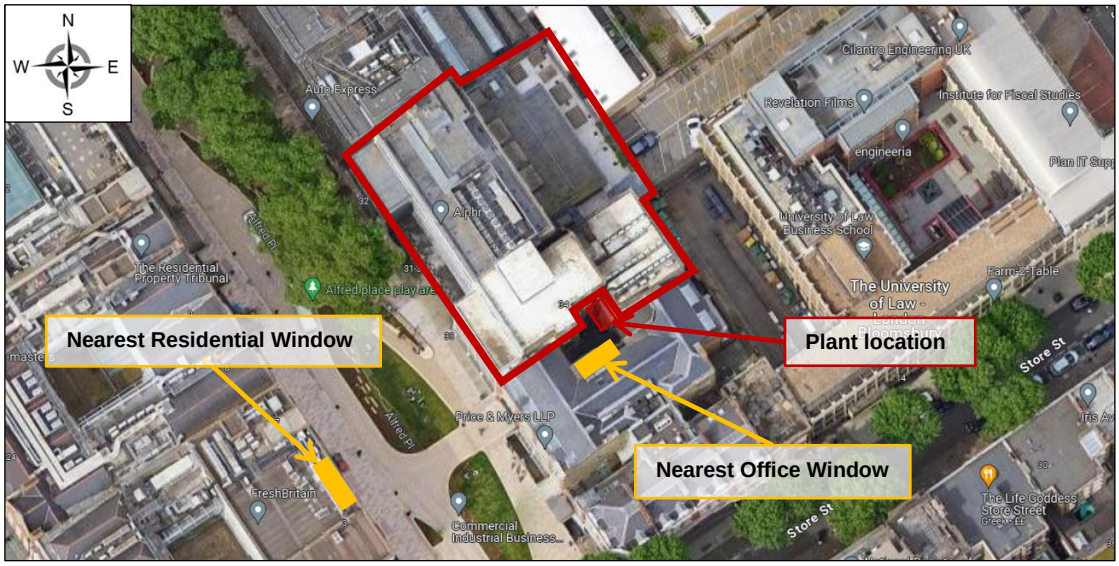
Plant Item	Plant Description	Location	Qty	Plant Make	Model Number
1	Condenser	Ground Floor Level - Lightwell	1	Mitsubishi Electric	PUMY-P200YKM3
2	Condenser	Ground Floor Level - Lightwell	1	Mitsubishi Electric	PUMY-SP112VKM2

8.1.1 Plant Location

We understand that the proposed condensers will be located externally, in a lightwell at the south of the site, at ground floor level.

We have identified the worst affected residential and office properties near the site. The nearest residential window is located the west of the site, at first floor level. The distance from the plant to the nearest noise sensitive residential window is approximately 35 metres. The nearest office window is located at the south of the site, at first floor level, facing the lightwell. The distance from the plant to the nearest office window is approximately 5 metres.

The location of the plant and the nearest residential and office windows are shown on the plan below.



Proposed Plant Location - Site Plan (Imagery © 2024 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map Data © 2024 Google)

8.1.2 Plant Operation

We understand that the plant will be operational during daytime hours (07:00 to 23:00 hours) only.

8.1.3 Plant Noise Data

We understand the manufacturer's noise data for the equipment to be as follows:

Plant item	Model Number	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
1	PUMY-P200YKM3	64	61	61	58	57	52	49	41	61
2	PUMY-SP112VKM2	58	55	55	52	49	45	38	32	54

8.2 Plant Noise Impact Assessment - Residential

The following table summarises our predictions of atmospheric noise emissions from the proposed plant to the nearest residential window.

Plant Item	Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
1	Manufacturer's Sound Pressure Level at 1m	64	61	61	58	57	52	49	41	61
	Conformal Area Distance Loss (1.0 m to 35.0 m) Quarter-Spherical radiation	-23	-23	-23	-23	-23	-23	-23	-23	
	Calculated Noise Level at Window	39	38	38	35	34	29	26	18	**38**
2	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Conformal Area Distance Loss (1.0 m to 35.0 m) Quarter-Spherical radiation	-23	-23	-23	-23	-23	-23	-23	-23	
	Calculated Noise Level at Window	33	32	32	29	26	22	15	9	**31**
Cumulative Sound Pressure Level at nearest residential window										**39**

Based on the above predictions of atmospheric noise emissions the table below provides an initial BS4142:2014 assessment.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} = 39dB	7.3.8 7.3.9 7.3.10	Cumulative noise level at the nearest receptor for all items of plant with proposed mitigation measures.
Acoustic Feature Correction	+0 dB	9.2	-
Rating level	(39+0) dB = 39dB	9.2	
Background sound level	L_{A90} = 50dB	8.1.1 8.1.3 8.3	Representative background sound level measured near the residential noise sensitive receptor during the day.
Excess of rating over background sound level	**(55-39) dB = -11 dB**	**11**	**Assessment indicates likelihood of low impact to residents**
Assessment indicates likelihood of a low impact to residents		11	The rating level is 11dB below the background level and thus should indicate a low impact on the nearby residents.
Uncertainty of the assessment	Low	10	The background sound level is based on a 24 hours noise survey.

With reference to BS:4142:2014+A1:2019, the assessment indicates that the proposed plant noise emissions should be 11dB below the representative background noise level and thus should indicate a low impact on the nearby residents.

Our calculations indicate that the proposed plant should be capable of achieving the requirements of the Local Authority outlined in Section 7.0.

8.3 Plant Noise Impact Assessment – Office

The following table summarises our predictions of atmospheric noise emissions from the proposed plant to the nearest office window.

Plant Item	Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
1	Manufacturer's Sound Pressure Level at 1m	64	61	61	58	57	52	49	41	61
	Conformal Area Distance Loss (1.0 m to 5.0 m) Quarter-Spherical radiation	-8	-8	-8	-8	-8	-8	-8	-8	
	Calculated Noise Level at Window	56	53	53	50	49	44	41	33	**53**

Plant Item	Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
2	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Conformal Area Distance Loss (1.0 m to 5.0 m) Quarter-Spherical radiation	-8	-8	-8	-8	-8	-8	-8	-8	
	Calculated Noise Level at Window	50	47	47	44	41	37	30	24	**46**
Cumulative Sound Pressure Level at nearest office window										**54**
Proposed Criterion										**55**

As can be seen from the above, calculations suggest that plant noise egress levels at the nearest office window are likely to be 1dB below the proposed criterion, presented in Section 7.2, and thus it should be considered acceptable.

Based on the above predictions of atmospheric noise emissions the table below provides an initial BS4142:2014 assessment.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} = 54dB	7.3.8 7.3.9 7.3.10	Cumulative noise level at the nearest receptor for all items of plant with proposed mitigation measures.
Acoustic Feature Correction	+0 dB	9.2	-
Rating level	(54+0) dB = 54dB	9.2	
Background sound level	L_{A90} = 54dB	8.1.1 8.1.3 8.3	Representative background sound level measured at the nearest office window during the day.
Excess of rating over background sound level	**(54-54) dB = 0 dB**	**11**	**Assessment indicates likelihood of a low impact to residents**
Assessment indicates likelihood of a low impact to residents		11	The rating level is equal to the background level and thus should indicate a low impact on the nearby office window.
Uncertainty of the assessment	Low	10	The background sound level is based on a 24 hours noise survey.

With reference to BS:4142:2014+A1:2019, the assessment indicates that the proposed plant noise emissions should be equal to the representative background noise level and thus should indicate a low impact on the nearby office window.

9.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing noise levels.

Plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the Local Authority's requirements.

An assessment has been carried out to determine the plant noise emissions at the nearest residential and office windows.

The assessment indicates that the proposed plant should be capable of achieving the proposed environmental noise criteria at the nearest residential and office windows.

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Appendix B

Planning Policies, Standards & Guidance

B.1 BS 4142:2014 + A1:2019

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 "*Methods for rating and assessing industrial and commercial sound".*

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level".

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

• *"Typically, the greater this difference, the greater the magnitude of the impact."*

• *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*

• *"A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context."*

• *"The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

The determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

B.2 Statutory Noise Nuisance

S79(1)(g) of the Environmental Protection Act 1990 defines a statutory nuisance as *"noise emitted from a premises so as to be prejudicial to health or a nuisance".* A duty is placed on the Local Authority to serve an abatement notice under S80 if it becomes satisfied that a statutory nuisance exists.

There is however no quantitative definition/objective method in determining statutory noise nuisance, and as such we are not able to definitively advise or determine on such matters. Noise nuisance is subjective and requires multiple factors to be considered, including but not limited to:

- Straining to hear something is *generally* considered not a nuisance, however,
- Noise level (of source and relative to background), timing, duration, type of noise, frequency, location, continuous or repetitive, all factor into judging nuisance.

To mitigate against, though not remove entirely, the risk of a statutory noise nuisance, a noise assessment should be undertaken by a Suitably Qualified Acoustician. Adoption of appropriate and relevant industry standards/guides can provide a structured framework for such assessments, improving the credibility of mitigation efforts. It is also important to also recognise that ongoing management (both active and passive) may also be necessary depending on the context of the situation.

Appendix C

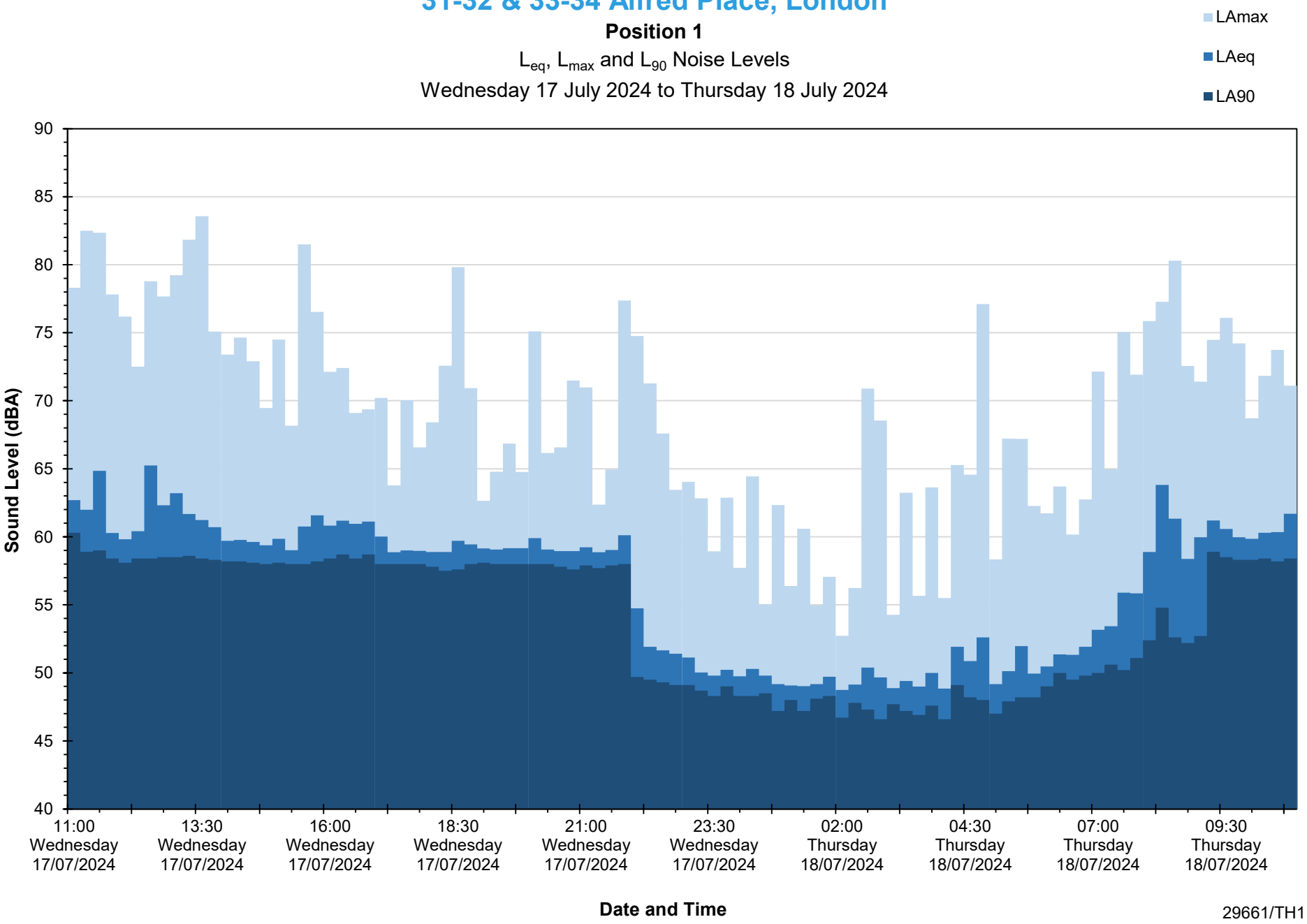
Time History Graphs

31-32 & 33-34 Alfred Place, London

Position 1

L_{eq}, L_{max} and L_{90} Noise Levels

Wednesday 17 July 2024 to Thursday 18 July 2024



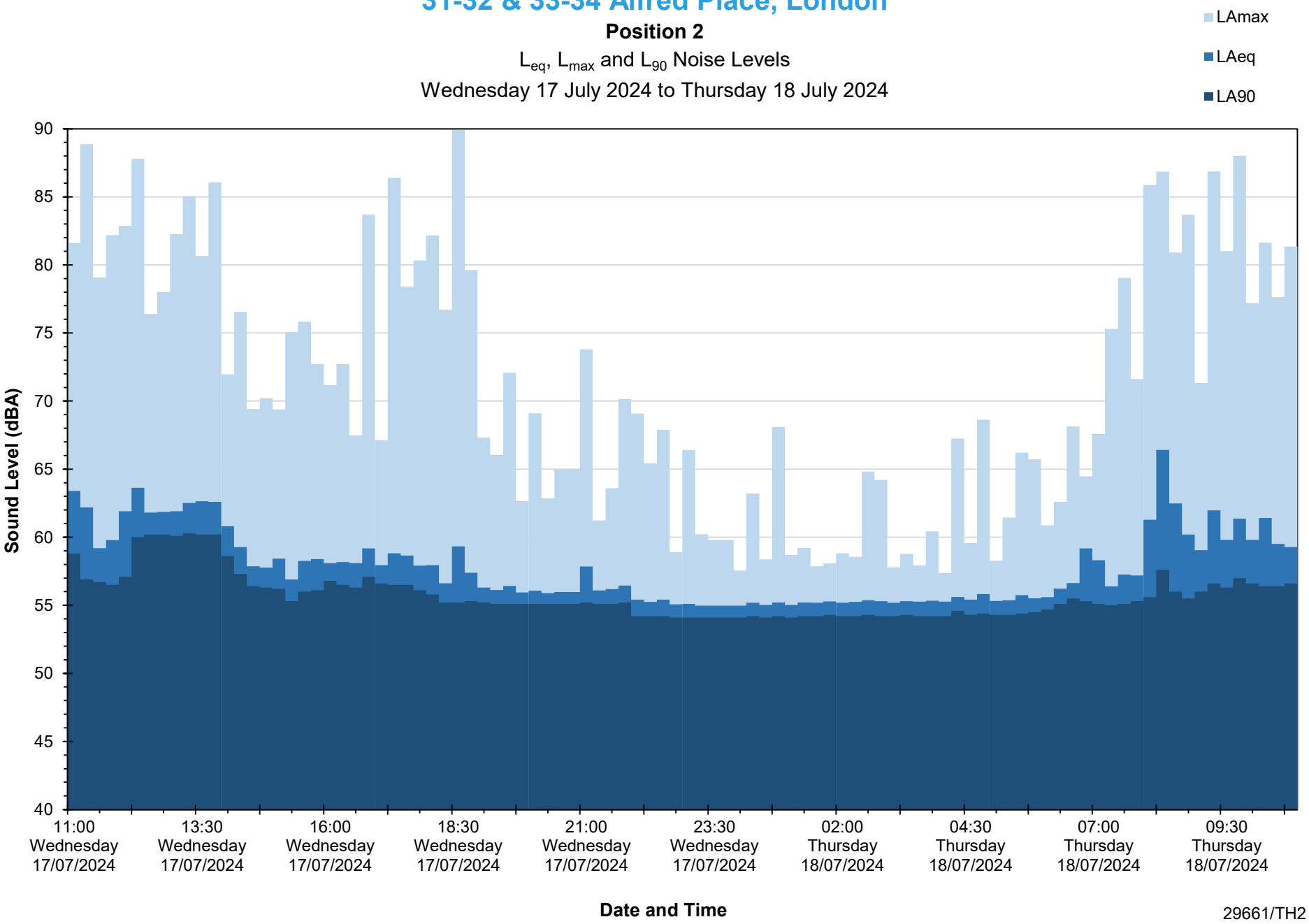
29661/TH1

31-32 & 33-34 Alfred Place, London

Position 2

L_{eq}, L_{max} and L_{90} Noise Levels

Wednesday 17 July 2024 to Thursday 18 July 2024



29661/TH2