

Middlesex House Camden

Environmental Noise Survey and Plant Noise Assessment Report

31677/PNA1

17 July 2024

For:
Jackson Coles LLP
Morelands
5-23 Old Street
London
EC1V 9HL



Hann Tucker Associates

Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595




Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041

(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk



Environmental Noise Survey and Plant Noise Assessment Report 31677/PNA1

Document Control

Rev	Date	Comment	Prepared by	Reviewed by	Approved by
0	17/07/2024	-			
			Stavros Tagios Consultant MSc	Bo Ding Senior Consultant Ph.D, MSc, MIOA	Robin Honey Director BA(Hons), MIOA

This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.



Environmental Noise Survey and Plant Noise Assessment Report Report 31677/PNA1

Contents	Page
1.0 Introduction	1
2.0 Objectives	1
3.0 Acoustic Terminology	1
4.0 Site Description	2
5.0 Planning Policies, Standards & Guidance	3
6.0 Baseline Noise Survey	5
7.0 Plant Noise Emission Criteria	9
8.0 Plant Noise Impact Assessment	11
9.0 Conclusions	14

Attachments

Appendix A – Acoustic Terminology

Appendix B – Relevant Planning Policies and Guidance

Appendix C – Time History Graphs



1.0 Introduction

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

The site, which is located on Cleveland Street, is proposing to install new external building services plant. Jackson Coles are proposing to install new plant on the 4th floor roof to serve future tenants from ground floor to level 4.

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/or the application of BS 4142: 2014+ A1:2019 have been established, and limiting noise levels established.

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings in order to identify suitable accessible locations for environmental noise measurements.

To establish by means of an unattended 24 hour survey the existing L_{Amax} , L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at up to 2No. secure and accessible on-site positions, using fully computerised noise monitoring equipment.

The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority and/or the application of BS 4142: 2014 and to minimise the possibility of noise nuisance to neighbours.

3.0 Acoustic Terminology

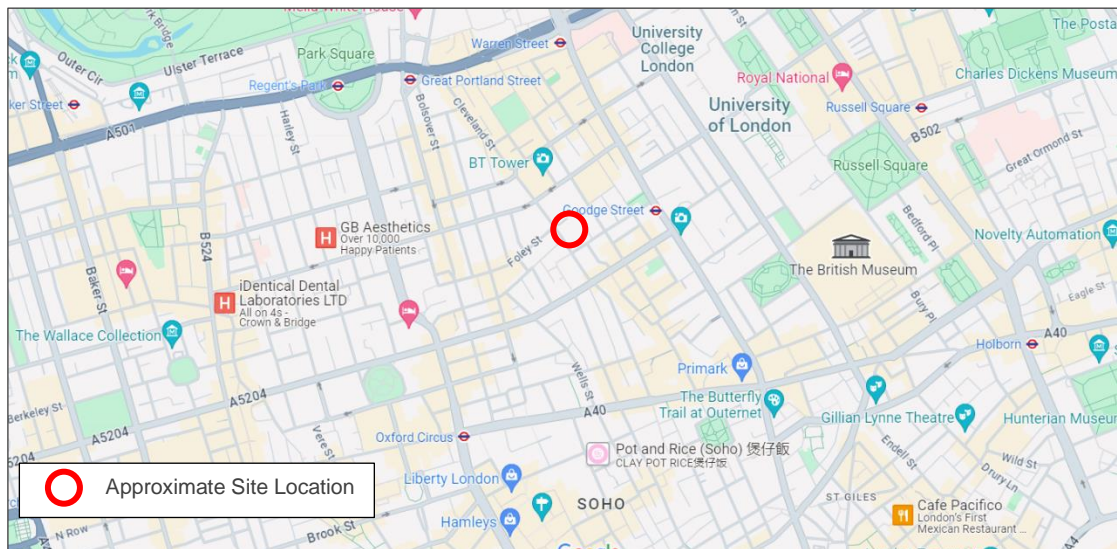
For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.



4.0 Site Description

4.1 Location

The site is Middlesex House, Located at Cleveland Street, London, W1T 4JE. The location is shown in the Location Map below.



Location Map, Map Data ©2024

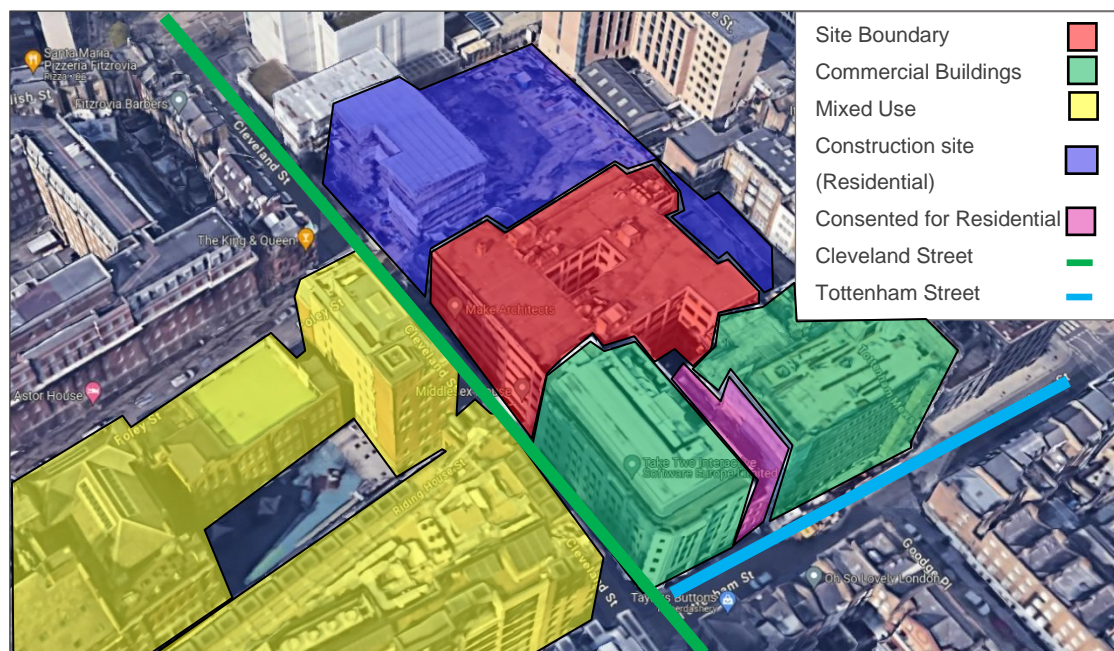
The site falls within the jurisdiction of London Borough of Camden.

4.2 Description

The building is situated within the Charlotte Street Conservation area, on Cleveland Street, which, together with neighbouring Whitfield and Chitty Street, is characterised by a greater proportion of 20th century development and a predominance of larger plots. Due to the nature of uses (predominantly commercial and residential) and limited levels of traffic, these streets are quieter and less populated, and have a strong sense of enclosure deriving from the relatively narrow widths, and continuous frontages of generally four or five storeys in height and strong parapet lines. There are also several listed buildings (mainly Grade II) located close to the application site. The surrounding area comprises mainly commercial buildings as well as mixed use buildings (commercial/residential). At the time of the survey adjacent to the site to the north, northeast and south were construction sites for consented residential developments.



The site is shown in the Site Plan below.



Site Plan, Imagery ©2024 Google, Map Data ©2024

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:

- Camden Local Plan (adopted in July 2017)
- British Standard 4142:2014 + A1:2019
- Statutory Noise Nuisance
- World Health Organisation: 2018

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. London Borough of Camden's planning policy for controlling atmospheric noise emissions from building service plant is detailed in Appendix 3 of the Camden Local Plan (adopted in July 2017). The relevant sections have been copied below.

"Industrial and Commercial Noise Sources

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 57dBL _{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 88dBL _{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 $L_{eq,5mins}$ 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 Stavros Tagios MSc from approximately 11:15 hours on Tuesday 2 July 2024 to 12:30 hours on Wednesday 3 July, 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 attached to an extendable pole that was fixed to the fourth-floor terrace balustrade on the northeastern elevation of the existing building. The microphone was approximately 1.5m above 4 th floor terrace level and was fully exposed to nearby activity on Tottenham Mews. This location is inclusive of local reflections (i.e. a façade level and not free-field).
2	Unattended	The microphone was attached to an extendable pole that was fixed to the fourth-floor terrace balustrade approximately 4m away from the southeastern elevation (i.e rear of buildings with fronts on Tottenham Street) and was exposed to noise from the surrounding area. The microphone was approximately 1.5m above the 4 th floor terrace level. This location is inclusive of local reflections (i.e. a façade level and not free-field).



The measurement positions are shown on the plan below.



Plan Showing Measurement Positions, Imagery ©2024 Google, Map Data ©2024

6.3 Weather Conditions

Between Tuesday 2nd July 2024 and Wednesday 3rd July 2024, local weather reports indicated no periods of prolonged or heavy rainfall, with temperatures ranging from 13 °C (night) to 20°C (day) and average wind speeds less than 4.7 m/s. During our time on site, skies were overcast, there was light rain, wind conditions were calm and road surfaces were largely 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
2	Type 1 ½" Condenser Microphone	ACO Pacific	7052E	71786	Calibration on 03/01/2024
	Preamp	Svantek	SV18	135659	Calibration on 03/01/2024
	Type 1 Data Logging Sound Level Meter	Svantek	971	87087	Calibration on 03/01/2024
-	Type 1 Calibrator	Bruel & Kjaer	4230	1558535	Calibration on 27/07/2023



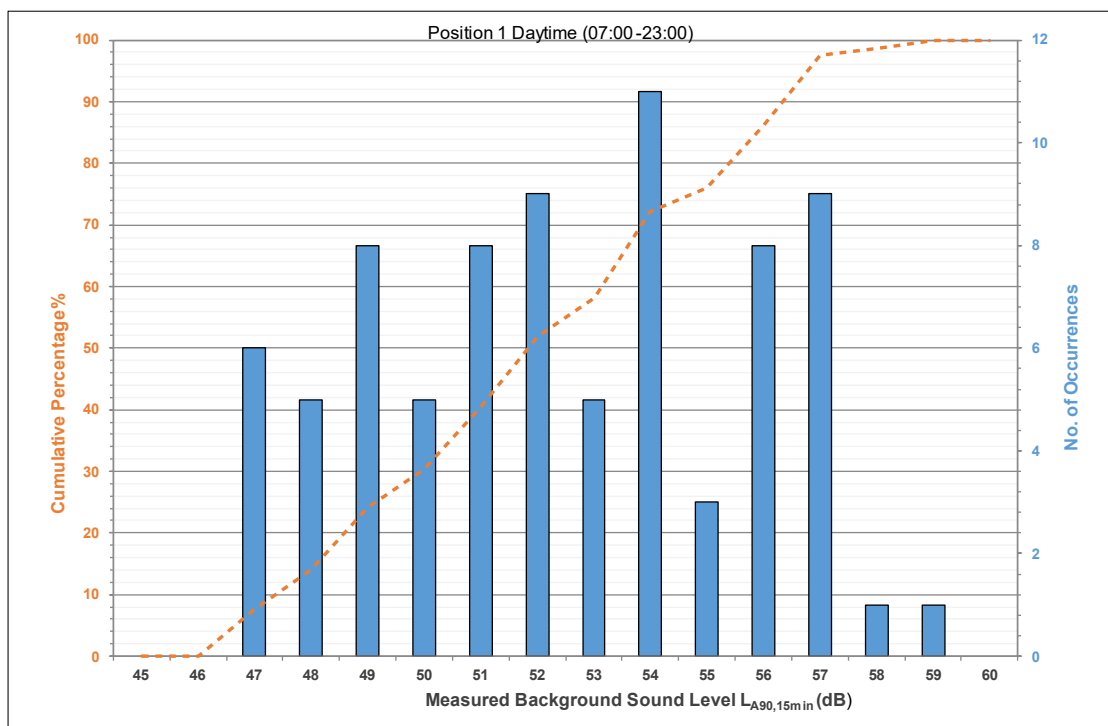
Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.03 dB).

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.

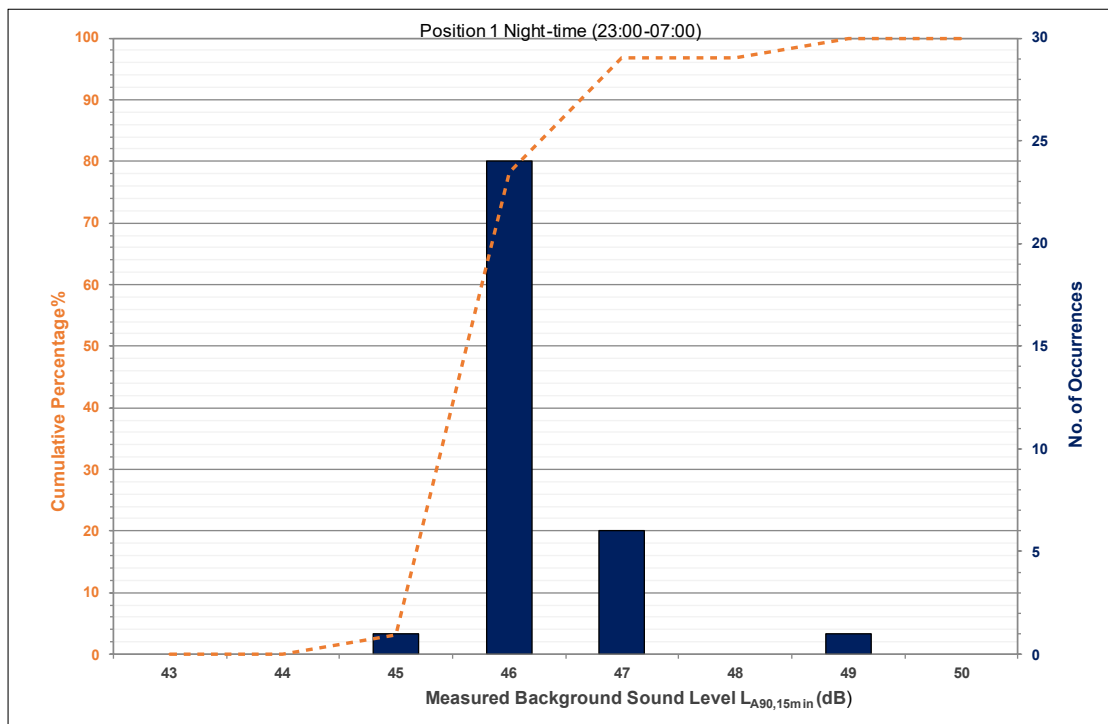
6.5 Results

The results have been plotted on Time History Graphs 31677/TH1 to 31677/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.

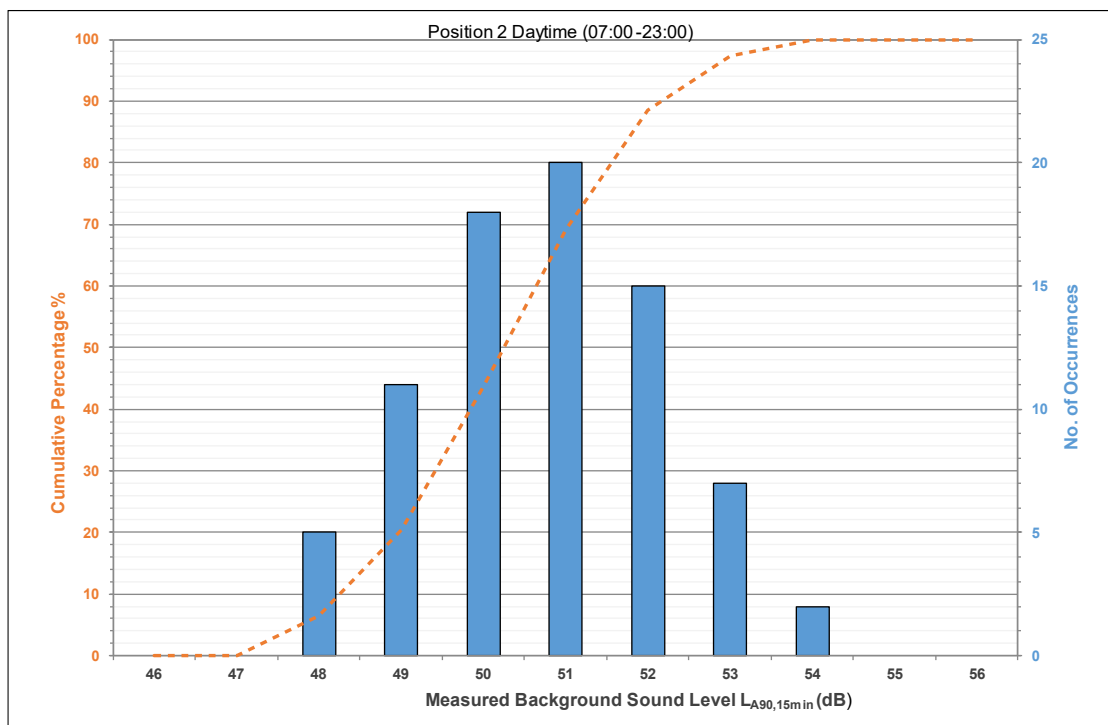
BS 4142 states that “the background sound level must be reliable and suitably represent the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time 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.



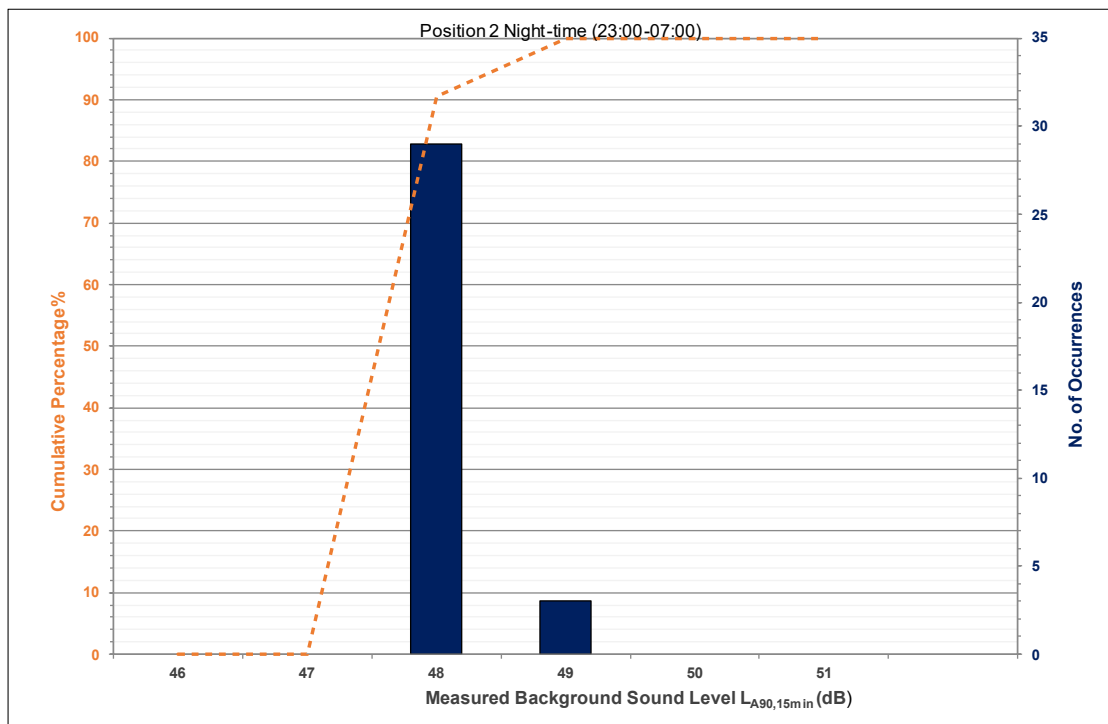
Statistical Graph showing daytime measured background noise levels $L_{A90}(15mins)$ at measurement position 1



Statistical Graph showing night-time measured background noise levels $L_{A90(15mins)}$ at measurement position 1



Statistical Graph showing daytime measured background noise levels $L_{A90(15mins)}$ at measurement position 2



Statistical Graph showing night-time measured background noise levels $L_{A90(15mins)}$ at measurement 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 in line with BS 4142 and the requirements of the Local Authority.

Position	Representative Measured $L_{A90(15min)}$ Background Sound Level (dB re 2×10^{-5} Pa)	
	Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	47	46
2	48	48

6.6 Discussion Of Noise Climate

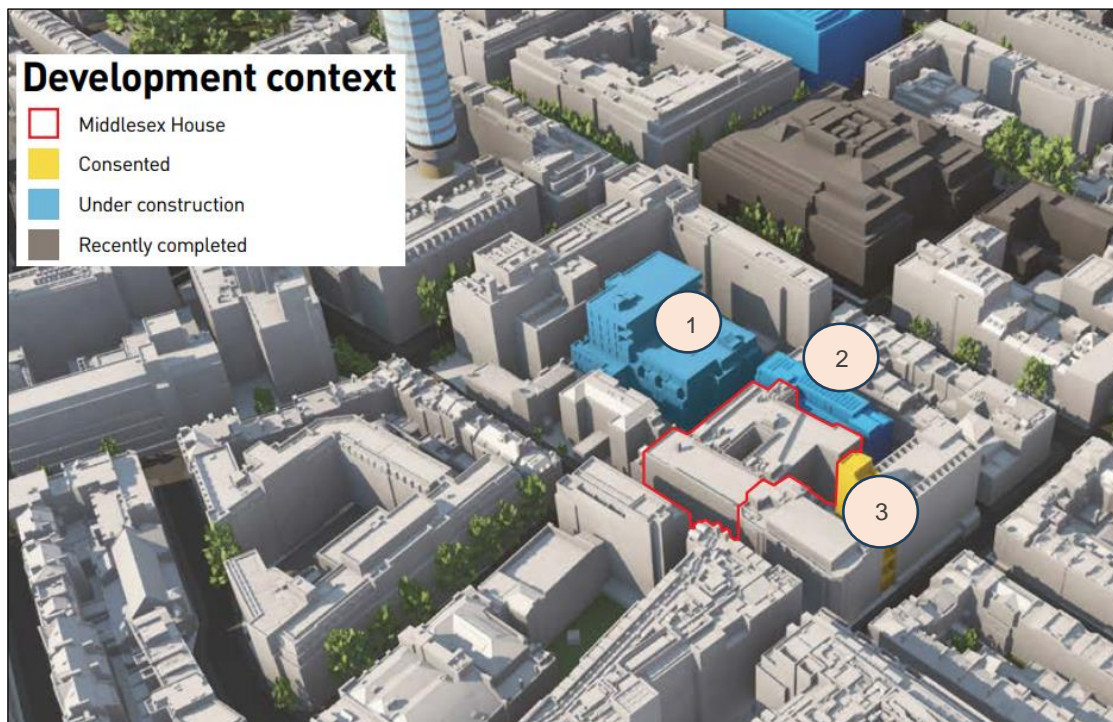
Due to the nature of the survey, i.e. unattended, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However, at the beginning and end of the survey period the noise climate was noted to be dominated by construction noise in the surrounding area as well as scarce road traffic at the surrounding road network.

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.



We have identified the following 3 Noise Sensitive receptors nearest to the site.



Snapshot from document titled "Middlesex House Design and Access Statement" and dated 22/04/2024, provided by Jackson Coles LLP

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	Plant Noise Emission Criteria ($L_{A,T}$ dB)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Receptors 1 & 2	37	36
Receptor 3	38	38

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.



8.0 Plant Noise Impact Assessment

8.1.1 Plant Location

The proposed roof plant layout and nearest identified noise sensitive receptors are shown in the following drawing:



Plant compound Plan showing different groups of plant items as addressed in subsequent assessments, drawing provided by Jackson Coles LLP

8.2 Proposed Plant

The exact models and makes of the proposed plant are currently unknown. Assumptions have therefore been made based on existing proposals and limiting noise levels have been set.

It is proposed to install 9No. new VRF outdoor units, 9No. DX standby outdoor condenser units and relocate 2No. existing VRF units.

We have identified the below groups based on the proposed plant layouts:

Type of plant	Group	Items (No. of)
VRF Outdoor units	Red Group	9
DX Outdoor Condenser Units	Green Group	4
DX Outdoor Condenser Units	Blue Group	5
Relocated VRF Units	Orange Group	2

Based on the plans we were provided and google maps we have identified the following distances from the proposed groups of plant to the nearest residential receptors:



Plant Group	Approximate Distance to 1m from Receptor 1 (m)
Red	10
Green	19
Blue	25
Orange	22

Plant Group	Approximate Distance to 1m from Receptor 2 (m)
Red	8
Green	7
Blue	13
Orange	13

Plant Group	Approximate Distance to 1m from Receptor 3 (m)
Red	36
Green	27
Blue	17
Orange	26

8.2.1 Plant Operation

We understand the plant will operate 24hours.

8.3 Proposed Limiting Noise Levels

In order to control plant noise emissions in line with the proposed criterion, we would recommend that the following limiting noise levels be achieved at 1m from each plant group.

Type of plant	Location	Items (No. Off)	Proposed Limiting Cumulative Sound Pressure level @ 1m from plant	Proposed Limiting Cumulative Sound Pressure level @ 1m from each individual unit
VRF Outdoor units	Red Group	9	49dBA	38dBA
DX Outdoor Condenser Units	Green Group	4	44dBA	38dBA
DX Outdoor Condenser Units	Blue Group	5	45dBA	38dBA
Relocated Condenser Units	Orange Group	2	45dBA	42dBA



Plant have not yet been selected, therefore, plant noise data are not available. To achieve the above limiting noise levels, acoustic attenuation is likely to be required for individual units or groups of units. Solutions may typically comprise of acoustic enclosures capable of providing at least the required attenuation such that the aforementioned limiting noise levels are not exceeded. The amount of attenuation (if required) will depend on plant noise levels.

There may be more than one way to achieve the proposed criteria at the nearest noise sensitive receptor. Hann Tucker would be happy to review proposals should that be deemed necessary.

8.4 Plant Noise Impact Assessment

The following tables summarise our predictions of atmospheric noise emissions from the proposed plant, considering the recommended limiting noise levels in Section 8.3, to the nearest noise sensitive residential window (i.e Receptor 2).

	Sound Pressure Level (dBA)
	Night-time (23:00 – 07:00 hours)
Cumulative Red Group plant noise emissions	49 @ 1 m
Conformal Area Distance Loss (8m)	-14
Calculated Noise Level at 1m from Receptor 2	33
Cumulative Green Group plant noise emissions	44 @ 1m
Conformal Area Distance Loss (8m)	-14
Calculated Noise Level at 1m from Receptor 2	30
Cumulative Blue Group plant noise emissions	45 @ 1 m
Conformal Area Distance Loss (13m)	-18
Calculated Noise Level at 1m from Receptor 2	27
Cumulative Orange Group plant noise emissions	45 @ 1m
Conformal Area Distance Loss (13m)	-18
Calculated Noise Level at 1m from Receptor 2	27
Cumulative Noise Level at Receptor 2	36

Our calculations indicate that the proposed plant, provided that it complies with the limiting noise levels proposed in Section 8.3, should be capable of achieving the requirements of the Local Authority outlined in Section 9.0.



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 policy.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

The assessment indicates that the proposed plant, provided that it complies with the proposed cumulative limiting noise levels, should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive residential window.

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} L₉₀ 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.

B.3 World Health Organisation Guidelines on Community Noise

BS8233:2014 is based upon the current World Health Organisation (WHO) guidance “*Guidelines on Community Noise*”. A summary of the noise guidelines relevant to the proposed scheme is presented in the table below.

Residential Environment	Critical Health Effect(s)	L _{Aeq}	L _{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

These WHO guidelines are based, in almost all cases, on the lower threshold below which the occurrence rates of any particular effect can be assumed to be negligible.

Appendix C

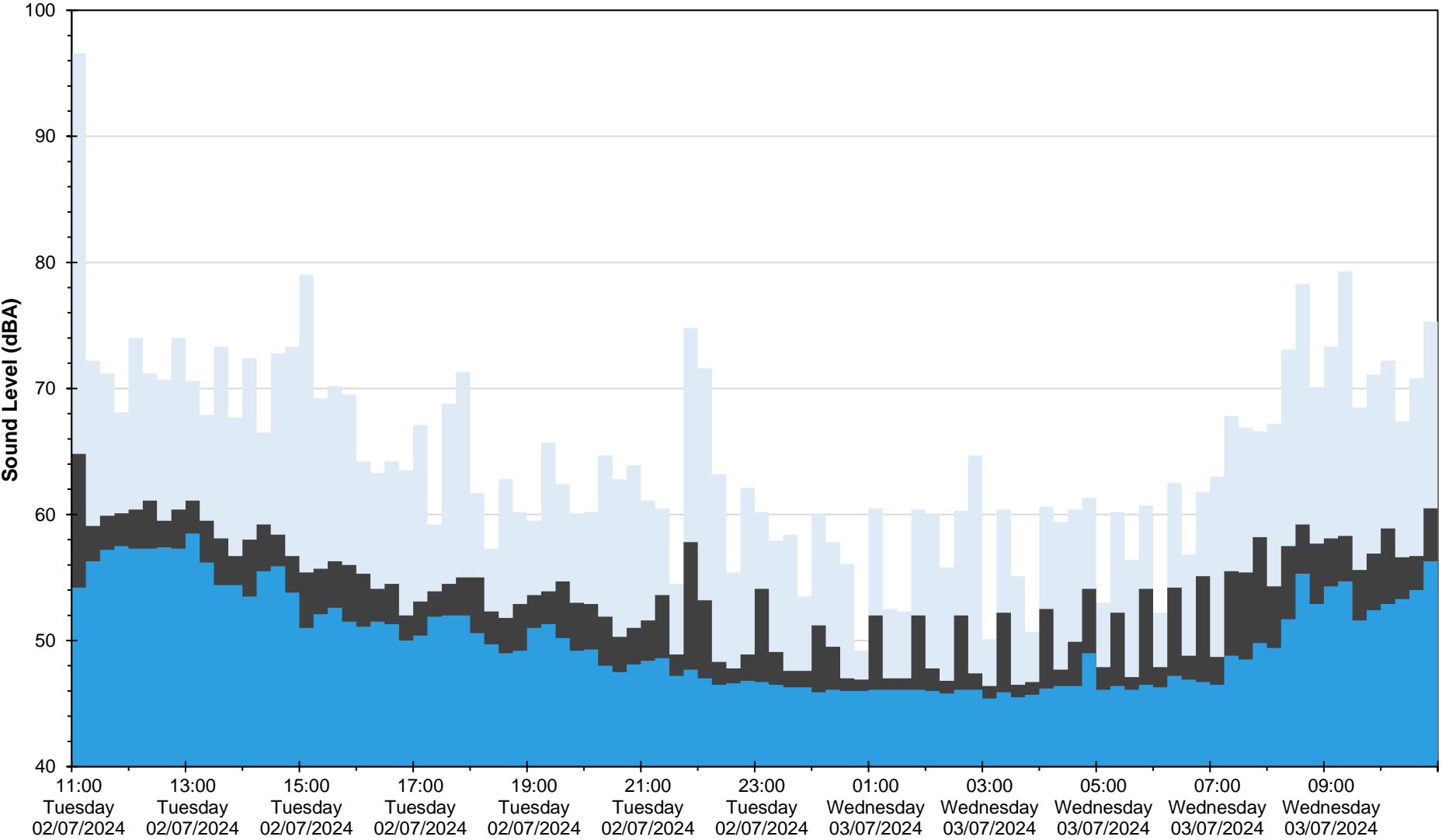
Time History Graphs

Middlesex House

Position 1

L_{eq} , L_{max} and L_{90} Noise Levels
Tuesday 2 July 2024 to Wednesday 3 July 2024

- LAmax
- LAeq
- LA90



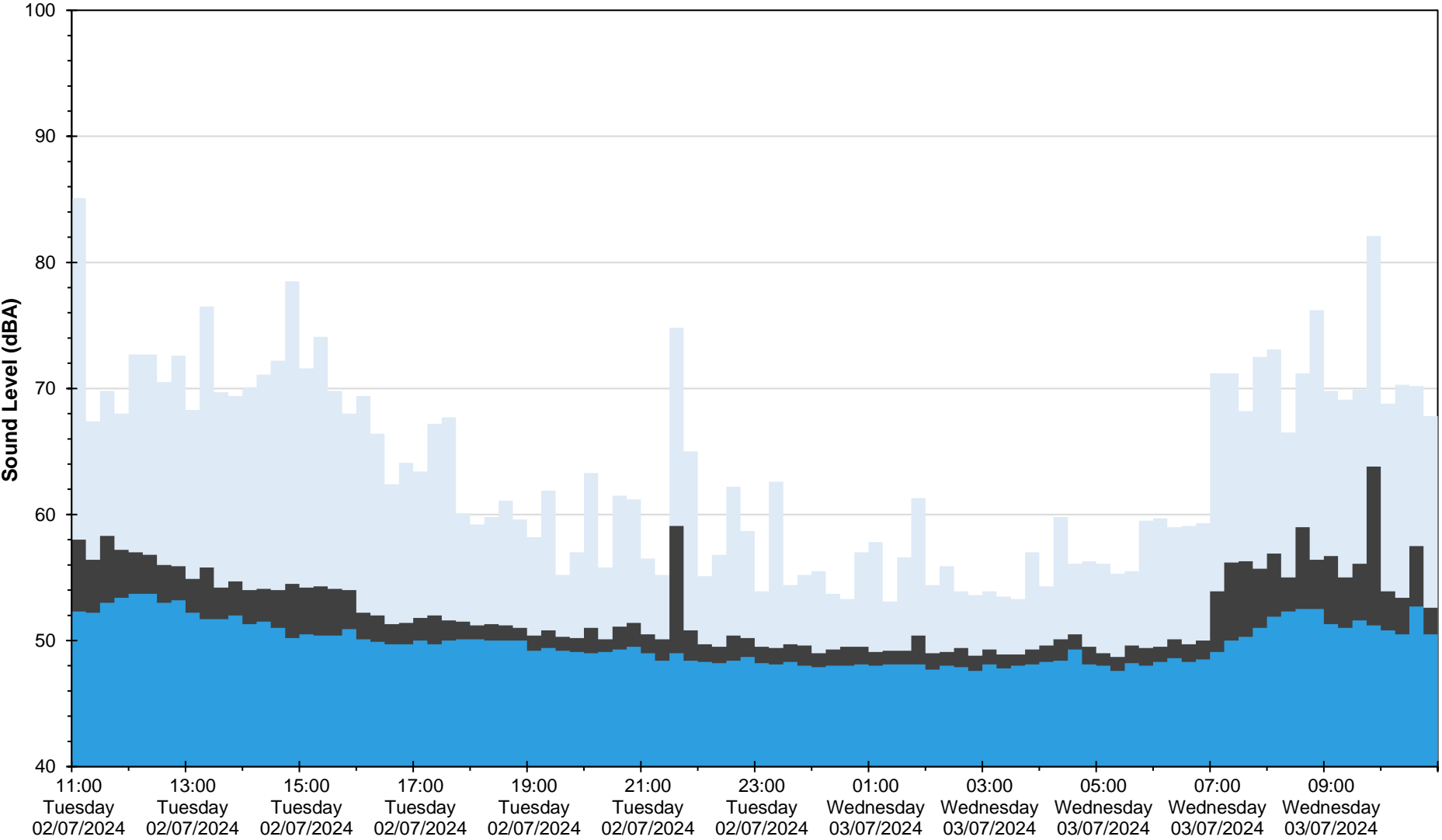
Date and Time

Middlesex House

Position 2

L_{eq} , L_{max} and L_{90} Noise Levels
Tuesday 2 July 2024 to Wednesday 3 July 2024

- LAmax
- LAeq
- LA90



Date and Time

31677/TH2