43 Whitfield Street
London

Environmental Noise Survey and Plant Noise Assessment

28861/PNA1 Rev2

12 May 2022

For:
West London & Suburban Property Investment
25 Savile Row
London
W1S 2ER

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Hann Tucker Associates

Environmental Noise Survey and Plant Noise Assessment Report 28861/PNA1 Rev2

Document Control

Rev	Date	Comment	Prepared by	Authorised by
2	12/05/2022	Section 5.0, 10.0 & 11.0 updated with new plant selection and location		
			Kyungmin Kim Assistant Consultant	Simon Hancock Director BEng (Hons), CEng, MIMechE, MCIBSE, FIOA
1	06/07/2021	Updated plant information	Kyungmin Kim Assistant Consultant	Simon Hancock Director BEng (Hons), CEng, MIMechE, MCIBSE, FIOA
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Attachments

1.0 Introduction

It is proposed to replace and install new roof plant on the lower roof and main roof plant deck at 43 Whitfield Street.

Hann Tucker Associates have been commissioned to undertake a noise survey to establish the existing environmental noise level around the roof and determine the appropriate plant noise criteria with reference to the Local Authority criteria's requirements.

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 unmanned 24 hour survey the existing L_{Amax}, L_{Aeq}, and L_{A90} environmental road, rail and air traffic noise levels at a secure and accessible on-site positions, using fully computerised noise monitoring equipment.

Measurement procedure shall be in general accordance with British Standard BS 7445 "Description and Measurement of environmental noise".

Measurement procedures shall be in general accordance with those described in BS 4142: 2014, Method for rating industrial noise affecting mixed residential areas, published by the British Standards Institution.

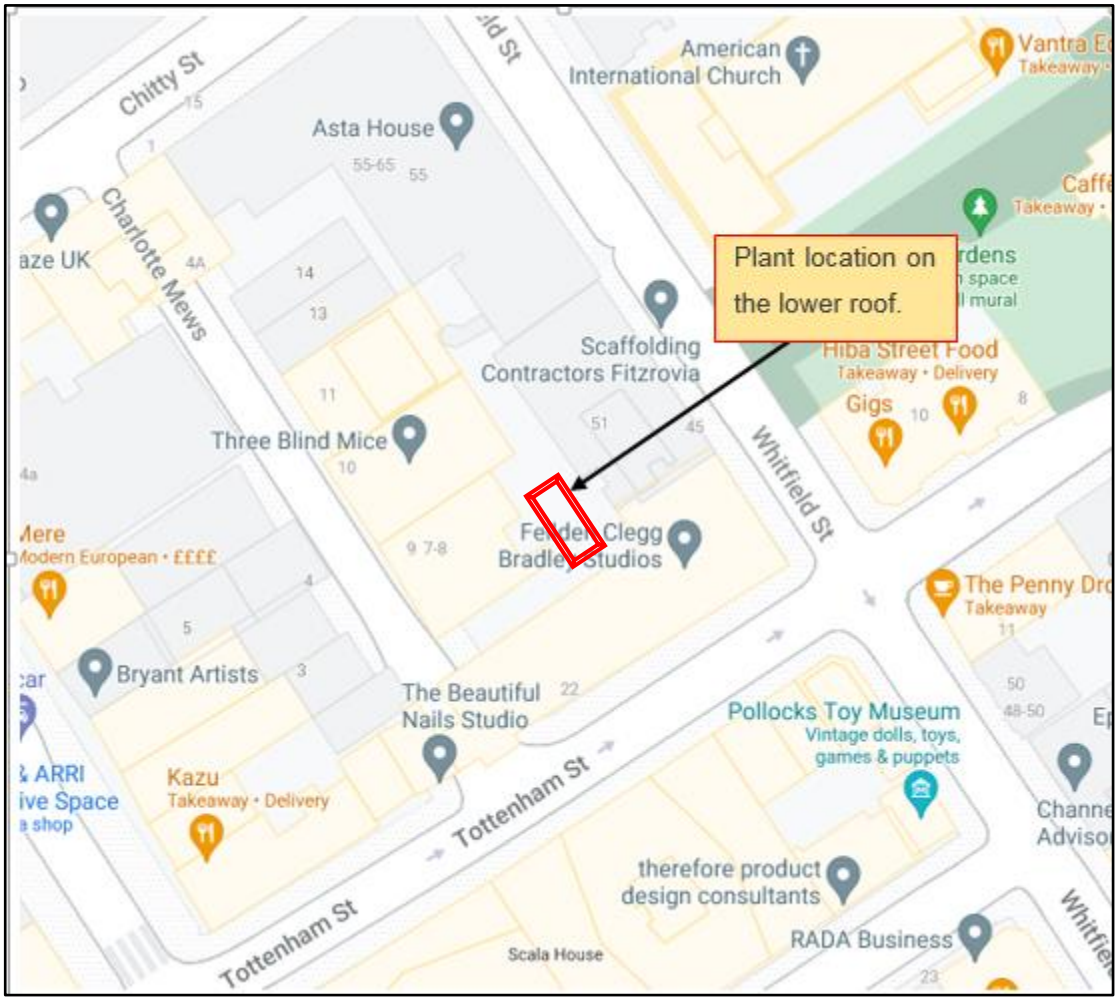
The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority and/or the application of BS 4142: 2014 and to minimise the possibility of noise nuisance to neighbours.

To present our methodology and findings in a detailed Environmental Noise Survey and Plant Noise Impact Assessment Report to accompany the planning application.

3.0 Site Description

3.1 Location

43 Whitfield Street is a commercial office building set over 6 storeys, from the ground and up to level 5. The location is shown in the Location Map below.



Location Map (Map Data © 2021 Google)

The site falls within the jurisdiction of London Borough of Camden

3.2 Description

The proposed plant location is on the lower roof of 43 Whitfield Street, surrounded and overlooked by adjacent buildings.

Currently, there are 4No. VRF condensers within wooden fenced enclosure, and 6 smaller DX condensers distributed around the roof area serving the adjacent 7 – 10 Charlotte Mews.

The site is shown red in the map below.

Location Map Showing Site Location (Map Data © 2021 Google)

4.0 Acoustic Terminology

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

5.0 Project Proposals

5.1 Drawings

Our Acoustic analyses is based on the following drawings provided by Watts Group Ltd.

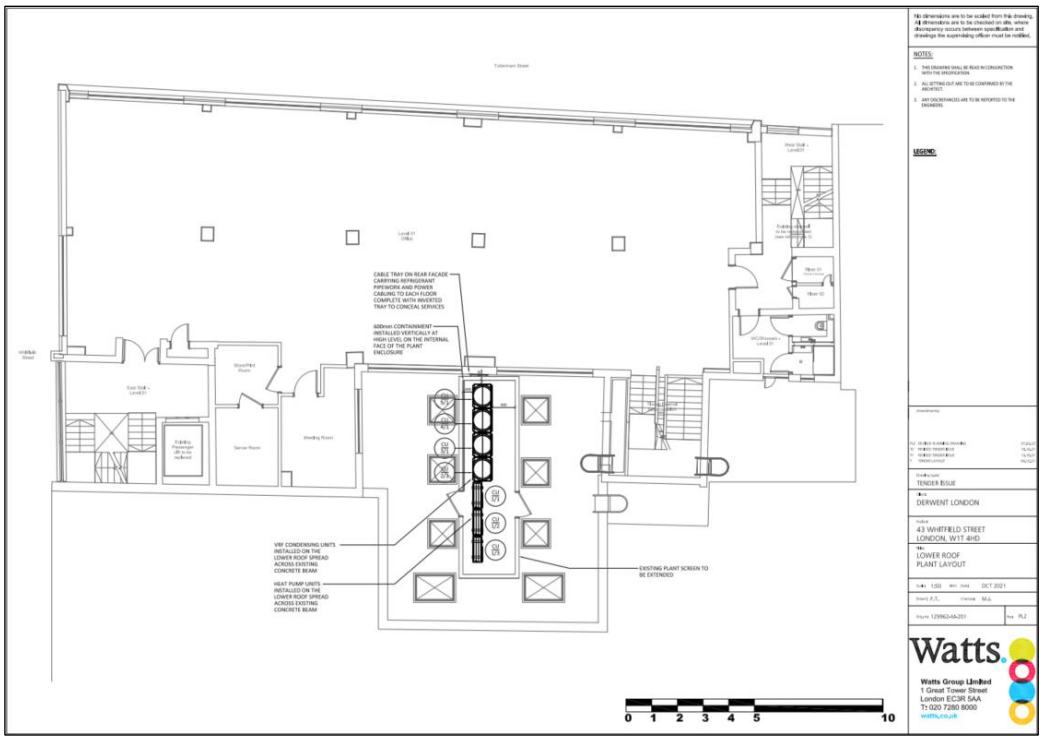
Reference	Title	Date
129962-M-201	Lower Roof Plant Layout	07 February 2022
129962-E-209	Roof Plan Electrical Services Layout Proposed Photovoltaic Panels	27 July 2021

5.2 Proposed Plant

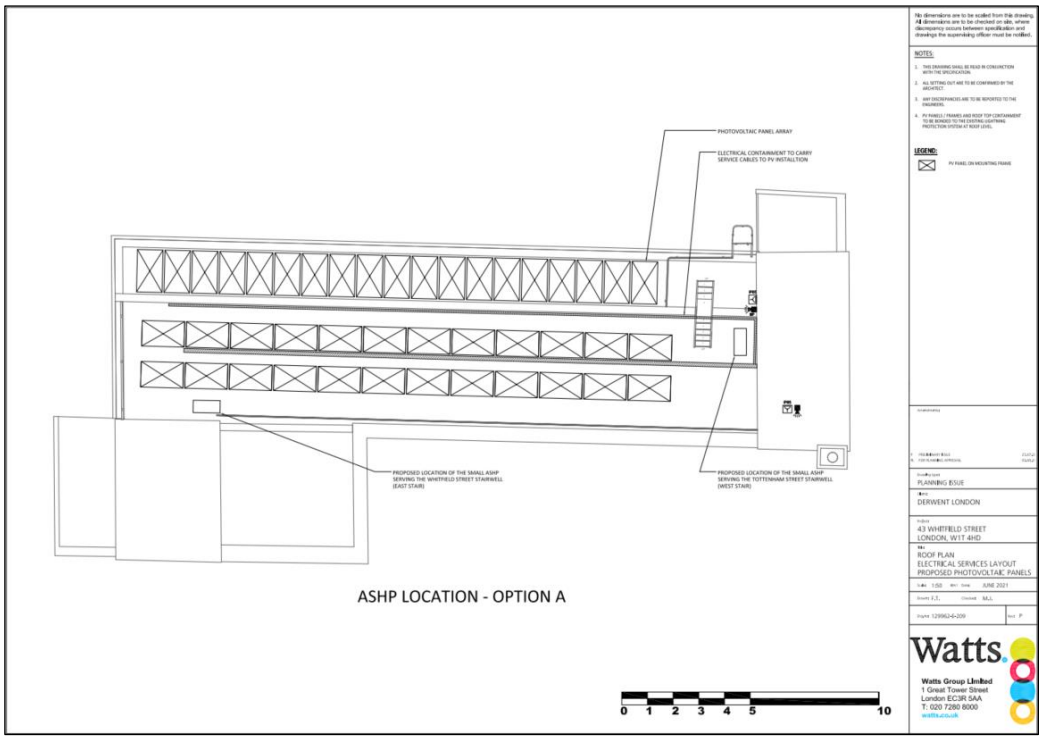
We understand the proposed plant comprises of the following units.

Plant Description	Location	Qty	Plant Make	Model Number
VRF Condenser (CU5/1, CU4/1, CU3/1, CU2/1)	Lower Roof plant deck	4	Mitsubishi	PURY-P300
Air Source Heat Pump (CU 1/1, CU 1/2, CU1/3)	Lower Roof plant deck	3	Mitsubishi	PUZ-HWM140YHA
DX Condenser	Lower Roof plant deck	6	To be installed by future tenants	
Air Source Heat Pump	Main Roof plant deck	2	Mitsubishi	PUZ-WM112VAA

The location of the units noted above are shown below:



Drawing Showing Plant Locations on Lower Roof Plant Deck (drawing ref. 129962-M-201)



Drawing Showing ASHP Locations On Main Roof Plant Deck (drawing ref. 129962-E-209)

6.0 Acoustic Standards and Guidelines

6.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is to:

"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

6.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was first published in March 2012. This document replaced the existing Planning Policy Guidance Note 24 (PPG24) "Planning and Noise". A new edition of NPPF was published in July 2018 and comes into effect immediately. This new edition however, contains no new directions with respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the July 2018 edition.

Paragraph 170 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by (amongst others) *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely*

affected by unacceptable levels of soil, water or noise pollution or land stability."

The following paragraphs are from the NPPF (revised February 2019):

"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Paragraph 180 also references the Noise Policy Statement for England. This document does not refer to specific noise levels but instead sets out three aims:

"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

6.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at http://planningguidance.planningportal.gov.uk/blog/guidance/. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

6.4 Local Authority Requirements

The site lies within the jurisdiction of London Borough of Camden. Their advice regarding criteria for atmospheric noise emissions from building service plant is stated in London Borough of Camden's Local Plan.

As quoted below from Policy 4 titled *"Noise and Vibration"* included in Chapter 6 *"Protecting amenity"* in the Local Plan, the London Borough of Camden recognises commercial office as a noise sensitive development:

"6.90 Noise sensitive developments includes housing, schools and hospitals as well as offices, workshops and open spaces. "

Considering the Local Authority's guidance and from most recent noise assessment surveys completed for plant proposals within the London Borough of Camden, the following statement should be referred:

"Noise levels at a point 1 metre external to sensitive facades shall be at least 10dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 15dB(A) below the LA90, expressed in dB(A).

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies A1 and A4 of the Camden Local Plan 2017."

We have contacted the London Borough of Camden's environmental health officer to discuss the appropriate approach. Their response was as follows:

"*Our local plan does not set out a specific assessment methodology for commercial receptors impacted by mechanical plant noise. I have checked our records and I could not find any noise complaints linked to the existing plant. In the past consultants have provided a simple assessment based on the guidelines for internal noise levels for office space set out in BS8233*"

6.5 BS 8233:2014

As suggested in Section 5.4, Camden Council requires the guidelines of BS8233:2014 "Guidance on sound insulation and noise reduction for buildings" to be satisfied for commercial receptors.

In relation to the commercial properties within the vicinity of the proposed location of the new plant, Section 7 Table 2 of BS8233:2014 states that for an open plan office a design target of between 45-50dBA Leq,T should be acceptable.

In addition, BS 8233 states that attenuation of 10 to 15dB can be provided by an open window. Hence the external noise level must not exceed 55-65dBA outside the nearest office façade (based on achieving the above design range).

Various London Borough Councils often accept 55-65dBA as an acceptable external ambient noise level.

6.6 BS 4142:2014

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.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to "No Observed Effect Level" as defined in the Noise Policy Statement for England. It is also reasonable to infer from the above that if the plant noise rating level does not exceed the existing background noise level outside any noise sensitive residential window then the plant noise is of "low impact".

6.7 Statutory Noise Nuisance

There is no quantitative definition of statutory noise nuisance. It is generally accepted however, that if the plant noise level is at least 5dB (or 10dB if tonal) below the minimum background $L_{90(15minutes)}$ at 1m from the nearest noise sensitive residential window, then the risk of a statutory noise nuisance is avoided. By adopting this as a design criterion the guidance contained in BS 4142:2014 should also be complied with.

7.0 Survey Methodology

The survey was undertaken Kyungmin Kim, Assistant Consultant.

7.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 13:00 hours on Wednesday 19th May 2021 to 13:00 hours on Thursday 20th May 2021.

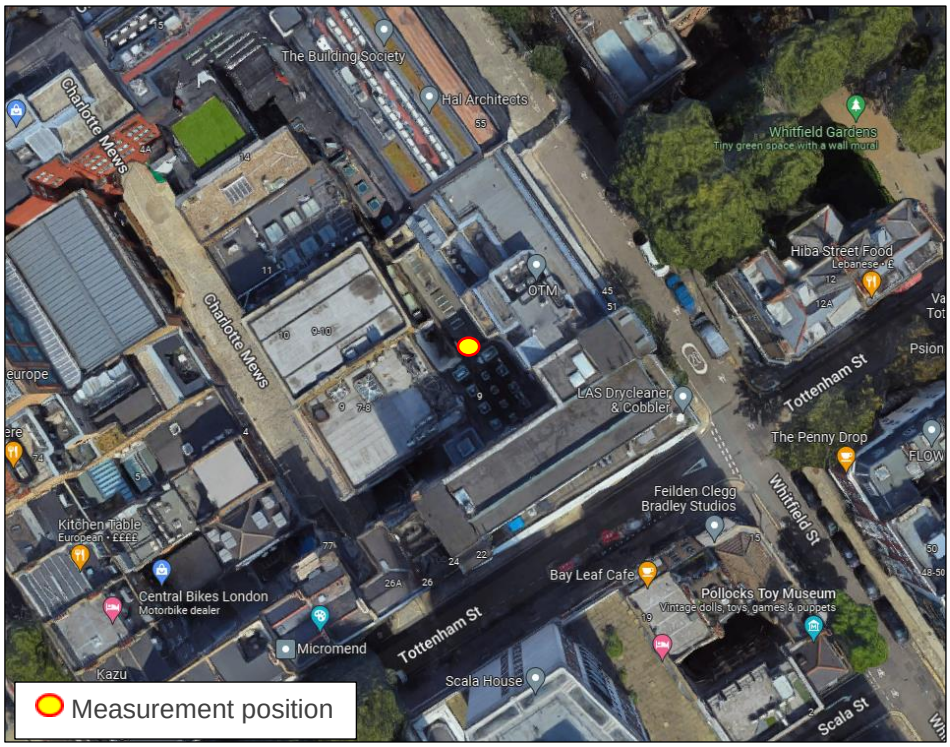
During the periods we were on site the wind conditions were moderate. The sky was overcast. We understand that generally throughout the survey period the weather conditions were similar. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods

7.2 Measurement Position

The microphone was attached to the handrail on the roof area approximately 1.5 metres above roof ground level, which is at first floor level of the building.

The microphone position is shown on the plan below.



Plan Showing Measurement Position (Map Data © 2022 Google)

7.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Svantek	971	72538	21/01/2021
Preamp	Svantek	SV18	72276	21/01/2021
Microphone	ACO Pacific	7052E	68293	21/01/2021
Type 2260 Calibrator	Brüel & Kjær	4231	2115545	09/06/2020

The 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 0.1 dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable.

The microphone was fitted with a windshield.

8.0 Results

The results have been plotted on Time History Graph 28861/TH1 enclosed, presenting the 15-minute A-weighted (dBA) L_{90} and L_{eq} noise levels at each measurement position throughout the duration of the survey.

The lowest $L_{eq(15\ min)}$ and $L_{A90\ (15\ min)}$ measurements recorded during the survey are presented in the tables below:

Lowest Measured $L_{Aeq(15min)}$ Noise Level (dB re 2 x 10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	**Night-Time (23:00 – 07:00) Hours**
49 dBA	45 dBA

Lowest Measured $L_{A90(15min)}$ Noise Level (dB re 2 x 10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	**Night-Time (23:00 – 07:00) Hours**
44 dBA	42 dBA

9.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately determine the individual noise sources or specific noise events that occurred throughout the duration of survey. Nevertheless, during the periods we were on site the subjectively dominant noise source was traffic noise from the surrounding road network.

10.0 Plant Noise Emission Criteria

10.1 Residential Receptors

The nearest residential receptors to the lower roof plant are located at the rear façades of 24 Tottenham Street, and Asta House, 65 Whitfield Street.

The receptor located at 24 Tottenham Street is acoustically screened from the existing/proposed plant.

The nearest residential receptor located at Asta House is approximately 49 metres to the north

of the plant.

The nearest residential receptor to the main roof plant is located at Scala House on 21 Tottenham St, London W1T 2AW, approximately 19 metres to the south of the plant.

Based on the requirements of the London Borough of Camden (see Section 5.4), and the results of our environmental noise survey, we recommend that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential windows.

Proposed Noise Criteria (dBA) at Noise Sensitive Residential Window	
Daytime (07:00 – 23:00 hours)	**Night-time (07:00 – 23:00 hours)**
34	32

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.

10.2 Non-Residential Receptors

The nearest non-residential i.e. office receptors to lower roof plant are the windows of 45 Whitfield Street, located approximately 9 metres away, which overlook the existing/proposed plant.

The nearest non-residential i.e. office receptors to main roof plant are the windows of 60 Charlotte Street, located approximately 30 metres away.

As stated in Section 5.4 and 5.5, for office receptors we propose the external plant noise level should not exceed 65dBA outside the nearest office façade.

11.0 Plant Noise Impact Assessment

11.1 Location of Plant

It is proposed to replace the existing lower roof plant, comprising 4No. VRF condensers within a fenced enclosure and 6No. DX split condensers distributed around this area.

The work includes installing 3No. new VRF condensers and 3No. Air Source Heat Pump on the lower roof, and additional 2No. new Air Source Heat Pump on the main roof plant deck.

In addition, future tenants may also want to install small DX condensers on the lower roof to serve the server rooms. These would be part of a future tenant fit out.

11.2 Proposed Plant

We understand the proposed plant comprises the following:

Plant Description	Location	Qty	Plant Make	Model Number
VRF Condenser (CU5/1, CU4/1, CU3/1, CU2/1)	Lower Roof plant deck	4	Mitsubishi	PURY-P300
Air Source Heat Pump (CU 1/1, CU 1/2, CU1/3)	Lower Roof plant deck	3	Mitsubishi	PUZ-HWM140YHA
DX Condenser	Lower Roof plant deck	6	To be installed by future tenants	
Air Source Heat Pump	Main roof plant deck	2	Mitsubishi	PUZ-WM112VAA

We understand:

- the future tenants DX condensers serving the server rooms are likely to be operational 24 hours per day.
    - all of the other plant will operate during daytime (07:00 – 23:00 hours) only.
- the proposed VRF condensers will be limited to 85% fan speed, so to not be noisier than the existing VRF condensers.
- the worst case scenario will be with the condensers operating in cooling mode.

11.3 Plant Noise Data

Based on the manufacturers noise data provided to us, we understand that the proposed VRF condensers are no noisier than the existing VRF condensers to be replaced.

Plant Description	Plant Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1 metre
Existing VRF Condenser	PUHY-EP200	57dBA
Proposed VRF Condenser	PURY-P300	55.5dBA at 85% capacity

The manufacturers noise data for new additional equipment are as follows:

Plant Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1m at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
VRF Condenser PURY-P300	63	59	57	54	49	45	41	37	55.5dBA at 85% capacity
Air Source Heat Pump PUZ-HWM140YHA	56	57	53	50	48	43	39	35	53dBA
Air Source Heat Pump PUZ-WM112VAA	54	48	44	43	38	38	31	24	45dBA
Future Tenants DX Condenser	47dBA (see note)								

In the absence of tenant DX condenser plant noise data, we recommend they be selected so as not to exceed a limiting noise level for future DX condensers of 47 dBA at 1m.

11.4 Plant Noise Assessment

Assessment to Residential Window from Lower Roof Plant

The following table presents our calculation of atmospheric noise emission from the proposed plant on lower roof and main roof to the nearest noise sensitive residential window during daytime:

Description	Sound Level at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Lower Roof									
1No. VRF Condenser (PURY-P300)	63	59	57	54	49	45	41	37	55.5dBA
Quantity Correction for 4No	+6								
1No. ASHP (PUZ-HWM140YHA)	56	57	53	50	48	43	39	35	53dBA
Quantity Correction for 3No.	+5								
1No. Future Tenants DX Condensers	47 dBA								
Quantity Correction for 3No.	+8								
Barrier Loss	-5	-5	-4	-4	-2	0	0	0	
Façade Correction	+7								
Main Roof									
1No. ASHP (PUZ-WM112VAA)	54	48	44	43	38	38	31	24	45dBA
Quantity Correction for 2No.	+3								
49m Distance Correction	-34								
Calculated Noise Level at Noise Sensitive Residential Receptor	34 dBA								

We understand the future tenants DX condensers serving the server rooms are likely to be operational 24 hours per day. All of the other plant will operate during daytime (07:00 – 23:00 hours) only.

Based on this, the following table presents our calculation of atmospheric noise emission from the proposed plant to the nearest noise sensitive residential window during night-time:

Description	Sound Pressure Level (dBA)
	Night-Time (23:00 – 07:00 hours)
1No. Tenants DX Condensers	47 dBA at 1m
Quantity Correction for 6No.	+8
Cumulative Level of Tenants DX Condensers	55 at 1m
49m Distance Correction	-34
Façade Correction	+7
Calculated Noise Level at Nearest Noise Sensitive Residential Receptor from future tenants plant on lower roof	28dBA

Assessment to Residential Window from Main Roof Plant

The following table presents our calculation of atmospheric noise emission from the proposed plant on main roof to the nearest noise sensitive residential window:

Description	Sound Level at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1No. ASHP (PUZ-WM112VAA)	54	48	44	43	38	38	31	24	45dBA
Quantity Correction for 2No.	+3								
19m Conformal Area Distance Correction	-22								
Calculated Noise Level at Noise Sensitive Residential Receptor	35	29	25	24	19	19	12	5	26dBA

Our calculations thus indicate the proposed plant should be capable of achieving the criteria outlined in Sections 9.1.

Assessment to Office Window

The nearest office window to the lower roof plant is located at the rear of 45 Whitfield Street, located approximately 9 metres away, which overlooks the lower roof plant deck.

The following table presents our calculation of atmospheric noise emissions from the new proposed units to the nearest office window:

Description	Sound Level at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1No. VRF Condenser (PURY-P300)	63	59	57	54	49	45	41	37	55.5dBA
Quantity Correction for 4No	+6								
1No. ASHP (PUZ-HWM140YHA)	56	57	53	50	48	43	39	35	53dBA
Quantity Correction for 3No.	+5								
1No. Future Tenants DX Condensers	47 dBA								
Quantity Correction for 3No.	+8								
Barrier Loss	-4	-4	-3	-1	0	0	0	0	
Façade Correction	+7								
9m Conformal Area Distance Correction	-14								
Calculated Cumulative Noise Level at Noise Sensitive Office Receptor from Plant	55 dBA								

The nearest office window to the main roof plant is located at 60 Charlotte Street, located approximately 30 metres away. Our calculation indicates the proposed plant on main roof achieves the criteria outlined in Section 9.1 which is more onerous than that in Section 9.2.

Our calculations thus indicate the proposed plant should be capable of achieving the criteria outlined in Section 9.2.

12.0 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 assess plant noise emissions to the nearest noise sensitive windows.

The assessment indicates that the proposed plant should be capable of achieving the proposed environmental noise criteria.

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.

L_p — Sound Pressure Level (SPL) 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).

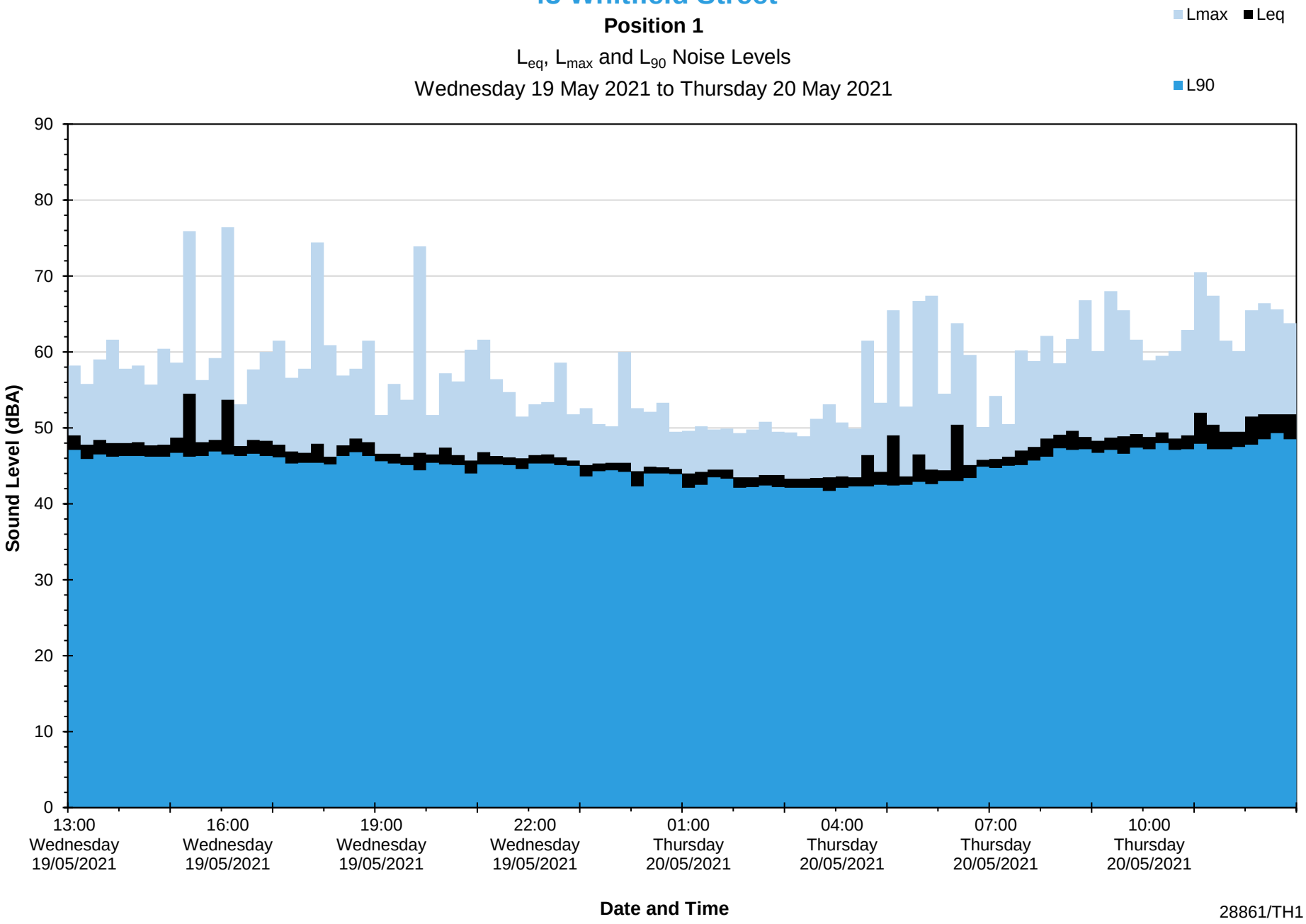
L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

43 Whitfield Street

Position 1

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

Wednesday 19 May 2021 to Thursday 20 May 2021



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