

MoJ Fleetbank House 28 Kirby Street London

Environmental Noise Survey and Plant Noise Assessment Report

28459/PNA1

14 May 2021

For:
Wates
1 Clearwater
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
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2	13/05/2021	-	Thomas Jebson Technical Assistant	Tom Bonnert Principal Consultant BEng(Hons), MIOA
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1.0 Introduction

It has been proposed to install new items of building services plant at 28 Kirby Street, London.

Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey and plant noise assessment for planning purposes.

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 up to one secure and accessible on-site positions, using fully computerised noise monitoring equipment.

Measurement procedures 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 set plant noise emission limits considering lowest background L_{90} sound pressure levels and Local Authority criteria.

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 with reference to the requirements of the Local Authority.

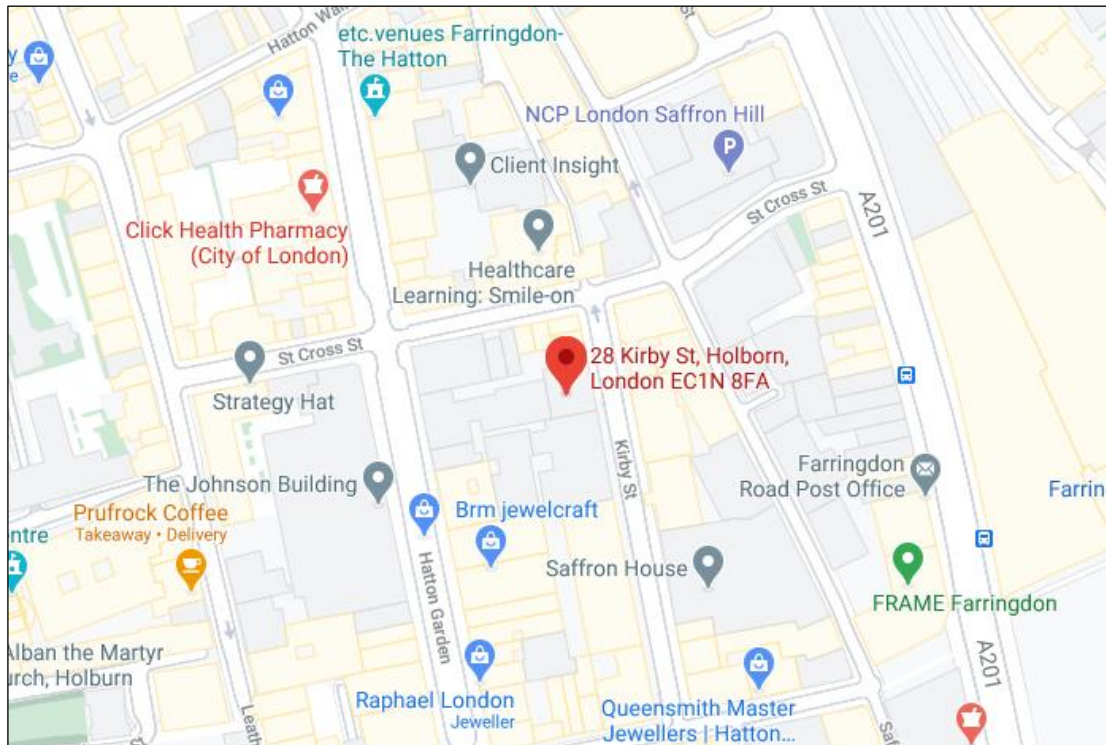


3.0 Site Description

3.1 Location

The site 28 Kirby Street is located in London.

The location is shown in the Location Map below.



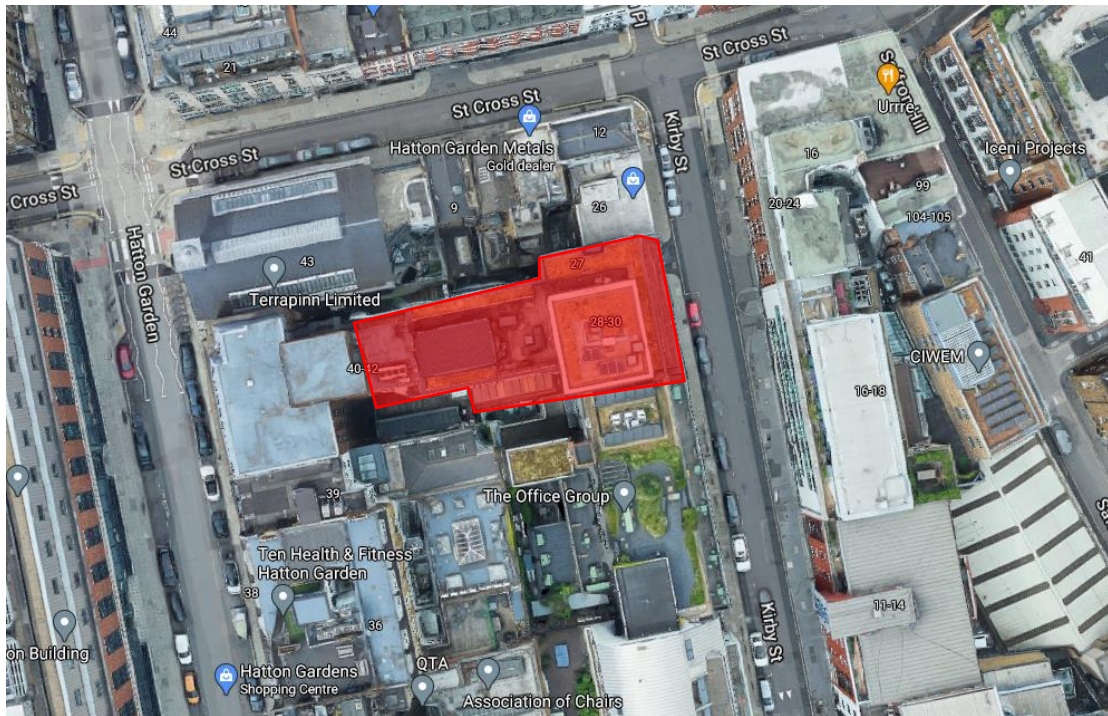
Location Map (Imagery © 2021 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2021 Google.)

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

3.2 Description

To the North of the site is St Cross Road, to the East of the site is Hatton Gardens, to the West of the site is Saffron Hill and to the South of the site is Greville Street. The site is a six storey building with a basement. Buildings surrounding the site are of a similar height and comprise offices, shops and residential flats. Dominant noise sources are traffic noise and items of plant from surrounding buildings.

The site is shown in the Site Plan below.



Site Plan (Imagery © 2021 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, 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 Acoustic Standards and Guidelines

5.1 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.

5.2 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.”

The NPPF document does not refer to any other documents or British Standards regarding noise other than the NPSE.

Paragraph 2 of the NPPF states that *“planning law required that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise.”*

Paragraph 12 of the NPPF states that *“The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed.”*

5.3 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

5.4 Local Authority Requirements

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

5.4.1 Noise Sensitive Developments

The LBC determines in Policy A4 of their Camden Local Plan (2017) that a noise sensitive development is that which, "...includes housing, schools and hospitals as well as offices, workshops and open spaces..."

5.4.2 Building Services Plant Noise Criteria

LBC's policy stated within the *Camden Local Plan (2017)* regarding criteria for atmospheric noise emissions from building service plant is as follows:

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 'Rating level' greater than 5dB above background and/or events exceeding 88dBL _{Amax}

5.5 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”.

5.6 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.



5.7 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

BS8233:2014 Section 7.7.2 titled “Internal ambient noise levels for dwellings” states:

“In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 - 23:00	23:00 - 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

5.8 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. The requirements of the LBC are noted to be more onerous than this, therefore through compliance with the planning requirements the risk of noise complaints would be considered low.

6.0 Survey Methodology

The survey was undertaken by Alastair Grieves MEng (Hons) AMIOA, AMIMechE

6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 11:30 hours on 11th February 2021. to 11:30 hours on 12th February 2021.

During the periods we were on site the wind conditions were moderate and from approximately a Easterly direction. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were suitable for obtaining representative measurement results.

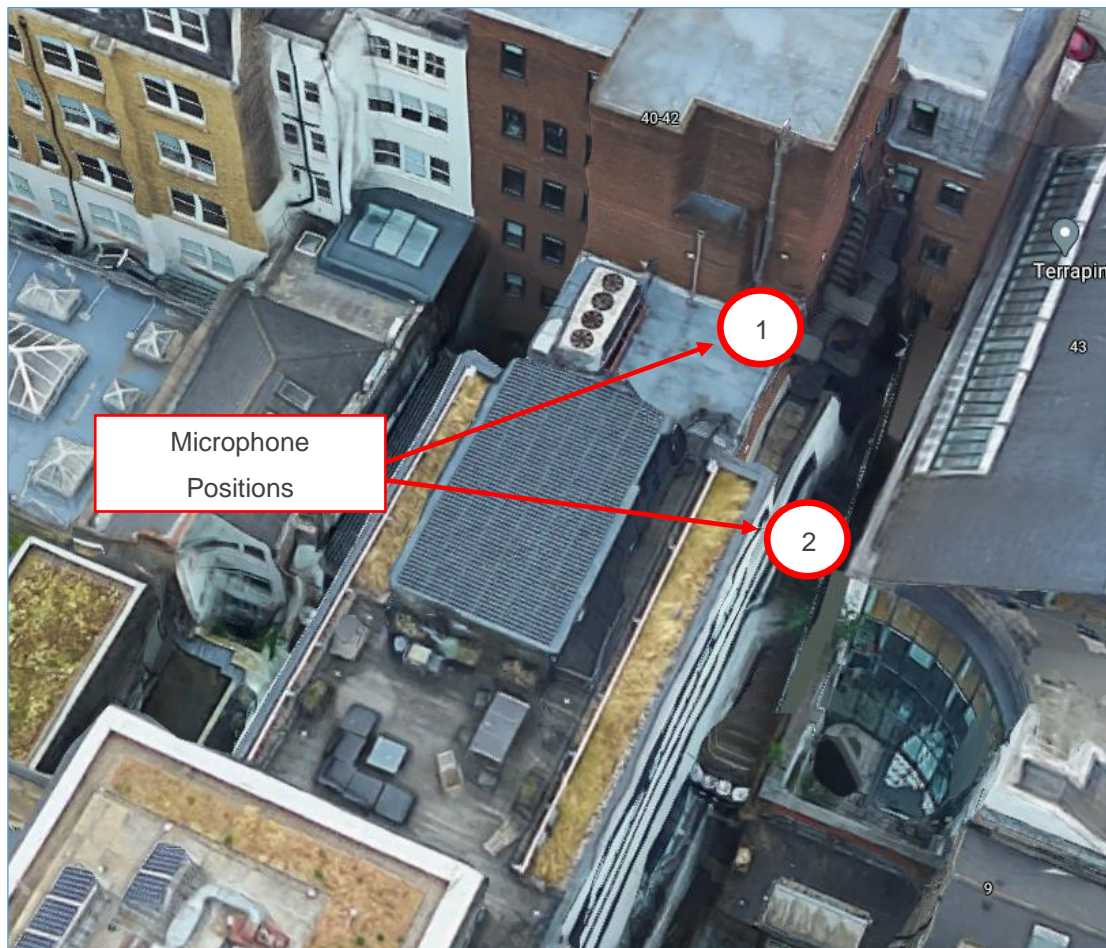


Measurements were taken continuously of the A-weighted (dBA) L_{90} , L_{eq} and L_{max} sound pressure levels over 15 minute periods.

6.2 Measurement Positions

The noise level measurements were undertaken at two positions as described in the table below.

Position No	Description
1	Microphone attached to pole 1.5m in height on the roof around 10m from the nearest noise sensitive receptor.
2	Microphone was attached to a pole 1.5m in height on the first floor decking area around 5m from the nearest noise sensitive receptor.



Plan Showing Measurement Positions (Imagery © 2016 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2016 Google.)



6.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	75073	Calibration on 19/07/2019
Preamp	Svantek	SV18	82324	Calibration on 19/07/2019
Type 1 Data Logging Sound Level Meter	Svantek	971	84050	Calibration on 19/07/2019

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	67983	Calibration on 19/07/2019
Preamp	Svantek	SV18	71464	Calibration on 19/07/2019
Type 1 Data Logging Sound Level Meter	Svantek	971	80233	Calibration on 19/07/2019

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 0.1dB).

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.

7.0 Results

The results have been plotted on Time History Graphs 28459/TH1 and 28459/TH2 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 external ambient $L_{Aeq,T}$ noise level measurements recorded during the survey are presented in the following table:



Position	Measured $L_{Aeq,T}$ Noise Level (dB re 2×10^{-5} Pa)	
	Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	55 dBA	51 dBA
2	55 dBA	48 dBA

The lowest L_{A90} (15 min) measurements recorded during the survey are presented in the table below:

Position	Lowest Measured $L_{A90(15min)}$ Background Noise Level (dB re 2×10^{-5} Pa)	
	Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	50 dBA	48 dBA
2	45 dBA	44 dBA

8.0 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 survey duration. During the periods we were on site the dominant noise sources were noted to be traffic along the surrounding road network combined with plant from surrounding buildings.

9.0 Plant Noise Emission Criteria

Building services plant external noise emission levels will need to comply with local planning/environmental authority requirements and statutory noise nuisance legislation. Based on the typical requirements of the LBC (see Section 5.4), the plant noise limits proposed for this development are summarised in the following sections.

On the basis of the above and the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the worst affected noise sensitive window. These limits are presented as free-field limits given that the baseline survey was conducted in free-field conditions.

Façade/ Position	Noise Emission Limit (dBA)	
	Daytime (07:00 – 23:00 hours)	Night-time (07:00 – 23:00 hours)
1	40	38
2	35	34



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.

10.0 Plant Noise Impact Assessment

We understand the proposed plant comprises the following 9No. units. We have been informed that a number of the proposed condensers can be operated on a low noise mode as a way of mitigating their noise output. Where this is the case, this has been sub-noted within the following table.

Plant Description / Reference	Location	Qty	Plant Make	Model Number
Condenser Unit - CUB/01	First floor plant deck	1	Daikin	REYQ16T ⁽¹⁾
Condenser Unit – CUB/02	First floor plant deck	1	Daikin	RZAG71NV1
Condenser Unit – CUB/03	First floor plant deck	1	Daikin	RZAG71NV1
Condenser Unit – CU0/01	First floor plant deck	1	Daikin	REYQ18T ⁽¹⁾
Condenser Unit – CU1/01	First floor plant deck	1	Daikin	REYQ22T (Multi) ⁽¹⁾
Condenser Unit – CU2/01	First floor plant deck	1	Daikin	REYQ20T ⁽¹⁾
Condenser Unit – CU2/02	First floor plant deck	1	Daikin	RZAG71NV1
Condenser Units – CU2/03	First floor plant deck	1	Daikin	RZAG71NV1
Condenser Unit – CU3/01	First floor plant deck	1	Daikin	REYQ20T ⁽¹⁾

⁽¹⁾ Low Noise Mode

We understand there are 2No. items of existing plant which are to be retained within the existing acoustic enclosure on the roof of the site. Given that these are existing items of plant being retained it is not considered necessary to assess these against the plant noise limits.

Plant Description / Reference	Location	Qty	Plant Make	Model Number
Condenser Unit – Remaining 1	Roof Plant Enclosure	1	Daikin	RXYQ8P9Q1B
Condenser Unit – Remaining 2	Roof Plant Enclosure	1	Daikin	RXYQ10P9Q1B



10.1 Plant Noise Data

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

Plant Description	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	
CUB/01 ⁽¹⁾	50	55	55	51	42	44	41	38	53
CUB/02	43	52	35	34	34	26	21	20	40
CUB/03	43	52	35	34	34	26	21	20	40
CU0/01 ⁽¹⁾	60	57	57	55	49	45	43	38	56
CU1/01 ⁽¹⁾	62	56	50	48	48	47	44	36	54
CU2/01 ⁽¹⁾	60	57	57	55	49	45	43	38	56
CU2/02	43	52	35	34	34	26	21	20	40
CU2/03	43	52	35	34	34	26	21	20	40
CU3/01 ⁽¹⁾	60	57	57	55	49	45	43	38	56

(1) Low Noise Mode

10.2 Location of Plant

It has been proposed to install the following 9No. units within an existing acoustic enclosure on the first floor southern plant deck. The worst affected noise sensitive receptor for these items of plant is a window to the west of the enclosure.

Plant Description	Model Number
CUB/02	RZAG71NV1
CUB/03	RZAG71NV1
CU0/01 ⁽¹⁾	REYQ18T
CU1/01 ⁽¹⁾	REYQ22T (Multi)
CU2/02	RZAG71NV1
CU2/03	RZAG71NV1
CUB/01 ⁽¹⁾	REYQ16T
CU2/01	REYQ20T
CU3/01	REYQ20T

(1) Low Noise Mode

10.3 Mitigation Measures

We have been in contact with the Local Authority and received a previous plant noise assessment (dated February 2011) for 28 Kirby Street which details the following acoustic insertion loss of the existing acoustic enclosures on the southern plant deck and roof of the property.



Octave Band Enclosure Insertion Loss							
63	125	250	500	1k	2k	4k	8k
5	6	8	11	18	25	20	16

10.4 Plant Noise Impact Assessment

We understand that the proposed units will be operational during between the hours 07:00-19:00.

It should be noted that the proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. In order to be robust, however, a +3dB feature correction as advised in BS 4142:2014 has been applied for the possible presence of “... characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment”

The following tables summarise our predictions of atmospheric noise emissions from the external building services plant to the relative worst affected noise sensitive windows.

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
CUB/02 – Sound Pressure Level at 1m.	43	52	35	34	34	26	21	20	39
Distance Correction (1m to 9.7m)	-20	-20	-20	-20	-20	-20	-20	-20	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	18	26	7	3	-4	-19	-19	-16	11
CUB/03 – Sound Pressure Level at 1m	43	52	35	34	34	26	21	20	39
Distance Correction (1m to 8.1m)	-18	-18	-18	-18	-18	-18	-18	-18	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	20	28	9	5	-2	-17	-17	-14	13
CU0/01 – Sound Pressure Level at 1m	60	57	57	55	49	45	43	38	56
Distance Correction (1m to 13.4m)	-23	-23	-23	-23	-23	-23	-23	-23	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	32	28	26	21	8	-3	0	-1	22



	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
CU1/01 – Sound Pressure Level at 1m	62	56	50	48	48	47	44	36	54
Quantity Correction	+3								
Distance Correction (1m to 11.4m)	-21	-21	-21	-21	-21	-21	-21	-21	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	39	32	24	19	12	4	6	2	22
CU2/02 – Sound Pressure Level at 1m	43	52	35	34	34	26	21	20	39
Distance Correction (1m to 11.4m)	-21	-21	-21	-21	-21	-21	-21	-21	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	17	25	6	2	-5	-20	-20	-17	10
CU2/03 – Sound Pressure Level at 1m	43	52	35	34	34	26	21	20	39
Distance Correction (1m to 6.8m)	-17	-17	-17	-17	-17	-17	-17	-17	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	21	29	10	6	-1	-16	-16	-13	14
CUB/01 – Sound Pressure Level at 1m.	50	55	55	51	42	44	41	38	53
Distance Correction (1m to 15m)	-24	-24	-24	-24	-24	-24	-24	-24	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	21	25	23	16	0	-5	-3	-2	18
CU2/01 – Sound Pressure Level at 1m	60	57	57	55	49	45	43	38	56
Distance Correction (1m to 15m)	-24	-24	-24	-24	-24	-24	-24	-24	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	31	27	25	20	7	-4	-1	-2	21
CU3/01 – Sound Pressure Level at 1m	60	57	57	55	49	45	43	38	56
Distance Correction (1m to 15m)	-24	-24	-24	-24	-24	-24	-24	-24	
Existing Enclosure Acoustic Insertion Loss	-5	-6	-8	-11	-18	-25	-20	-16	
Noise at 1m from Noise Sensitive Receptor Window	31	27	25	20	7	-4	-1	-2	21
Cumulative Noise at 1m from Noise Sensitive Receptor Window	41	37	32	27	16	6	9	6	28



11.0 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 advice.

Noise emissions from the proposed plant have been assessed, based upon data with which we are provided, and comment upon the acceptability.

Noise mitigation control measures have been reviewed with reference to the requirements of the Local Authority and on previous plant noise impact assessments.

Our calculations indicate that the proposed plant, in conjunction with the retained noise mitigation measures, should be capable of achieving the requirements of the Local Authority outlined in Section 9.0.

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).